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Prairie Dog Management Project

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Dakota Prairie Grasslands, Little Missouri National Grassland

Medora and McKenzie Ranger Districts

Billings, Golden Valley, Slope, and McKenzie Counties, North Dakota

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SUMMARY

The Dakota Prairie Grasslands (DPG) proposes to institute a Prairie Dog Management Plan that implements the DPG Land and Resource Management Plan (LRMP). The project area is located on the Little Missouri National Grassland (LMNG) and includes the Medora and McKenzie Ranger Districts, DPG, North Dakota. This action is needed because a consistently applied prairie dog management plan is needed to implement the LRMP and the good neighbor policy in a timely manner.

- The good neighbor policy refers to direction from former USDA Deputy Undersecretary David Tenny to work with state and county officials and local landowners to control prairie dogs in cases where there is unwanted cross boundary colonization.

The proposed action may create short-term effects to various sensitive species and, particularly, specific prairie dog colonies as the DPG begins to take pro-active management actions through Adaptive Management to inhibit existing and future unwanted prairie dog encroachments onto adjacent non-federal land ownerships. The DPG will maintain species viability, passively manage toward the desired condition of four prairie dog complexes, and passively management toward LRMP objectives of Management Area 3.63 (Black-footed Ferret Reintroduction Habitat).

The Forest Service evaluated the following four alternatives which include the proposed action:

- *Alternative 1: The No Action alternative where no action is taken to manage prairie dog colonies, regardless of encroachment status;*
- *Alternative 2: The Proposed Action. A rodenticide (zinc phosphide) would be used along with other management tools in the manipulation of the prairie dog ecosystem under the three cases outlined in the LRMP. Initial actions include management of approximately 66 colonies. Total acres of initial treatment is approximately 954 acres. After initial treatment, management of prairie dogs would be implemented using an adaptive management approach, controlling those colonies where encroachment is likely or occurring. Additional colonies may be added for control within the sideboards of the alternative using an adaptive approach detailed in this EA;*
- *Alternative 3: Control of prairie dogs without use of rodenticide. Approximately 66 colonies are proposed for various levels of treatment. Lethal trapping would be the predominant tool replacing the use of rodenticide. Total acres of initial treatment is approximately 954 acres. After initial treatment, management of prairie dogs would be implemented using an adaptive management approach, controlling those colonies where encroachment is likely or occurring. Additional colonies may be added for control within the sideboards of the alternative using an adaptive approach detailed in this EA;*
- *Alternative 4: A rodenticide (zinc phosphide) would be used along with other management tools in the manipulation of the prairie dog ecosystem under the three cases outlined in the LRMP. Approximately 103 colonies are proposed for various levels of treatment. Total acres of initial treatment is approximately 1,828 acres. After initial treatment, management of prairie dogs would be implemented using an adaptive management approach, controlling those colonies where encroachment is likely or occurring. Additional colonies may be added for control within the sideboards of the alternative using an adaptive approach detailed in this EA. For Alternative 4 the initial control zone extends to ¼ mile from adjacent ownerships where encroachment is unwanted.*

Based upon the effects of the alternatives, the responsible official will decide which alternative or mix of alternatives best meets the Purpose and Need.

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Chapter 1. Purpose and Need

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- Introduction: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- Environmental Consequences: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

1.1. Background

The Medora and McKenzie Ranger Districts, which comprise the Little Missouri National Grassland (LMNG) of the Dakota Prairie Grasslands (DPG), have developed a Proposed Action for the Prairie Dog Management Project. The Project Area encompasses the LMNG, which is approximately 1,033,271 acres in the counties of McKenzie, Billings, Golden Valley, and Slope.

The Forest Service is proposing to implement the DPG Land and Resources Management Plan (LRMP) prairie dog/animal damage management direction in order to begin a program of prairie dog management. An important piece of that management includes responding to unwanted encroachments onto non National Forest System (NFS) lands and to divert expansion of existing colonies away from non-NFS lands. The proposed action also calls for adaptive management so that a variety of tools can be used as needed to change management to meet LMRP goals.

The activity of the black-tailed prairie dog, while natural, can have impacts to agricultural production, land values, and some aspects of public health. Land ownership on the LMNG occurs in an intermingled pattern. This land ownership pattern results in situations where prairie dogs move between NFS lands and adjacent non-NFS lands, whether private, state, or federal. Many land owners are concerned about the encroachment of prairie dog colonies between Forest Service and private and state trust lands.

The 2002 DPG LRMP Record of Decision (ROD) recognizes the importance of the national grasslands in increasing prairie dog numbers, improving prairie dog viability, the importance of prairie dogs to black-footed ferret recovery (ROD, p.7) as well as other key species such as burrowing owl and ferruginous hawk (Northern Great Plains Management Plans Revisions Final Environmental Impact Statement (NGP FEIS), pp. 3-265 to 3-266). The ROD also recognizes that as a good neighbor, the DPG should control prairie dogs in cases where there is unwanted colonization (ROD p. 7).

On May 5, 2004, U.S. Department of Agriculture Deputy Under Secretary David Tenny directed the DPG to work with state and county officials and local landowners to aggressively implement the spirit and intent of the good neighbor policy identified in the ROD and to specifically work with local interests and landowners to use the full suite of management tools available to them to reduce the potential for prairie dog colonies to expand onto adjacent non-federal lands.

Being responsive to the dynamics of prairie dog expansion in an intermingled ownership pattern can be challenging, especially when faced with unwanted encroachments on a nearly annual basis. Several prior project decisions on both districts of the LMNG in 2004, 2007, and 2008, as well as a Section 18.1 review in 2014 allowed for prairie dog control at site-specific locations, using both lethal and non-lethal management activities. However some of these discreet actions have had short-term benefits and have not addressed long-term program requirements for managing unwanted colony encroachment onto private lands. Therefore, there is a need to address prairie dog management on a broader scale using an adaptive approach.

Managing unwanted encroachments may be accomplished using a variety of methods, including land exchange, land purchase, conservation easement, or cooperative poisoning. Discouraging future encroachments may be done by using an array of non-lethal methods including visual barriers, managing for high structure vegetation (limiting livestock grazing), and increasing predator effectiveness. Consideration of all these tools, applied in consideration of specific management situations, can be effectively addressed using an adaptive management approach.

1.2. Existing Condition

Prairie dogs are surveyed on the LMNG on an every third year basis. According to the most recent 2015 survey information, there are approximately 137 known prairie dog colonies on the LMNG occupying approximately 5,500 acres (or 0.5% of the LMNG) of the 1.033 million acres on the LMNG.

About 66 of the colonies, or portions of 66 colonies, (covering approximately 954 acres) may be encroaching on non-NFS lands. An additional 37 colonies are within a ¼ mile of non-NFS land and possibly could encroach in the future. Whether or not any of these would be controlled depends on the site-specific situation and whether or not the adjacent land owner will also engage in control of prairie dogs on their own lands. The number of colonies potentially encroaching on adjacent lands is only a snapshot in time and will likely change over time.

Overall the LMNG contains about 454,000 acres of suitable prairie dog habitat (soils, slope, vegetation, and hydrology), meaning that approximately 44% of the LMNG is capable of supporting prairie dogs. Proportionately by ranger district this breaks down to approximately 256,000 acres for the Medora Ranger District (56%) (Black-tailed Prairie Dog Conservation Assessment and Strategy, Medora Ranger District. Svingen 2006, page 8) and 198,000 acres (44%) for the McKenzie Ranger District (Black-Tailed Prairie Dog Conservation Assessment and Strategy, McKenzie Ranger District. Svingen 2006, page 7). Therefore the current amount of suitable prairie dog habitat that is occupied is about 1.2% of the habitat available on the LMNG.

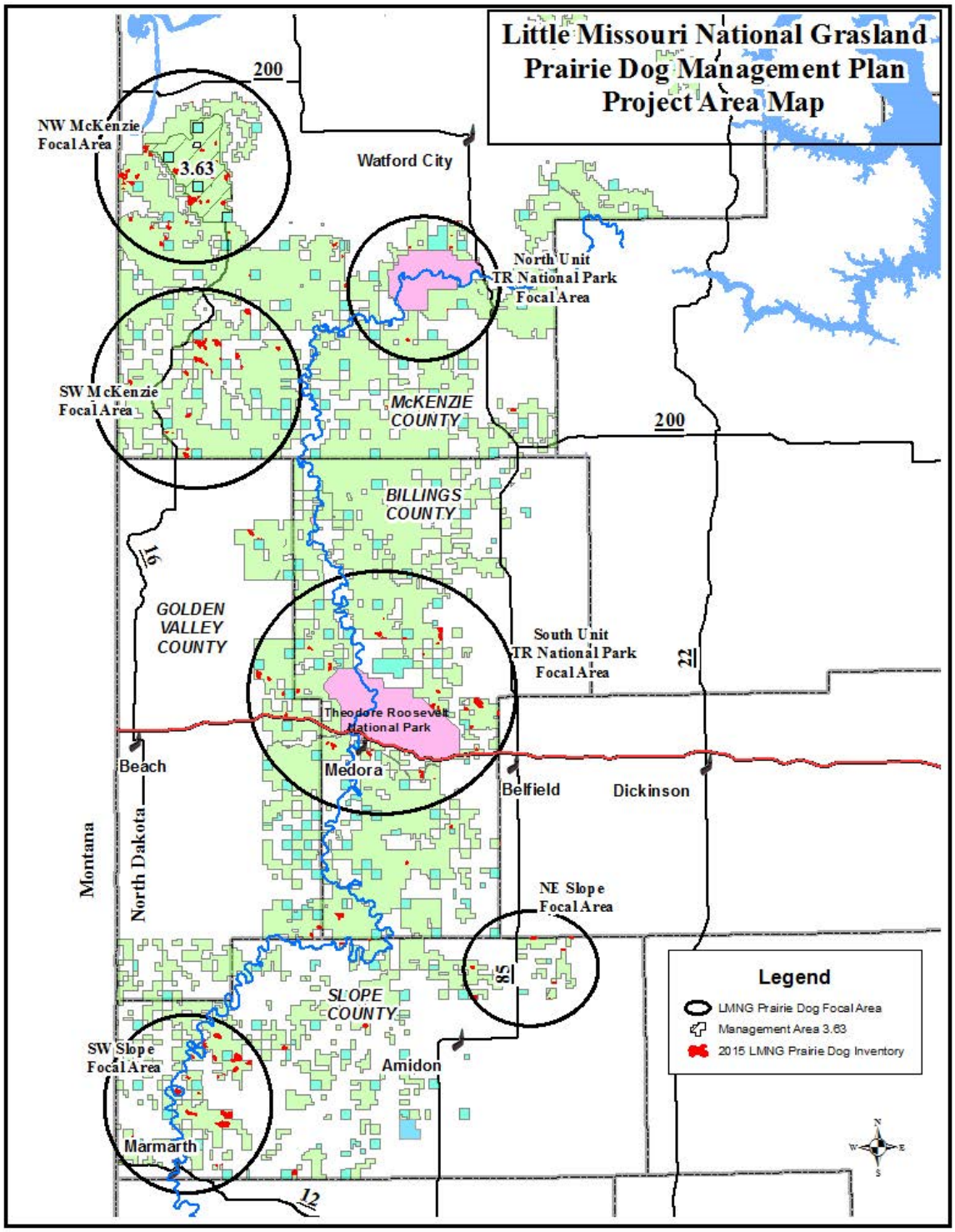

Figure 1. Project Area Map.

1.3. Desired Condition

The 2001 NGP FEIS estimated that implementation of the selected alternative ("Final 3") would result in 5,400 to 9,400 acres of active prairie dog colonies on the LMNG within the life of the DPG LRMP (NGP FEIS, p. H-98). These numbers are estimates only and not goals, either maximum or minimum. They were used to analyze likely effects of the presence of prairie dog colonies.

The LRMP relies on the development of four prairie dog complexes to achieve plan goals and for conservation of associated species (LRMP Chapter 2, various pages). A complex is defined as an area having at least ten prairie dog colonies, a minimum of 1,000 acres, and a nearest-neighboring colony distance of no more than six miles. The DPG LRMP identifies three sites to establish and expand prairie dog complexes:

- Indian and Boyce Creeks of the Medora Ranger District (p. 2-15);
- Vicinity of Theodore Roosevelt National Park – South Unit - on the Medora Ranger District (p. 2-22);
- Horse Creek drainage of the McKenzie Ranger District, which is located within MA 3.63 (p. 2-22).

A fourth complex was not specifically identified in the LRMP.

Lastly, the Desired Condition would be to balance the requirements of the LRMP with USDA direction of following the spirit and intent of the good neighbor policy as it pertains to minimizing encroachment from NFS lands to lands of other ownerships. Cross boundary encroachment may be acceptable to some adjacent landowners such as the National Park Service.

1.4. Purpose and Need for Action

The primary purpose of this project is to implement the LRMP as well as direction that can be found in many federal laws concerning the Forest Service's commitment to wildlife and species diversity. The purpose and need statement has been refined since scoping to more accurately describe project goals and objectives. The needs for this project include:

1. There is a need to be responsive to public concern for encroachment of prairie dogs on to non-NFS lands and comply with the good neighbor policy.
    - Public concern focuses on public health, agricultural production, land values, and facilities on private and other non-NFS lands.
2. There is a need to meet or move towards the LRMP guidance to achieve two or more prairie dog complexes in both the Rolling Prairie and Badlands Geographic Areas on NFS lands to provide habitat for prairie dogs and associated species.
3. There is a need to take steps to prevent future unwanted prairie dog encroachments onto non-NFS lands.

1.5. Project Scope

The geographic scope for the project is the LMNG portion of the DPG, which includes the Medora and McKenzie Ranger Districts.

1.6. Relationship to the Grasslands Land and Resources Management Plan (LRMP)

The 2002 DPG LRMP provides direction regarding the prairie dog, listed as both a Forest Service-designated sensitive species and a management indicator species (MIS), has also been informed and clarified in two district-level conservation assessments in 2006. In 2016, LRMP monitoring was changed to meet the 2012 planning rule to include focal species. The prairie dog is also a focal species in the new LRMP monitoring plan (DPG 2016).

Consistent with the LRMP, the DPG follows guidelines to increase overall prairie dog populations by allowing for expanding prairie dog colonies, where appropriate, on NFS lands. Special emphasis to increase acres of occupied colonies will be made in MA 3.63 on the McKenzie Ranger District. Survey data indicates prairie dog populations have increased over time, moving towards the LRMP's desired condition (see Table 1 below). Actual prairie dog population numbers are quite variable within colonies (Milne 2004). Attempting to assign a number of individuals to a colony would likely be so inaccurate as to not be useful; therefore prairie dog population goals tend to be quantified using occupied acreage rather than using numbers of individuals.

Past control measures utilized to manage encroachment of colonies have had various levels of success in addressing the good neighbor policy. However, these efforts have not appreciably reduced the total species presence on NFS lands (McCain and Associates 2008, Carlson McCain 2013, Carlson McCain 2015), which indicates they have not interfered with desired expansion in other areas as described in the LRMP. The LRMP desired condition is described in section in 1.3 above. The NGP FEIS estimated that meeting LRMP objectives for prairie dogs would result in between 5,400 and 9,400 acres of occupied prairie dog colonies.

Table 1: Acres of Occupied Prairie Dog Habitat on the LMNG – 1997-2015

YEAR	1997	2002	2005	2008	2012	2015
Colony Acreage	2,763	3,842	4,793	6,928	5,200	5,559

Grassland-wide Direction: For this project, all grassland-wide standards and guidelines will be followed. Proposed activities would occur in most management areas (MAs), especially occurring in MA-6.1, Rangelands with Broad Resource Emphasis, and MA -3.65, Rangelands with Diverse Natural-appearing Landscape. Standards and guidelines pertinent to this project from the Grassland-wide portion of the DPG LRMP include the following direction:

1. Coordinate with state and federal wildlife agencies regarding black-footed ferret reintroduction as soon as prairie dog complexes reach sufficient size. **Standard** (LRMP page 1-15)
2. Restrict prairie dog shooting where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansion. Restrictions shall be year-long or seasonal, and dates of seasonal restrictions shall vary depending on the species at risk. Coordinate and consult with the appropriate wildlife agencies prior to implementation of restrictions. **Guideline** (LRMP page 1-16)

3. Use livestock grazing and prescribed fire to enhance habitat suitability for prairie dogs where prairie dog expansion is desired. These areas are identified at the project level. **Guideline** (LRMP page 1-16)
4. Manage for low vegetative structure in areas where prairie dog expansion is desired. Emphasize areas adjacent to existing prairie dog colonies as well as at abandoned colony sites. **Guideline** (LRMP page 1-16).
5. Manage for high vegetative structure around prairie dog towns where prairie dog expansion is not desired. Emphasize maintaining high structure between existing prairie dog colonies and private land. **Guideline** (LRMP page 1-16)
6. Require mitigation measures to protect the national grassland resources when animal damage control activities are conducted by other governmental entities. Emphasize public safety; threatened, endangered, and sensitive species conservation; water quality protection, or other resource values. **Standard** (LRMP page 1-18)
7. Limit the use of rodenticides (grain baits) for reducing prairie dog populations to the following situations:
    - Public health and safety risks occur in the immediate area.
    - Damage to private and public infrastructure or facilities, such as cemeteries and residences.
    - To respond to unwanted prairie dog colonization on land adjoining the national grasslands when consistent with state-wide prairie dog conservation strategies. **Standard** (text, as modified; striking *"U.S. Fish and Wildlife Service"* from the direction, see p. 50, NGP FEIS Addendum). (LRMP page 1-18)
8. Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program. **Guideline** (LRMP page 1-18)
9. Restrict the use of rodenticides (above-ground grain baits) for reducing prairie dog populations outside the period October 1 to December 31 to reduce risks to migratory birds. **Guideline** (LRMP page 1-19)
10. Do not use burrow fumigants in prairie dog colonies. **Standard** (LRMP page 1-19)
11. Badlands Geographic Area **Objective**: For black-tailed prairie dog, establish two or more prairie dog colony complexes within 10 to 15 years. A colony complex is 10 or more colonies with a total combined acreage of at least 1,000 acres. Individual complexes may extend across the adjoining Rolling Prairie geographic area. (LRMP page 2-14)
12. Rolling Prairie Geographic Area **Objective**: For black-tailed prairie dog, establish two or more prairie dog colony complexes within 10 to 15 years. Individual complexes may extend into Theodore Roosevelt National Park or Badlands Geographic Area. (LRMP page 2-22)

Note that North Dakota state law considers prairie dogs to be pests and does not classify them with other wildlife species for management (North Dakota Century Code Chapter 4.1-33; 4.1-34 #23). With respect to 7 above, third bullet, there is no statewide management plan for prairie dogs.

In addition to direction found in the LRMP, additional discussion of prairie dog management is located in the 2002 Record of Decision (ROD) for the DPG LRMP (LRMP 2002 ROD page 12). This discussion is included below and highlights the challenges and controversy surrounding prairie dogs on the DPG.

> ***"Managing prairie dogs***
>
> *Prairie dog management continues to be a contentious issue. FEIS Alternative 3 Final allows use of rodenticides for reducing prairie dog populations under three conditions:*
>
> *1. Where there is a threat to public health and safety.*

2. *Where prairie dogs are causing damage to private and public facilities such as cemeteries and residences.*
3. *Where there is unwanted prairie dog colonization occurring on lands adjacent to the national grasslands and reduction is consistent with a U.S. Fish and Wildlife Service approved, state-wide prairie dog conservation strategy.*

With regard to number 3 above, the USFWS has indicated they no longer intend to approve state level conservation strategies. Given this change, I have decided to strike the words "U.S. Fish and Wildlife Service" from number 3 above (Revised Grasslands Plan, p 1-18). The USFWS has been consulted on this change and has concurred that this change does not alter its "no jeopardy" biological opinion for the black-footed ferret. This means I will consider the use of rodenticides where there is unwanted colonization on a case-by-case basis. It must be consistent with the statewide prairie dog conservation strategy and will not be implemented until the Forest Service's nationwide policy on black-tailed prairie dog poisoning is revised. Under this direction, site-specific environmental analysis and coordination with the U.S. Fish and Wildlife Service would be required before the use of any rodenticide. I will review this prairie dog management policy three years after signing this ROD. The current national policy allows use of rodenticides as stipulated in the first two instances noted above.

As a good neighbor, I feel prairie dogs should be controlled in some cases. I also recognize the importance of the national grasslands in increasing prairie dog numbers and improving prairie dog viability. I also recognize their importance to black-footed ferret recovery and am committed to the program."

When the DPG ROD was signed in 2002, a nation-wide moratorium on poisoning prairie dogs on NFS lands was in place (July 26, 2000 Furnish letter, located in the project file). This moratorium was rescinded in 2004 (February 4, 2004 Thomas letter, located in the project file). This accomplished the commitment in the LRMP 2002 ROD to review the FS prairie dog monitoring policy by 2005.

1.7. Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the alternatives, the environmental consequences, and public comments on the analysis in order to make the following decisions:

- Whether to implement measures to control prairie dogs, and, if so, in which categories and to what extent;
- Whether to use rodenticides as a part of an integrated management strategy for prairie dogs, and, if so, to what extent;
- Whether to use an adaptive management strategy to manage new and existing unwanted prairie dog colonies as they become established and/or problematic (unwanted encroachment on to private property; threat to infrastructure and/or human health) in the future;
- What, if any, specific design criteria or mitigation measures are needed;
- What specific project monitoring requirements are needed to assure design features are implemented and effective, and to evaluate whether the project met objectives?

Chapter 2. Alternatives, including the Proposed Action

This chapter describes the issue and alternative development process, including how public comments helped formulate the alternatives, the issues identified, and the descriptions of alternatives. In this analysis, four alternatives, including the no action alternative, are carried forward and analyzed in detail in Chapter 3 by resource. Tables 2 and 3 display an alternative comparison of proposed activities, project objectives, and key issues, providing a clear comparison for the decision maker and the public (40 CFR 1502.14). Chapter 2 also includes project design features which would help protect resources under the alternatives studied in detail.

2.1. Public Involvement

Scoping for the proposal began with a letter to potentially interested members of the public, other agencies, and organizations sent September 3, 2015. The proposal was listed in the Schedule of Proposed Actions on October 1, 2015. The proposal was provided to the public and other agencies for comment during scoping from September 3 through October 5, 2015. In addition, as part of the public involvement process, the agency placed a legal ad in the Bismarck Tribune on September 5, 2015 and display ads in both the Dickinson Press (September 5, 2015) and the McKenzie County Farmer (September 9, 2015) in an effort to reach interested parties.

Using the comments from the public, other agencies, local governments, grazing associations, non-governmental organizations (NGO's), and tribal government representatives of the Standing Rock Sioux Tribe, Three Affiliated Tribes, Turtle Mountain Band of Chippewa, and Lower Brule Sioux (see Issues section), the interdisciplinary team developed a list of issues to address.

Forty-six individual comment letters were received during scoping from a broad array of interested parties. Comments received ranged widely from complete control of prairie dogs to complete recovery of prairie dogs and associated species. More detail on scoping comments received is found below.

2.2. Issue Identification

The comments received during scoping for the LMNG Prairie Dog Control Project included:

- Concerns that prairie dog control measures will not be aggressive or effective enough to address concerns for human health risk or to protect infrastructure; that control measures should be implemented annually over multiple years until the target colony is eliminated; that control should occur further than 600 feet or even ¼ mile from private property; questions about the effectiveness of vegetative barriers to discourage unwanted colonization on private property;
- Concern that control of prairie dogs should not be contemplated until LRMP goals for increase of the species is reached; concerns that the Forest Service (FS) should more aggressively increase prairie dog numbers and colonies managing for larger complexes up to 10,000 acres; that killing prairie dogs should not occur in areas where there is no conflict; that recovery of prairie dogs is needed to recover other wildlife species found in those ecosystems including golden eagles and burrowing owls; FS should construct artificial burrows to assist dispersal of prairie dogs;
- The project should be designed to recover black-footed ferret, should reintroduce black-footed ferret, or should use black-footed ferret as a biological control for prairie dogs; alternately, comments were received stating that black-footed ferret reintroduction and habitat should only occur in Theodore Roosevelt National Park;

- The FS should use measures to control plague including insecticidal dust or oral vaccines to protect colonies;
- The FS should establish a prairie dog working group including local and national stakeholders;
- Grazing permittees should be compensated for loss of forage if prairie dog colonies expand;
- Concern about injury to domestic animals (e.g. livestock and horses) because of the presence of prairie dog dens;
- Concern about the use of poisons including rodenticides and anticoagulants due to potential effects to non-target species and pain and suffering to prairie dogs;
- Concern that timing measures used to reduce non-target species poisoning may not be effective due to climate change;
- Concerns about plans to relocate prairie dogs; that these plans should be communicated with partners or concerned individuals;
- Concerns about the dangers of shooting of prairie dogs in colonies close to private residences.

Issues were divided into the following five categories:

- Issues that are considered beyond the scope of this project;
- Issue is already addressed by LRMP standards and guidelines;
- Issue can be addressed by adopting design features to the proposed action and alternatives;
- Effect of the issue will be measured through comparison of alternatives in the effects analysis;
- Issue is best addressed through the development of alternatives to the proposed action.

The comments received that were determined to be best addressed by developing alternatives to the Proposed Action are considered "key" issues and are described below. The alternatives to the Proposed Action, including those dropped from detailed study, are described in this chapter. Other issues mentioned above but not found to be "key" issues are addressed in effects analysis or described in one of the other categories. The issue disposition document, located in the public involvement and collaboration section of the project file, shows how the scoping comments were considered and categorized.

2.3. Issues

External and internal comments revealed key issues that drove the development of alternatives, some of which did not receive detailed study. Those issues include:

Issue 1: The FS should consider the use of non-lethal management tools.
In the scoping document, the Proposed Action permits the use of lethal means, particularly in unwanted encroachment situations. This elicited several comments objecting to the use of lethal control tools. These commenters argued that the Purpose and Need could be met without the use of killing prairie dogs. Non-lethal tools are considered more humane than and as effective as the use of lethal tools by commenters.

Issue 2: Use of rodenticides and other poisons as control measures may negatively affect non-target wildlife and domestic animals.
In the scoping document, the Proposed Action permits the use of a USFS approved rodenticide, particularly in unwanted encroachment. This elicited several comments objecting to the use of poisons as a management tool. These commenters argued that the Prairie Dog Project Purpose and Need could be met without the use of rodenticide. They also argued that secondary effects to non-target species, in addition to presenting a hazard, can be significant.

Issue 3: The proposed action, which only controls prairie dogs presently encroaching or likely to encroach may not be effective at reducing encroachment on to private lands especially during drought years. Interpretation of the distance for control adjacent to private lands has historically been determined to be 600 feet for initial control. A vegetation barrier is

then created 300 feet from the non-NFS boundary. Colonies have been allowed to return up to the vegetation barrier. Concern has been expressed that this control buffer is not enough to prevent unwanted, rapid encroachment.

Issue 4: **Prairie dogs should be controlled regardless of whether or not they are encroaching on private lands.** A portion of responses and interactions with members of the public indicate that some individuals and groups do not accept prairie dogs as an integral part of the prairie ecosystem and feel that their activity on NFS lands causes economic harm to grazing permittees. These commenters would prefer prairie dogs to be eliminated from the DPG.

2.4. Alternatives

The range of alternatives presented in this chapter was determined by evaluating public and internal comments, environmental issues, and the purpose and need for the project. Other influences include LRMP goals, objectives, desired conditions, standards, and guidelines; Federal laws, regulations, and policies; and economic viability. Within these parameters the alternatives display a range of reasonable and feasible outputs, treatments, costs, management requirements, design features, and effects on resources.

In addition to the alternatives considered in detail, two other alternatives were examined during the analysis process. Although these alternatives contributed to the reasonable range, they were eliminated from further consideration for the reasons listed below.

Alternatives Considered but Eliminated from Detailed Study

Use of non-lethal control methods only (Issue 1): This alternative includes only control methods that do not intentionally kill prairie dogs, whereas Alternative 3, the no poison alternative, would still allow prairie dogs to be killed using methods other than poisons, and including measures such as trapping. The non-lethal control methods available would consist of live trapping and transporting or relocating prairie dogs to other areas; use of vegetative screening to discourage expansion where it is not wanted; and modifications to livestock grazing. Non-lethal control methods may also be used along with any other alternative.

This alternative would not be feasible because of several factors. First, translocation of prairie dogs does not appear to be necessary to recovery of the species on the DPG as evidenced by the increase in occupied area of prairie dog colonies using only passive management (see 2015 Prairie Dog Monitoring Report). Secondly, the LMNG has an intermingled land ownership pattern which causes a large proportion of the grassland to be in close proximity to private lands where, generally, prairie dogs are not wanted. This limits suitable relocation sites to a large extent. In addition, translocation is expensive and is likely to have limited success (Fischer, J., and D. B. Lindenmayer 2000). Live trapping and relocating under this scenario would likely result in high mortality rates due to predation though can be made more effective if coteries (family groups) are captured and released together (Shier 2006). While translocation has limitations if used as the sole method of control for prairie dogs on the DPG, it is one of the tools that may be used under adaptive management with any of the action alternatives.

Continuation of Current Management: Under this Alternative, prairie dog management would continue to occur as it has been since the signing of the current LRMP (2002). Site specific NEPA analysis to address the good neighbor policy would occur sporadically and would be dependent on funding and overall priority ranking with other projects on the DPG. In effect, specific colonies, or portions thereof, are targeted for site-specific NEPA to act upon good neighbor policy direction. Because this alternative is reactive rather than proactive, in other words a colony has to become a concern prior to NEPA being completed, there is a lag time between development of the issue and management response. This lag time includes not only the time to complete necessary analysis and decision making, but also the time to receive funding to complete the NEPA and funding to accomplish the control work.

LRMP direction does currently exists to actively manage prairie dog habitat, particularly in Management Area (MA) 3.63, Black-footed Ferret Reintroduction Habitat where the desired condition is for increased prairie dog presence from the current condition. However, management toward LRMP objectives, such as the development of four prairie dog complexes and increasing prairie dog populations would continue to be passive with this alternative.

Therefore, under this alternative:

- When authorized via site-specific NEPA analysis and decision, active prairie dog management would be focused on control of specific unwanted encroachments to address the good neighbor policy. Lethal and non-lethal tools would continue to be used. Control actions would likely entail a large amount of colony acres every few years;
- Follow-up management to ensure adequate achievement of objectives would occur as approved under each decision;
- There would continue to be passive expansion of prairie dog colonies within MA 3.63. Passive approaches may or may not result in development of four prairie dog complexes across the LMNG.
- Response time to developing encroachment would be slower than with the proposed action due to the need for additional analysis, public involvement, and funding prior to taking action on each colony as conditions change and evolve. For this reason, continuation of current management is not analyzed in detail.

Elimination of all Prairie Dog Towns (Issue 4): As described above in Issue 4, some individuals and groups commented that all prairie dogs should be eliminated on the LMNG. This approach would not meet the LRMP, various federal laws (e.g. National Forest Management Act) or the project purpose and need, and would potentially cause the black-tailed prairie dog, currently a Regional Forester listed sensitive species, to trend toward federal listing under the Endangered Species Act.

Alternatives Considered in Detail

Alternative 1 – No Action

The NEPA and National Forest Management Act (NFMA) require the No Action Alternative to be analyzed to assess baseline environmental impacts. For this project, the no action alternative includes no active management or control of prairie dogs. Neither lethal nor non-lethal control measures would be used to manage prairie dog colonies, including wanted or unwanted colonies. Active measures that encourage expansion of prairie dog colonies would also not take place. This alternative would not respond to the good neighbor policy with respect to controlling prairie dogs encroaching onto adjacent private lands. This alternative serves as a baseline against which the action alternatives can be compared. For this alternative:

- Prairie dog management would be totally passive in nature and scope;
- All colonies currently encroaching onto adjacent non-NFS lands would likely continue to encroach;
- Contraction or expansion of the colonies would depend on climate, grazing patterns and intensities, and amount of prairie dog shooting, predation, and/or disease present. Therefore, three LMNG prairie dog complexes may or may not retain their minimum 1,000 acres of habitat. The Southwest McKenzie County focal area may or may not slowly move toward the colony complex objective of 1,000 acres.

Alternative 2 – Proposed Action

The proposed action includes implementation of the Good Neighbor Policy starting with identified encroaching prairie dog colonies (see table and maps of specific colonies in Appendix A), and additional

control areas using an adaptive management approach. This alternative utilizes an integrated approach to prairie dog management including lethal and non-lethal methods.

Under this alternative the following application of the three Category management zones shall be used to determine management actions and strategies:

Category 1: This category includes interior colonies entirely on NFS lands and more than ¼ mile from non-NFS land boundaries. In this category, prairie dogs will typically only be monitored, allowing for passive management. Under an adaptive context, management actions may be warranted to increase the number of colony acres in some cases and decrease the colony acres in other contexts (i.e. damage to public or private infrastructure or facilities (oil, gas, and water pipelines; fiber optic, telephone, and electric lines) and public health and safety). If, for example, monitoring indicates that the acreage goals or objectives established in the LRMP have not been met, then some activities such as heavy grazing, mowing, or prescribed fire could be implemented to encourage expansion of targeted colonies to encourage meeting the acreage goals. The LRMP limits the use of rodenticide to unwanted encroachment, public health and safety, and damage to/protection of private or public infrastructure (LRMP page 1-18). Control activities for a colony in Category 1 would be uncommon. However, non-lethal tools would still be available to reduce the threat.

Category 2: The second category includes all colonies within ¼ mile of non-NFS lands that are not currently encroaching. Proactive monitoring and coordination with potentially affected stakeholders (e.g. Grazing Association members, adjacent land owners, North Dakota Game and Fish, Fish Wildlife Service) would be used to determine the eventual risk of unwanted colony encroachment from areas within ¼ mile from non-NFS lands and within the good neighbor policy area. Depending on the risk context of a specific colony (does it contribute to population goals, are artificial or natural barriers present, etc.) an array of non-lethal and/or lethal management tools would be employed to neutralize expansion towards non-NFS lands while minimizing colony acreage loss. Non-lethal tools may include: using visual barriers (e.g. fences), managing for high structure vegetation through fenced or non-fenced means, transplanting, increasing predator effectiveness through raptor perches and screening, prescribed fire, and prescribed grazing. The actual methods employed would be site and goal specific as determined by an interdisciplinary team. If the initial actions taken appear to be unsuccessful in preventing the colony from moving toward the non-NFS land, through adaptive management principles, other tools would be used, including rodenticide. Monitoring would help inform how to proceed in the case of the initial action's failure. Lessons learned through monitoring will guide actions in other control areas.

Category 3: The third category includes colonies presently encroaching or likely to encroach (considering ¼ mile distance or less) on non-NFS lands as well as colonies damaging infrastructure or posing a potential health/safety risk. Zinc phosphide (a rodenticide) would be the predominant method used and the only rodenticide approved for above ground use on the DPG. Initial actions in this category would include meeting with the adjacent stakeholder to discuss extent and nature of encroachment or potential encroachment, possible health or safety risks, and reach an agreement for management of the specific situation. For control on NFS lands to proceed, the land owner would need to complete control on adjacent private lands concurrently with the control on NFS lands. Retreatment with rodenticide would likely be necessary to obtain overall control of any given site. Further, given the intermingled ownership patterns and the dynamics of prairie dog colony expansion and contraction, control measures may need to occur on a regular basis to be effective. Total acres of rodenticide used would be expected to decrease after the initial control effort.

Note control of encroaching colonies under Alternative 2, given the objective of reducing or eliminating encroachment from National Forest System (NFS) to non-NFS lands, has typically involved poisoning out 600 feet from the boundary on the NFS side followed by creating a vegetation barrier around 300 feet from the property boundary and allowing colonization to return up to the vegetation barrier. This method discourages colony expansion because prairie dogs tend to expand toward low structure vegetation (short

grass) and away from high structure vegetation (tall grass). The specific location for the vegetation barrier is best determined specific to each colony to account for soil, terrain, or other site-specific factors. The zone between the vegetation barrier and the non-NFS property boundary would receive continued control as needed.

Control of prairie dogs in response to damage to infrastructure will be considered on a case by case basis. Buffer zones of control, such as those adjacent to non-NFS lands, will not be created around infrastructure in Category 1 and 2 areas. Historically on the DPG prairie dogs have caused little damage to infrastructure such as stock dams, oil and gas infrastructure, and power and phone infrastructure. Therefore this component of the control program is expected to amount to a minor amount of treatment. An interdisciplinary team will assess individual situations and apply the adaptive management toolbox as needed. Earthen stock dams may be replaced with stock tanks and flexible water lines may be exchanged for pipes for example in order to minimize impacts to interior prairie dog colonies.

Comments were received during scoping as well as during interactions with local public indicating that certain colonies were causing a safety hazard to local residences due to public shooting from roads into dog towns with residences located behind. Most, if not all, of these colonies are within the zone of control included in the proposed action. In addition, current laws prevent shooting near homes and structures. Shooting closures may also be applied to areas where prairie dog shooting presents a hazard. It should be recognized that enforcement of shooting closures will be challenging given the large area under consideration and the amount of enforcement personnel available. Each colony at issue will be addressed using the adaptive management tool box appropriate for that situation.

Application of rodenticide would be completed in compliance with the LRMP and other federal and state guidelines and label restrictions. One LRMP guideline will be modified in order to improve effectiveness of rodenticide application. The guideline in the LRMP is as follows:

> *Rodenticide will only be applied from October 1 to December 31 to reduce risk of impacts to migratory birds in accordance with the LRMP guideline.*

Alternative 2 would extend the timing of rodenticide application to September 15 to January 31. This extension would allow rodenticide control of prairie dogs to occur both during drought conditions should they occur in fall, and during open winters when snowfall does not preclude rodenticide application. Effectiveness of control would be improved by taking advantage of seasonal conditions during which prairie dogs would be seeking food and thus likely to consume bait, while still avoiding application the remainder of the year to minimize impacts to migratory birds. Zinc phosphide product labels allow for application from July through January.

This extension is proposed for the first three years of the project and will only extend beyond those three years (2021) if monitoring of rodenticide application shows minimal effects to migratory birds.

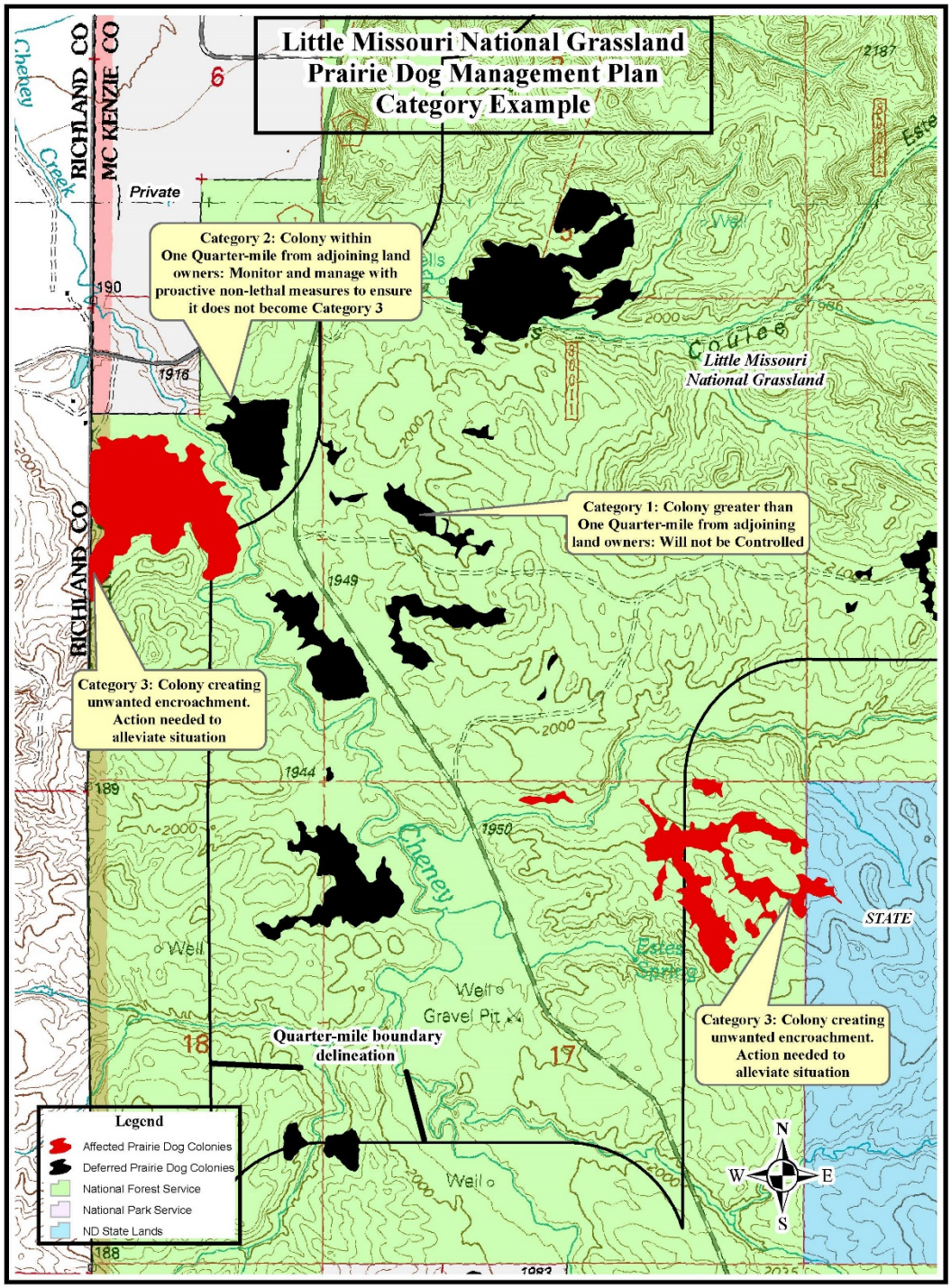

Figure 2: Figure illustrating the three categories of the Proposed Action.

This Alternative includes allowing for prairie dog colony expansion in Category 2 where there is not a threat to infrastructure or human health and safety. The LRMP objectives include four prairie dog complexes (which would include MA 3.63) in two Geographic Areas. This alternative may include more active management actions as compared to the no action alternative to help facilitate the establishment of a fourth prairie dog complex in southwest McKenzie County and consideration given to some management actions to help accelerate an increase in the prairie dog habitat acreage within MA 3.63. Refer to the tool box in Table 2 below for more detail. Active expansion measures would only be implemented if monitoring determined a need. Monitoring for prairie dogs is completed every third year. If less than 5% annual population growth is achieved over the next ten years, then activities encouraging expansion would be considered if funding and resources were available.

- Under Adaptive Management principles (via monitoring) this alternative:
    - Would implement the Good Neighbor Policy on a regular, as needed basis as determined by monitoring and received complaints;
    - Would consider a stronger emphasis, as compared to the no action alternative, of non-lethal tools such as potentially trapping/translocation, use of vegetative buffer strips, and prescribed grazing to direct prairie dog expansion in Category 2 (see Toolbox listed above).

Alternative 3 – Control of Prairie Dogs without the Use of Poisons

Control objectives for this alternative would be the same as Alternative 2; however measures to achieve those objectives would not include the use of rodenticides or other poisons. Other measures include translocation, lethal traps (e.g. conibear, leg-hold, etc.), shooting, as well as vegetative barriers to discourage colonization where unwanted. This alternative was developed based on comments received during scoping expressing concern over the use of poisons to kill prairie dogs and the effect to non-target wildlife and domestic species.

Under Adaptive Management this alternative would:

- Address the good neighbor policy without the use of poisons;

Some specific management actions include:

- Management actions would take place in the same locations as the proposed action; however it is likely that the progress of implementation would be slower due to the fact that these control measures are more labor intensive and expensive to implement.
- In time, this alternative would fully meet the LRMP complex objectives by continuing to trend toward the LRMP goal of four prairie dog complexes of 1,000 acres each and the minimum habitat objective for MA 3.63 (LRMP page 2-14, G-38) (see Wildlife effects analysis in Chapter 3).

Alternative 4 – Expanded Control Zone; Preferred Alternative

Alternative 4 was developed as a result of local stakeholder concern that control of only those prairie dog colonies defined as “presently encroaching or likely to encroach within two years” and interpreted as within 600 feet of non-NFS lands would not be effective at reducing encroachment onto non-NFS lands.

This alternative would allow initial control of prairie dogs with zinc phosphide out to ¼ mile from non-NFS property. A vegetation barrier would still be established at approximately 300 feet from the non-NFS land boundary to discourage future encroachment. This means lethal control would be permitted both in Category 2 and 3 colonies, whereas the proposed action (Alternative 2) only proposes lethal control within Category 3 colonies or portions of colonies unless damage to infrastructure or threats to human health and safety were present. Prairie dog control would continue within this ¼ mile zone over time as needed. Alternative 4 would also include expanding the time frame for rodenticide application to September 15 to January 31.

Actions Common to Alternatives 2, 3, and 4

Under Alternatives 2, 3, and 4 various levels and methods of prairie dog management would take place on the LMNG. Each of the action alternatives would address the Good Neighbor Policy, but would also consider active measures included in the adaptive management as described below to facilitate expansion of prairie dog populations where desired on the LMNG in accordance with the LRMP. Actions common to these alternatives are presented below.

2.5. Adaptive Management

Alternatives 2, 3, and 4 include specific colonies listed for control as well as adaptive management to allow for control of future unwanted colonies that fit the criteria described in the Good Neighbor Policy. Adaptive management is defined as, "A system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain" (36 CFR 220.3). It is a process that allows the responsible official to deal with uncertainty and changing conditions over time, and it provides for constrained flexibility to adapt to changing conditions or unanticipated resource response. Adaptive management is based on the assumption that current resources and scientific knowledge are limited and a certain level of uncertainty exists. Nevertheless, an adaptive management approach attempts to apply available resources and knowledge and adjusts management techniques as new information is revealed. In terms of natural resource management, adaptive management focuses on meeting or moving toward the desired condition objectives on the ground.

Under an adaptive approach, the NEPA process considers an initial set of actions to address a set of issues and identifies a series of additional adaptive options that can be implemented if monitoring indicates there is a need to change management actions. Because these additional options are analyzed in the NEPA document, it provides the responsible official with "constrained flexibility" to adapt to changing conditions within the realm of the identified adaptive options. The key feature of adaptive management is its use of monitoring. Monitoring is the basis on which management changes are proposed. In other words, if some aspect of the planned management is shown by monitoring to be ineffective or cannot be implemented as planned, then a team of Forest Service specialists would make a recommendation to the appropriate district ranger for a course of action based on a range of adaptive tools.

Adaptive Management Tool Box

To address prairie dog management, this proposal examines two lethal control measures and nine non-lethal control measures to use in combination with each other as appropriate to meet the objectives for each colony and within the emphasis of each alternative. A complete listing of these tools is found below.

Table 2 describes potential measures to be used for prairie dog control. If initial control measures do not meet management objectives, based on monitoring results, other methods from the tool box can be selected subject to further evaluation of the interdisciplinary team and determination that effects would be the same as or less than those described in this analysis.

Table 2: Table of potential adaptive management actions available to use for prairie dog management.

ADAPTIVE MANAGEMENT TOOLBOX		
Required	**Applicable Alternatives**	**When to use**
Monitoring	1, 2, 3, 4	Monitoring is a necessary and continuous need. Monitoring determines the effectiveness of tools and when objectives are met. For Alternative 1, monitoring would be continuation of LRMP monitoring of occupied area every third year. For Alternatives 2, 3, and 4, LRMP occupancy monitoring would be completed as in Alternative 1. Effectiveness of control measures would also be monitored for Alternatives 2, 3, and 4. Results of effectiveness monitoring will determine whether additional treatments of specific colonies are needed. Monitoring of any non-target poisoning, including non-target animal species and humans, is required to ensure that control measures are safe or that additional safety measures are added if needed.
Lethal Control Tool		
Rodenticide (Zinc Phosphide)	2, 4	Manage/control colonies that are encroaching on non-NFS lands where not wanted; to reduce public health and safety risks, and to eliminate damage to facilities per the LRMP. For Alternative 4, use on colonies or portions of colonies within ¼ mile of non-NFS lands where not wanted.
Lethal Trapping	2, 3, 4	Manage/control colonies that are encroaching on non-NFS lands (or out to ¼ mile with Alternative 4) where not wanted; to reduce public health and safety risks, and to eliminate damage to facilities per the LRMP.
Non-Lethal Tools		
Vegetation Management cattle-exclosure: Temporary (electric fence) or permanent (3 strand-wire) to provide visual/high structure barrier and discourage colony expansion	2, 3, 4	Management/Control
Vegetation Management non-fencing via cattle management to provide vegetation barrier to discourage colony expansion	2, 3, 4	Management/Control
Other Visual and Physical Barriers (e.g. snow fence) to discourage colony expansion	2, 3, 4	Management/Control
Collapsing or burying burrows (“disking” or dragging) to inhibit reoccupation after control. This option requires additional ID team involvement (heritage and botany at a minimum) due to the addition of ground disturbance not previously analyzed.	2, 3, 4	Management/Control
Live-trapping (e.g. live-traps; “foaming”) and translocation	2, 3, 4	Management/control as above with the addition of having an area where expansion or re-establishment of prairie dogs is desired.
Prescribed grazing management to provide low structure vegetation and encourage colony expansion	2, 3, 4	Management, when expansion is desired
Seeding of native plant species for areas where colonies have been removed.	2, 3, 4	When recovering vegetation in areas where prairie dog colonies have been removed, if needed.

ADAPTIVE MANAGEMENT TOOLBOX		
Shooting restrictions (36 CFR 261.10d)	1, 2, 3, 4	National Forest regulations prohibit the discharge of a firearm within 150 yards of a residence, building, campsite, developed recreation site, or any other occupied area; across a road or any body of water adjacent to a road; into or within a cave; or in any negligent manner that could endanger life or property.
Expansion Tools	**Applicable Alternatives**	**When to Use**
Prescribed grazing management to provide low structure vegetation	2, 3, 4	Expansion
Mowing to provide low structure vegetation	2, 3, 4	Expansion
Passive Management	1, 2, 3, 4	Expansion
Translocation	2, 3, 4	Management/Control/Expansion
Consideration of Additional Colonies		
Since location and size of prairie dog colonies is dynamic and will likely change over time, additional colonies may be considered for control as described in the selected alternative if all sideboards are met and interdisciplinary analysis determines that effects are the same as those described in the EA and the action meets all law, regulation, and policy.	2, 3, 4	In future when new or different colonies begin to encroach or are likely to encroach on non-NFS lands where their presence is not wanted.

Reciprocal Management Obligation

No actions will be taken on encroaching prairie dog colonies without surety of commensurate control actions by the adjacent non-NFS land owner or manager. Therefore an agreement will be signed by both the appropriate District Ranger and the adjacent landowner.

Move toward Grasslands Plan Objectives for Prairie Dog

Each of the four complexes would be managed to occupy over 1,000 acres in accordance with LRMP goals:

- Approximately 1,500 acres of occupied prairie dog habitat currently exists within the **Boyce/Indian Creek** Complex. Passive management of colonies within Category 1 will continue;
- There are approximately 900 to 1,000 acres of prairie dog colonies on NFS lands within the **South Unit of Theodore Roosevelt National Park** complex. Combining with NPS acres (approximately 1,200-1,300 acres) this complex currently meets the desired condition;
- Continue to passively manage towards the goal of a 1,000 acre prairie dog complex in the **Southwest McKenzie County** Focal Area. This focal area is defined as a geographic site delineated based on clumping of existing prairie dog colonies on NFS land. This focal area is relatively small with a relatively high degree of ownership fragmentation. Current acreage (2015 survey) of the Southwest McKenzie County Focal Area is approximately 959 acres; or 41 acres short of the target. Due to the intermingled land ownership pattern, it may be difficult to achieve the desired complex objective without impacting adjacent non-NFS lands. However, monitoring will inform decisions regarding the need for more active management within this Focal Area. Some active management activities within Category 1 (such as translocation from another area) may be necessary to encourage the achievement of the minimum LRMP acreage goal for a complex;

- Lastly, if in the future prairie dog populations increases appreciably within MA 3.63, than the associated **Northwest McKenzie** Focal Area could eventually far exceed the prairie dog habitat complex objectives – perhaps near 5,000 or more acres within the Focal Area with most of the acreage within MA 3.63. Current occupied habitat is approximately 924 acres within this focal area. The 2001 NGP FEIS estimated that meeting plan objectives of four prairie dog complexes in two Geographic Areas would occupy anywhere from 5,400 to 9,400 acres of active prairie dog colonies for the LMNG (NGP FEIS, p. H-98).;
- Other Focal Areas:
  - Under Alternatives 2, 3, and 4, consideration to actively manage prairie dogs to direct and/or expand colonies within Category 2 would be expected. Management would first consider using non-lethal means;
  - **Northeast Slope**: This Focal Area is known to have a relatively high concentration of nesting burrowing owls. There are currently approximately 175 acres of prairie dog colony habitat within this Focal Area. The ownership is highly fragmented and private ownership composes the majority of the focal area. Due to this pattern, most or all of the colonies are either Category 3 or Category 2. Under Alternatives 2, 3, and 4, management of colonies encroaching on non-NFS lands, or creating health and safety concerns, would take place. A lower number of prairie dog colony habitat acres would be managed in Category 2 to provide habitat for burrowing owls across the LMNG. With expansion options limited, an overall reduction in the number of colony acres would be necessary. Health and safety concerns (three sites) as well as the inherent fragmented ownership pattern (two sites) would force a relatively high level of treatment.
  - **North Unit Theodore Roosevelt National Park (NUTRNP)**: There are relatively few, scattered colony acres in this Focal Area, which currently covers approximately 115 acres. Due to some encroachment issues, there will be reduction of colony acreage (approximately 34 acres are likely to be removed) within this focal area;
  - The **Miscellaneous Focal Area**: These are colonies that are generally isolated from other colonies that may provide a loose connection between Focal Areas. Approximately 700 acres are currently within this Focal Area across both ranger districts. Management include control where there is unwanted encroachment and utilize active management to direct and expand colonies if feasible. Treatment of encroaching colonies may affect approximately 360 acres.

2.6. Design Features

All Resources

- Conduct an interdisciplinary review of each year's control operations prior to implementation to ensure effects are consistent with those anticipated in this analysis and signed decision. In particular any ground disturbing activities such as colony collapsing may require field survey work to ensure protection of resources.
- Limit the use of rodenticide to unwanted encroachment, public health and safety, and damage to public and private infrastructure and facilities.

Human Health and Safety

- Treatment areas must be closed to access of all but certified applicators in accordance with label requirements. Signage notifying of poison use near (approximately 1 mile) locations where zinc phosphide will be placed. Post signs at access points and around the perimeter of colonies such that parties approaching while recreating on NFS lands can be advised and avoid harm to humans, pets, or livestock.
- Inform local residences (within one mile) of the use of zinc phosphide prior to application.

Wildlife

- Rodenticide will only be applied from September 15 to January 31 to minimize potential impact to migratory birds.
- Promptly remove carcasses that remain above ground in accordance with rodenticide label requirements.
- If effects to any threatened or endangered species would occur as a result of proposed prairie dog management for which impacts cannot be avoided or are different than those anticipated in this analysis, the activity will not be implemented.
- To protect Dakota skipper, do not encourage prairie dog colony expansion into Dakota skipper habitat. See detailed analysis in Wildlife section of this EA.
- The whooping crane migration will be monitored by the FS to ensure no cranes will consume treated bait:
    - If a threat to whooping crane could potentially occur, shut down poisoning operations immediately;
    - If the FS determines, in consultation with the FWS, that crane migration will pass over the project area/analysis area, poison operations will be shut down and any poison grain on the surface will be disposed of immediately or permanently neutralized until it is determined the crane migration has passed the area and the risk to cranes has passed.

Sensitive Plant Species

- If monitoring indicates that measures used to control prairie dog colonies are a cause of a downward trend in the population of a Forest Service Northern Region sensitive plant species, the population may be fenced, or other protective measures may be applied.
- Prior to ground-disturbing activities, botanical surveys would be conducted and mitigation initiated, if needed. Clearly mark (stake/fence/flag) known populations of Missouri pincushion cactus and Hooker's *Townsendia,* if a decision is made to use mechanical means within colonies 170-4, 333-1, 339-1, and 375-2.
- Keep disturbance to a minimum to reduce the impacts to the native vegetation and spreading of invasive species.
- Clean vehicles and equipment prior to entering NFS lands to remove all seeds and plant propagules (seeds and vegetative parts that may sprout) in order to prevent the potential spread of noxious and invasive plant species.
- Any discovery of sensitive or watch plants within the proposed project area shall be immediately reported to the McKenzie and Medora Ranger Districts offices. Sensitive plant populations discovered after project approval should be protected; therefore, last minute alterations of the project design may be requested in order to avoid negative impacts to such populations.

Livestock

- Application areas are closed to livestock use per label requirements. Ensure livestock are removed from treatment areas prior to application of zinc phosphide.

2.7. Comparison of Alternatives

This section displays a tabular comparison of the alternatives considered in detail. This information, along with a detailed discussion of the Environmental Consequences presented in Chapter 3, provides the basis for comparing alternatives.

Comparison of Proposed Activities

The following table (Table 3) compares prairie dog management activities by alternative.

Comparison of Purpose and Need by Alternative

The following table (Table 3) compares achievement of purpose and need objectives by alternative.

Table 3. Comparison of Proposed Activities and Purpose and Need Objectives by Alternative

Purpose and Need Objective	Alt 1 - No Action	Alt 2 – Proposed Action	Alt 3 – Prairie Dog Control without Poisons	Alt 4 – Expanded Control
Proposed Activities: Acres of prairie dog colonies controlled/eliminated	0	954	954	1,828
There is a need to be responsive to public concern for encroachment of prairie dogs on to non-NFS lands and comply with the good neighbor policy.				
Number of encroaching prairie dog colonies controlled	0	66	66	103
Estimated number of years to implement control of colonies	NA	Determined by budget and personnel limitations	Same as Alternative 2	Same as Alternative 2
Effectiveness of control measures (qualitative – high, medium, low, not at all)	Not at all	Medium to High	Low to Medium	Medium to High
Does the alternative comply with the spirit and letter of the good neighbor policy (yes/no)	No	Yes	Yes	Yes
There is a need to meet or move towards the LRMP guidance to achieve two or more prairie dog complexes in both the Rolling Prairie and Badlands Geographic Areas on NFS lands to provide habitat for prairie dogs and associated species. (Year 0 = first year of control)				
Will the alternative achieve the LRMP guidance for number of prairie dog colonies by Geographic Area?	Year 0 = Yes Year 3 = Yes	Year 0 = No Year 3 = Yes	Year 0 = No Year 3 = Yes	Year 0 = No Year 3 = No
Estimated number of years for the alternative take to meet LRMP guidance for number of prairie dog complexes (4)	0	3	3	10
There is a need to take steps to prevent future unwanted prairie dog encroachments onto non-NFS lands.				
Will the alternative take steps to prevent future unwanted prairie dog encroachments onto non-NFS lands? (yes/no)	No	Yes	Yes	Yes
Relative effectiveness of the alternative at meeting this purpose and need statement (high, medium, low, not at all)	Not at all	Medium to High	Medium	Medium to High

Chapter 3. Affected Environment and Environmental Consequences

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes (effects) to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

The effects of the no-action alternative form a baseline against which action alternatives are evaluated. Each narrative begins with a brief explanation of how effects were analyzed for each resource. When the effects or impacts are associated with an issue, as described in Chapter 2, their relevance and connectedness with the issue are discussed and play an important role in the evaluation of alternatives.

Environmental effects can be direct, indirect, or cumulative. They can be of long or short duration. Effects can be quantitative or qualitative, adverse or beneficial, actual or potential. It is important to consider timing and location of effects.

- Direct effects are those caused by the action and occur at the same time and place.
- Indirect effects are those caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR 1508.8). In most cases, direct and indirect effects are discussed together.
- Cumulative effects are those that result from the incremental effect of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency or individual undertakes the action (40 CFR 1508.7).

The cumulative effects analysis includes the additive effect of the action being considered when added to the effects of past, present, and reasonably foreseeable future actions. As past actions are already included in the affected environment, the cumulative effects analysis builds upon this existing condition assessment by considering the incremental addition of direct and indirect effects of proposed, as well as present and reasonably foreseeable actions. While effects can be differentiated by direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time.

The Forest Service (FS) must comply with all regulatory requirements such as the (LRMP), National Forest Management Act (NFMA), National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA).

3.1. Project Area and Analysis Areas

The project area encompasses the initial 66 colonies proposed for control to address unwanted encroachment and public health and safety and includes the Little Missouri National Grassland (LMNG). These colonies are scattered across both districts of the LMNG. However, most colonies are west of Highway 85. There are a few in the North East Slope focal Area and one east of Grassy Butte in McKenzie County. See Appendix A, Maps.

The initial colonies proposed for treatment are interspersed throughout the entire LMNG prairie dog ecosystem which as of a 2015 survey, totaled approximately 5,559 acres. In addition, there are approximately 454,000 acres of suitable habitat based on slope, soils, hydrology, and vegetation across the LMNG (Svingen 2006, 2006a). In each of the following resource-specific subsections, a spatial and temporal analysis area will be defined, and the reasoning for its extent will be explained. The extent of the

analysis area for each resource may differ due to the likelihood of measurable impacts, the mode of impact, or some other aspect of the resource in question.

3.2. Past, Ongoing, and Reasonably Foreseeable Actions

Analysis of cumulative effects presented in this chapter considered past, ongoing, proposed and reasonably foreseeable activities on NFS lands and adjacent lands that could affect the issues pertinent to this analysis. The project area includes the entire LMNG. Adjacent landownership in the project area include: Army Corps of Engineers, National Park Service, National Wildlife Refuges (US Fish and Wildlife Service), North Dakota School Trust and Game and Fish lands, and other private ownership. Acreages in Table 4 were generated using GIS and are approximate totals.

Table 4. Land Ownership by Total Acres and Percent within the LMNG

Land Owner	Total Acres	Percent of Total
USDA Forest Service	1,027,839	48
US Army Corps of Engineers	5,135	< 1
National Park Service	69,722	3
US Fish and Wildlife Service	2,227	< 1
North Dakota School Trust Lands	109,835	5
Other Private	942,985	44
Total Acres	2,157,743	

Past Actions

The environmental analysis required under NEPA focuses on the potential impacts of the proposed action. Past and present activities and natural events have contributed to creating the existing condition and trends across the LMNG. In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies to a large extent on an examination of the current environmental conditions in order to highlight the impacts of past actions. This method is useful because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. Additionally, some of these activities, as well as reasonably foreseeable activities, may continue to produce environmental effects that overlap in time and space with issues or resources relevant to the proposal.

The cumulative effects analysis in this Environmental Assessment (EA) is consistent with regulations within the Code of Federal Regulations (CFR) at 36 CFR 220.4(f) (July 24, 2008) in accordance with CEQ Memorandum, *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*, which state, in part:

> "The analysis of cumulative effects begins with consideration of direct and indirect effects…agencies look for present effects of past actions that are, in the judgment of the agency, relevant and useful because they have significant cause-and-effect relationship with the direct and indirect effects of the proposal for agency action and its alternatives. CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonably foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required

> analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making." (40 CFR 1508.7)

This section lists known past activities on NFS and adjacent lands as identified by resource specialists, documentation, other agencies, etc. There are marked differences between past and current land management practices and policies. The evolution that has occurred in land management practices is the result of science, ongoing monitoring results, and changing public values.

During the scoping process and subsequent analysis of this project, the Forest Service determined that the following past activities, decisions, information, and environmental documents are applicable to all or portions of the NFS lands included in the analysis area for this EA, and considered them during the cumulative effects analyses discussed in this chapter.

Table 5. Past Actions within or Adjacent to the Prairie Dog Management Project Area

Action Category	Description
Activities on Private Lands	Within the project area, oil and gas development on private land has taken place over a large portion of the project area. Livestock grazing; farming and ranching; hay production; prairie dog control on private lands by a variety of methods including rodenticide use;
Prairie Dog Control, NFS lands	Rodenticides were used on NFS lands in the project area up until 1993. A moratorium was placed on poisoning in 1999 except under special circumstances. In February 2004, the moratorium was rescinded. In November 2006, three prairie dog colonies were partially treated with a rodenticide to aid in creation of vegetative strips to deter the spread of colonies onto adjacent private property. Approximately 89 acres were treated that year. Prior to modern record keeping, it is likely that prairie dogs were treated with rodenticides since the 1930's. However no records are available to indicate the number of acres treated. A study on the Medora Ranger District by Bishop and Culbertson (1976, located in the project record) indicated a 93 percent decline in prairie dog acreage between 1939 and 1972.
Livestock Grazing	Livestock grazing has taken place in the project area since the late 1800's and continues today. Federal management on NFS lands began in the late 1930's. Livestock grazing changed as a result to better protect resource values such as soil, water, and wildlife. After production of the first Forest Plan (LRMP) when the DPG was included as part of the Custer NF (1987) adjustments were made in the management of livestock grazing.
Public Actions on National Forest System Lands	Recreation activities such as sightseeing, hiking, cross country skiing, camping, snowmobiling, hunting, and fishing, are ongoing and expected to increase over the next 10 years. Three permitted recreational outfitters will be allowed to continue seasonal operations within the project area. Two of these outfitters conducted guided bicycle tours and one conducts guided horseback riding.
Recreational Prairie Dog Shooting	Unknown levels of recreational prairie dog shooting occur on the LMNG.
Road Activities	Routine road maintenance (road blading, culvert cleaning and BMP work) is likely to occur as needed on those NFS roads that are open within the project area.

Action Category	Description
Minerals	Oil and Gas: About 75 to 80 percent of federal minerals on the Medora Ranger District are currently leased. There are about 350 producing wells on the district. About 85 percent of the federal minerals are leased on McKenzie Ranger District. There is currently one gravel pit and three scoria pits in operation on the Medora RD. There are no gravel or scoria operations on the McKenzie RD at this time.
Special Use Permits	Numerous special use permits for aerial and buried power, water, and oil and gas lines, etc. are currently in place.
Weed Control	Ground-based and aerial spraying to control weeds is ongoing within the project area under the DPG Noxious Weed Management EIS (February 2007 Record of Decision).

Ongoing and Reasonably Foreseeable Actions

Ongoing actions are those actions initiated in the past which continue to take place. Reasonably foreseeable actions include those management activities that are proposed or imminent, as well as those from other agencies or persons (Table 6). These activities may occur regardless of which alternative is selected for implementation.

Table 6. Ongoing, and Reasonably Foreseeable Actions within or Adjacent to the Prairie Dog Management Project Area

Action Category	Description
Activities on Private Lands	Within the project area, continued oil and gas development on private land is expected. Livestock grazing, farming and ranching, hay production, prairie dog control by a variety of methods, are all potentially on-going.
Minerals	Oil and gas exploration is active on the Little Missouri National Grassland. Continued exploration, development, and production are currently proposed.
Public Actions on National Forest System Lands	Recreation activities such as sightseeing, hiking, cross country skiing, camping, snowmobiling, hunting, and fishing, are ongoing and expected to increase over the next 10 years.
Recreational Prairie Dog Shooting	Recreational prairie dog shooting is expected to continue.
Road Activities	Routine road maintenance (road blading, culvert cleaning and BMP work) is likely to occur as needed on those NFS roads that are open or gated within the project area. The roads most likely to receive maintenance are county roads and other major thorough-fares; i.e. those surfaced roads open to most types of public vehicle traffic.
Livestock Grazing and Allotment Management Plans	Pastures 3 and 5 Vegetation Management Project (McKenzie Ranger District). The proposal provides direction and guidance for livestock grazing on 32 allotments within Pastures 3 and 5 on the McKenzie Ranger District. The project is designed to maintain or improve vegetation and other ecosystem functions.
	Deep Creek Vegetation Management Project (Medora RD); Pastures 2, 10, 11 (McKenzie RD). Similar to above.
Conservation Practices Projects on Medora RD	Allotment 006: Move stock tank from private to NFS land.
	Allotment 063: Install a stock water pipeline and stock tank tied in to an existing water source and install an interior cross fence. Stock tank will replace an unreliable reservoir.
	Allotment 071: Removal of a nonfunctional fence combining two pastures.
	Allotment 114: Will move two existing stock tanks on NFS land and add another stock tank that will be placed on private lands within the allotment to address resource concerns and livestock distribution.

Action Category	Description
	Allotment 152: Installation of range water pipeline and one tank.
	Allotment 153: Installation of electric power line to power range water well in Bell Lake Road area.
	Allotment 182: Installation of a range water pipeline and two stock tanks.
	Allotments 287 and 288: Replace allotment border fence that no longer functions as a barrier.
Pasture 7 Range Water Pipeline	Range water developments in Pasture 7, McKenzie County, ND.
McKenzie Rural Water Development	Installation of pipeline to provide rural water in portions of the McKenzie Ranger District.
McKenzie Electric Coop Silurian 9-1 and 18-1 Electrical System	Installation of 5,450 feet of three-phase buried electric cable with associated above ground structures on National Forest System Road (NFSR) 883-1 and 885 to service oil and gas wells in McKenzie County.
Dakota Prairie Oil and Gas Reasonably Foreseeable Development Scenario SEIS	Supplemental EIS to analyze the change in oil and gas development pattern on the DPG as it relates to the DPG LRMP and ROD for Oil and Gas activities.
Antelope Master Development Plan (MDP)	Project would approve ten well pad expansions or new pads and would authorize 54 wells to facilitate development of federal and private minerals for Petro-Hunt, Continental Resources, and Slawson Exploration Company.
Cherry Creek EA	Oil and gas development. XTO, Burlington, and Slawson proposals for new well pad development and expansion of existing pads in the Cherry Creek area.
Peregrine Petroleum EA	Peregrine Petroleum proposes to construct three wells on one well pad in McKenzie County, ND. This project has federal surface and private minerals.
Petro-Hunt LLC USA Oil and Gas Wells	Drilling of multiple oil and gas wells from existing or expanded well pads located in McKenzie County, ND.
Whiting Oil and Gas Corporation Oil and Gas Wells	Drilling of three oil and gas wells from an existing pad in McKenzie County.
Bridger Pipeline LLC Little Missouri Loop Pipeline EA	Construction of approximately 10 miles of 16-inch steel crude oil pipeline in various sections in Billings and Golden Valley Counties, North Dakota, Medora Ranger District. Project currently on hold.
Pronghorn Expansion Oil and Gas Wells EA	Whiting Oil and Gas Corp. proposes to construct three new well pad developments, housing seven wells, within the Park Oil Field in Billings County, ND, Medora Ranger District.
Southwestern Tracy Mountain Oil and Gas Wells EA	Southwestern Production Corporation proposes to construct five new well pads, housing one well each, within the Tracy Mountain Oil Field in Billings County, ND, Medora Ranger District.
Weed Control	Ground-based and aerial spraying to control weeds is ongoing within the project area under the DPG Noxious Weed Management EIS (February 2007 Record of Decision).

3.3 Hydrology and Soils

This analysis focuses on the existing condition of soils and hydrology resources with respect to 6th order watersheds within the project area as well as the effects the proposed action and alternatives will have on these resources.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Dakota Prairie Grasslands Land and Resource Management Plan

Those most relevant LRMP relevant standards to soil and hydrology resources and prairie dog management are (LRMP at 1-9 and 1-10): Chapter 1, Standards B.1, B.2, B.3, B.4, and B.8.

Desired Condition

Long-term soil productivity and properly functioning water cycles are maintained. Properly functioning water cycles are characterized by high infiltration rates, low soil compaction and minimal overland flows. Energy flow and nutrient cycling are functioning properly to maintain diverse, native plant and animal communities. (LRMP, 2002).

Management Area

Management areas (MA) within the planning area include MA 6.1, rangeland with broad resource emphasis; MA 3.65, rangelands with diverse natural-appearing landscape, and MA 3.63, black-footed ferret reintroduction area. The black-footed ferret reintroduction management area is located in the Horse Creek Watershed in NW McKenzie County. No additional specific guidance is given in these MA's with respect to hydrology and soils.

Federal Law

Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.). This act provides for restoration and maintenance of the chemical, physical and biological integrity of waters in the United States (FSM 7430 and 7440). The CWA regulates the discharge of pollutants into waters through point sources. In addition, the CWA provides for management of non-point source pollution by states. Pertinent sections include Water Quality Standards and Implementation Plans (33 U.S.C. § 1313), Certification (33 U.S.C. § 1341), National Pollutant Discharge Elimination System (33 U.S.C. § 1342), and Permits for Dredged or Fill Material (33 U.S.C. § 1344).

Organic Administration Act of June 4, 1897, as amended. The act contains the initial, basic authority of watershed management on National Forest System (NFS) lands. The purpose for the establishment of national forests, as stated in the act, includes securing favorable conditions of water flows.

Bankhead Jones Farm Tenant Act of July 22, 1937, as amended. This act directs the Secretary of Agriculture to develop a program of land conservation and land use to correct maladjustment in land use and thus assist in controlling soil erosion, mitigating floods, preventing impairments of dams and reservoirs, conserving surface and subsurface moisture, protecting the watersheds of navigable streams, and protecting the public lands, health, safety, and welfare. Land Utilization Project lands, now largely included in national grasslands and national forests, were acquired under this act prior to the repeal of land acquisition authority by the Act of October 23, 1962.

USDA Departmental Regulation 9500-8 (DR 9500-8). This departmental regulation provides direction for all agencies on protection and enhancement of groundwater quality. DR 9500-8 provides for protection of water users and the natural environment from exposure to harmful substances in groundwater and enhancement of groundwater quality where appropriate through prudent use and careful management of potential contaminants and promotion of programs and practices that prevent contamination.

Forest Service Directives. Forest Service Manual (FSM) 2540 establishes procedures for complying with Federal policy and state water rights laws. FSM 2542 establishes procedures for management of watersheds on NFS lands with municipal water supplies. Forest Service Handbook (FSH) 2509.16 establishes procedures for inventorying water resources. FSM 2550 R1 Supplement (Region 1 Soil Quality Standards) requires that the activity will result in fewer than 15 percent of the project acres be detrimentally disturbed by project activities. Detrimental soil disturbance includes the effects of compaction, displacement, rutting, severe burning surface erosion, loss of surface organic matter, and soil mass movement. FSM 2880 provides direction on inventorying and monitoring groundwater resources. FSH 2709.11 establishes procedures for administering special uses.

Executive Orders

Executive Order 11514 – Protection and Enhancement of Environmental Quality. As amended by Executive Order 11991, May 24, 1977. This order states that the Federal Government shall provide leadership in protecting and enhancing the quality of the nation's environment to sustain and enrich human life. This order provides for monitoring, evaluation, and control on a continuing basis of the activities of each Federal agency so as to protect and enhance the quality of the environment.

Executive Order 11990 - Protection of Wetlands. This executive order requires Federal agencies to minimize the destruction, loss, and degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out their responsibilities.

State and Local Law

North Dakota Administrative Code Chapter 33-16-02.1 Standards of Quality for Waters of the State. This state law establishes a system for classifying waters of the state; provides standards of water quality for waters of the state; and protects existing and potential beneficial uses of waters of the state.

Topics and Issues Addressed in This Analysis

Issues

No issues were raised during scoping regarding soil erosion and potential impacts to the hydrological regime from prairie dog colonies in addition to the potential use of rodenticides (zinc phosphide) to negatively impact water quality. Regardless, this report addresses the direct and indirect impacts of the alternatives on the hydrological and soil resources within the project areas.

Although there is a great deal of literature about prairie dogs and their habitat, very little quantitative data could be found on the effects of prairie dog colonies with regard to soil erosion and water quality. Most of the research found, with regard to soil and water, is qualitative and all discuss the positive effects of prairie dog colonies with respect to soil and water. Working on a white-tailed prairie dog colony on the Hutton Lake National Wildlife Refuge in eastern Wyoming, Clark (1970) reported no evidence of increased erosion on the colony and suggested that the benefits from prairie dogs adding organic materials, increasing air and water penetration, and mixing soils might more than offset any accelerated erosion that might occur on a prairie dog colony. Research also suggests that burrowing activities of prairie dogs leads to decreased erosion rates due to the fact that prairie dog burrows allow for more rapid absorption rates during rainfall events (National Park Service 2006a). A recent study by Lourdes Martinez-Estevez et.al. (2013) conducted in the grasslands of the Janos biosphere reserve in northwestern Chihuahua Mexico substantiates these findings.

Resource Indicators and Measures

Watershed condition is assessed as determined by using 12 core national indicators. The best available data is outlined in the USDA Forest Service (2011) Watershed Condition Framework FS-977. Indicators assessed include water quality, water quantity, riparian/wetland vegetation, and soils.

Methodology

Incomplete and Unavailable Information

There have been no quantitative studies within the DPG to determine the potential direct or indirect impacts of prairie dog colonies to soil erosion or water quality degradation.

Upon completing a literature search very little comprehensive and quantitative information could be found on the impacts of prairie dog colonies or their management to soil erosion and water quality in other geographic areas.

Spatial and Temporal Context for Effects Analysis

The scope of the effects analysis was considered on the 12-digit Hydrologic Unit Code (HUC 12) for watersheds in the project area that consist of 20 percent or more of NFS acres within those watershed boundaries, and with 1 percent or more active prairie dog colony acres within those watersheds. The temporal boundary is 10 years.

In 2011, the Forest Service tasked each forest and grassland to evaluate the condition of the watersheds in which the Forest Service owned 1 percent or more of the land surface. Watershed conditions were assessed for the 6th-level watersheds, as defined by the National Hydrography Dataset (USGS), using 12 core national indicators and the best available data. The 12 core indicators are water quality, water quantity, aquatic habitat, aquatic biota, riparian/wetland vegetation, roads and trails, soils, fire regime condition class, forest cover, rangeland vegetation, terrestrial invasive species, and forest health. The DPG did not evaluate forest cover because it isn't applicable to the grasslands.

The Forest Service uses three classes to describe watershed condition (USDA Forest Service 2004a, FSM 2521.1)

- Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition (Functioning Properly).
- Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition (Functioning at Risk).
- Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition (Impaired Function)

Table 7. Watershed condition and percent of PD colony acres within the project area.

Watershed/HUC #	County	Watershed Condition	Watershed Class	Percent of NFS land in Watershed	Percent of PD colony acres on NFS lands/Watershed
Cherry Creek 101000042701	McKenzie	Functioning at Risk	2	61	2.94
Lower Horse Creek 101000042703	McKenzie	Functioning at Risk	2	83	1.38
North Fork Smith Creek 101000042002	McKenzie	Functioning at Risk	2	57	2.09
Spring Creek 101000042403	McKenzie	Functioning at Risk	2	61	5.5
Upper Bennie Peer 101000042401	McKenzie	Functioning at Risk	2	51	1.11
Upper Horse Creek 101000042702	McKenzie	Functioning at Risk	2	77	1.87

Watershed/HUC #	County	Watershed Condition	Watershed Class	Percent of NFS land in Watershed	Percent of PD colony acres on NFS lands/Watershed
West Branch Charbonneau Creek 101000042601	McKenzie	Functioning at Risk	2	37	1.40
101302020101 101302020101	Billings	Functioning at Risk	2	28	4.43
Franks Creek 101102031305	Billings	Functioning at Risk	2	46	1.32
Government Creek 101102031304	Billings	Functioning at Risk	2	33	1.11
Medora-Little Missouri 101102031301	Billings	Functioning at Risk	2	32	1.19
Boyce Creek 101102030106	Slope	Functioning at Risk	2	25	7.27
Horse Creek 101102030301	Slope	Functioning at Risk	2	46	1.94
Indian Creek 101102030104	Slope	Functioning at Risk	2	55	8.61
Lower Deep Creek 101102030409	Slope	Functioning at Risk	2	33	1.01
Spring Coulee-Little Missouri 101102030308	Slope	Functioning at Risk	2	22	1.00

In 2010 watersheds on the DPG and nationwide were rated using what would become the USDA Forest Service Watershed Condition Framework (2011). This rating considered 12 indicators that are surrogate variables representing the underlying ecological, hydrological, and geomorphic functions and processes that affect watershed condition (USFS 2011). In general, watersheds on the LMNG are composed of a high percentage of private lands intermingled with NFS lands. There are exceptions where the majority of lands are managed by the US Forest Service. Prairie dog activity is not responsible for these watershed conditions as evidenced by the low percentage of area occupied by prairie dog colonies per watershed in the table above.

Affected Environment

Existing Condition

Black-tailed prairie dog colonies can be found on a variety of soils (Clippinger 1989, Reading and Matchett 1997, Reid 1954). Preferred soils are, deep silty, clayey or loamy, but colonies will expand into less desirable soils that are shallow and/or rocky. They avoid soils that are frequently flooded or excessively sandy and unable to support burrow systems. Prairie dogs will also use soils that have been previously disturbed (Knowles 1986, Licht and Sanchez 1993). This includes disturbances commonly associated with past homestead activity, abandoned fields, and livestock concentrations (water sources and developments, mineral sites, supplemental feeding sites, oilers, corrals). Historically, prairie dogs were most likely attracted to areas heavily impacted by bison and other large native herbivores (USDA Forest Service 2005c).

The project area lies within two Major Land Resource Areas (MLRA); 54 (Rolling Soft Shale Plain) and 58C (Northern Rolling High Plains, Northeastern Part). MLRA 54 would be similar to the Rolling Prairie

Geographic Area (GA) within the LRMP. Soils of the Rolling Prairie are typically moderately deep to deep and are either of glacial origin in the north part of the project area or have derived from soft sedimentary residual bedrock. The soils are well developed, stable and occupy nearly level to rolling hills with some inclusions of scattered buttes and badlands landscapes. Soils of the Badlands GA are typically shallow in depth and have developed in soft rock or rock-like substances such as siltstones, clay stones, shale, and sandstones. They have primarily developed in steep topography including intricately dissected drainages and draws dropping from grassy ridgelines or butte-like hills and color-banded mounds typical of a badlands landscape (USDA Forest Service 2001).

The climate of the Badlands and Rolling Prairie GAs found within the LMNG is semi-arid continental. Precipitation is erratic, but averages about 15-18 inches per year, with half of the precipitation falling from May through July (LRMP 2-9 and 2-17). Short but intense thunderstorms, sometimes accompanied by hail, are a frequent occurrence between April and September. Moisture deficits are critical during the summer months. Drought cycles are typical, some lasting as long as 10 to 15 years. Yearly temperatures range between -35 degrees Fahrenheit to 100 degrees Fahrenheit. Snowfall averages about 30 inches per year. Winds, average about 10 miles per hour, usually create deep accumulations of snow in draws but prevent deep accumulations on the plains.

There are no listed waterbodies on the 2002, ND 303(d) list of impaired streams. The Little Missouri River was listed in 1998 but was removed from the list for lack of sufficient credible data.

Natural waterbodies within or near prairie dog colonies consist primarily of a few perennial or intermittent streams. Small ponds that have been constructed on the national grasslands for livestock, wildlife, and recreation are also commonly found within or near prairie dog colonies. The streams and rivers and some of the small impoundments support both introduced and native fish but no at risk species (USDA Forest Service 2005c).

Environmental Consequences

Direct and Indirect Effects

Alternative 1-No Action

No active management or control of prairie dogs would occur. Neither lethal nor non-lethal control measures would be used to manage prairie dog colonies, including wanted or unwanted colonies. Contraction or expansion of the colonies would depend on climate, grazing patterns and intensity, and amount of prairie dog shooting, predation, or disease present.

Actions Common to Alternatives 2, 3, and 4

Under the Alternatives 2, 3 and 4 various levels and methods of prairie dog management would take place on the LMNG. Each of the action alternatives would primarily address the Good Neighbor Policy, but also consider active measures to facilitate expansion of prairie dog populations where desired on the LMNG. The desired outcome of these alternatives would be accomplished through the use of adaptive management tools. Modifying cattle grazing systems, using visual and physical barriers such as taller grasses or barrier fencing, using prescribed fire to enhance prairie dog habitat, and utilizing live trapping and translocation of prairie dogs are examples of management tools to control or expand prairie dog colonies. A complete description of the alternatives as well as a full list of possible adaptive management tools is included in Chapter 2.

Comparison of Proposed Activities

Watershed condition and soil erosion are the only resource indicators used to compare the effects of the three alternatives for this report. The following table (Table 8) compares watershed condition by alternative.

Table 8. Comparison of Proposed Activities Effects by Alternative

Proposed Activities	Alt. 1	Alt. 2	Alt. 3
Watershed condition	No effect	No effect	No effect
Soil Erosion	No Increase	No Increase	No Increase

Soil erosion from all lands, including grasslands colonized and un-colonized by prairie dogs, is a source of sedimentation into rivers and streams. There are very few published or unpublished references documenting and quantifying comparative erosion rates on and off prairie dog colonies, though, making it difficult to quantitatively assess soil and sedimentation rates from prairie dog colonies. Another difficulty in quantifying soil erosion rates on and off prairie dog colonies is that vegetation conditions within and between prairie dog colonies is highly variable, based on years of colonization (age of colony), concurrent livestock grazing practices, and other variables. This variability would have to be considered to accurately assess soil erosion rates on prairie dog colonies (USDA Forest Service, 2005c).

A 2013 study investigated the effect of prairie dogs on five ecosystem services, including regulation of soil erosion, regulation of soil productive potential, and groundwater recharge. Their findings showed that prairie dogs had a very strong positive effect on the supply of groundwater recharge, regulation of soil erosion, and regulation of soil productive potential (Martinez et al. 2013). These findings concur with those of Clark's (1970) research on a white-tailed prairie dog colony on the Hutton Lake National Wildlife Refuge in eastern Wyoming where he reported no evidence of increased erosion on the colony, and suggested that the benefits from prairie dogs adding organic materials, increasing air and water penetration, and mixing soils might more than offset any accelerated erosion that might occur on a prairie dog colony.

Black-tailed prairie dogs were not identified as significant agents of soil and water degradation in the NGP 2001 FEIS, and no further detailed analyses were conducted on the direct, indirect, or cumulative effects of the alternatives on soil and water resources and the hydrologic function of watersheds.

Available data suggests that prairie dog burrowing improves soil productivity and decreases soil erosion while improving water infiltration (Martinez-Estevez et.al. 2013; USDA Forest Service 2005c; Munn 1993). However, there are few quantitative research studies with relation to prairie dogs on soil productivity, soil erosion, and water impacts. Therefore, this analysis concentrated on those areas with active prairie dog colonies that are at least one percent coverage within the watershed (see Table 8). After conducting a thorough literature search, it is the conclusion that the presence and expansion of prairie dog colonies would not result in accelerated soil erosion. All of the literature found discusses the benefits of prairie dogs to the soil through mixing and addition of organic material. There is no documented evidence that soil erosion from prairie dog colonies contributes to excessive sedimentation of streams or other water bodies and if the rodenticide is applied correctly there is no documentation of water quality impairment. There was also no documentation of impaired riparian areas as a result of prairie dog encroachment. Prairie dogs do not typically burrow in floodplains or areas that are frequently flooded.

One of the tools in the adaptive management tool box is colony collapsing. Impacts to soil and erosion as a result of colony collapsing will depend on the method and machinery used. If the colonies are collapsed using heavy equipment then the soils may need to be tilled to prevent compaction which could impede vegetative growth. Any area that is collapsed or disturbed should be seeded as soon as possible to reestablish desirable vegetation. Riparian areas or wetlands would need to be avoided so as not to disturb

vegetation or compact soils. Further ID team involvement by the hydrologist is required when site-specific measures such as colony collapsing or other soil disturbing activity is proposed when using the adaptive management toolbox.

Cumulative Effects

In the absence of measurable direct or indirect effects on water and soil quality, there would be no cumulative effects on watershed condition and soils as a result of implementation of any of the alternatives.

3.4 Botany

This document serves as the biological evaluation of impacts the Prairie Dog Management Project will have on plant species listed under the Endangered Species Act, including threatened, endangered, and proposed species, and USDA Forest Service Region 1 (R1) sensitive plant species. It is Forest Service policy to protect the habitat of federally listed threatened and endangered species (Forest Service Manual (FSM) 2670.31), and to avoid or minimize adverse impacts to species designated by the Forest Service as sensitive (FSM 2670.32).

In order to determine impacts, all Forest Service projects, programs, and activities are reviewed for possible effects to federally listed threatened or endangered plant species and Forest Service designated sensitive species. There are 14 Forest Service R1 designated sensitive plant species known or suspected to occur on the LMNG. There are no threatened or endangered plant species known or suspected to occur on the LMNG. Therefore, the following analysis will address only the potential impacts to Forest Service R1 LMNG designated sensitive plant species and their habitats as a result of implementing of a prairie dog management plan on the LMNG.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Desired Condition

The desired condition, derived from overarching national law and policy, is to ensure population viability for Forest Service sensitive plant species. Management practices are to be implemented to ensure the viability of native and desired non-native plant species in habitats distributed throughout their geographic range on NFS lands.

Federal Law

Endangered Species Act

Under the Endangered Species Act of 1973, federal departments and agencies are required to conserve threatened or endangered species by ensuring their activities “are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats”. The US Fish and Wildlife Service (FWS) is responsible for designating (listing) species as threatened or endangered. Federal agencies such as the Forest Service must consult with the FWS when their activities would affect threatened or endangered species (FSM 2670.31).

National Forest Management Act

The **National Forest Management Act of 1976 (NFMA)** directs the Forest Service to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.”

Forest Service sensitive plant species, designated by the agency’s Regional Foresters, are species “for which population viability is a concern, as evidenced by significant current or predicted downward trends in 1) population numbers or density and/or 2) habitat capability that would reduce a species’ existing distribution” (FSM 2670.5). Forest Service management practices should “avoid or minimize impacts” on sensitive species to ensure they do not become threatened or endangered because of Forest Service actions and to maintain viable populations of all native species throughout their geographic range on NFS lands (FSM 2670.22 and 2670.32). Where impacts cannot be avoided, the agency will analyze “the significance of potential adverse effects on the population or its habitat within the area of concern and on

the species as a whole" (FSM 2670.32). For sensitive species, effects are considered adverse if they "contribute to a trend toward federal listing or loss of viability for the species".

2001 LRMP

The DPG LRMP provides standards and guidelines for sensitive plant management. Several LRMP standards reiterate national direction and include ensuring that management actions do not contribute to a loss of population viability for Forest Service sensitive plant species (USDA Forest Service 2001, p 1-15).

The 2001 LRMP includes specific direction with respect to sensitive plant species, including the following standards and guidelines (LRMP pages 1-15 and 1-16):

29. Avoid placing new facilities, roads, trails, fences, salting and mineral areas, and other developments such as water tanks and impoundments, in habitat occupied by sensitive plant species. **Guideline**
30. Identify sensitive plant habitats and rare plant communities as priorities for noxious weed and invasive plant monitoring and control. **Guideline**
31. Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants. **Guideline**
32. Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations and the health of rare plant communities. **Standard**
33. Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant and animal populations from adjacent populations. **Standard**
34. Maintain hydrologic regimes and protect and restore developed springs and seeps where habitat for sensitive plant species would be enhanced.
35. Manage for natural disturbance processes when necessary to maintain early seral habitat for species such as smooth goosefoot, sandgrass, and beach heather. Do not initiate stabilization measures for habitats occupied by these species. **Standard**
36. Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species. **Standard**
37. Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats. **Guideline**
38. Conduct target surveys for globally rare (G1, G2, and G3) Forest Service sensitive plant species. **Guideline**
39. Protect globally rare plant communities (G1-G3) through implementation of conservation strategies. **Guideline**
40. Enhance and improve habitat for known sensitive plant populations through restoration programs. **Guideline**

Topics and Issues Addressed in This Analysis

Resource Indicators and Measures

The proposed LMNG prairie dog management plan may potentially harm individuals or habitats of sensitive plant species. Direct impacts can include damage or death of individual plants. Indirect effects can result from disturbance and resulting changes to potential sensitive species habitats from treatment or lack of treatment.

Table 9. Sensitive plant indicators and measures for assessing effects.

Resource Element	Resource Indicator	Measure	Used to address: P/N, or key issue?	Source
Sensitive plant condition (occupied area)	Abundance	Would there be no change, an increase, or a decrease in the species' abundance?	No	Analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. FSM 2670.32
Sensitive plant habitat	Suitable habitat	Would there be no change, an increase, or a decrease in the amount or quality of suitable habitats?	No	Analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. FSM 2670.32
Sensitive plants	Species viability	Determination category	No	Review activities through a biological evaluation, to determine their potential effect on sensitive species. FSM 2670.32

Determination Categories

This biological evaluation reviews the proposed action and alternatives in sufficient detail to determine the level of effect that would occur to Forest Service Region 1 LMNG designated sensitive plant species (Forest Service 2011). One of four possible determinations is chosen based on analysis of the potential effects of the project using the best available scientific information, and the professional judgment of the botanist completing the evaluation. The four possible determinations are:

- No impact;
- Beneficial impact;
- May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species; or
- Will impact individuals or habitat with a consequence that the action will contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Methodology

Portions of the project area have previously been surveyed for other projects on NFS lands and during targeted surveys by Forest Service personnel. Not all of the project area has been surveyed because of its extent and variation in potential sensitive species habitat. Analysis and design criteria will take into account the presence and management of potential habitat.

The effects of the project will be evaluated by applying each species' expected responses, if any, to the known occurrences and predicting the likely changes that would result from each of the alternatives. Effects that are reasonably expected from the project activities on sensitive plants or their habitats will be used to determine the appropriate determination category for the biological evaluation. Any expected changes in the species abundance and condition of habitat will be described.

Prairie dog colonies on the LMNG, absent predation or other control, may expand. Based on a 5-year period an individual colony could expand by 25 percent and more. For the purposes of this evaluation, a 150 foot buffer as an estimate of colony expansion was chosen because prairie dog colony expansion rates vary considerably site to site, and year to year. In general, expansion rates are driven by weather patterns and grazing-related changes in vegetative cover (Milne 2004). The 150 feet may be over estimating the size and other areas it may be underestimating the expansion of colonies on the LMNG. However it is a useful tool for comparison of effects between alternatives. The Forest Service GIS sensitive species layer

was then intersected with the buffered colonies to determine what species, population, and habitat would be effected by expanding prairie dog towns. Forest Service prairie dog colony and sensitives species GIS layers were joined to generate the distances of individual sensitive plant species populations from existing colonies on both the Medora and McKenzie Ranger Districts.

Information Sources

Sensitive plant species occurrences and their potential habitat in the project area were compiled from Medora and McKenzie Ranger Districts sensitive plant records, Forest Service GIS sensitive plant layer, description of existing sensitive plant communities on the LMNG, Natural Resources Conservation Service (NRCS) soil survey and ecological sites, National Agriculture Imagery Program (NAIP) images, and local knowledge of the area by Forest Service personnel.

Incomplete and Unavailable Information

National Forest System (NFS) lands within the project area have not been completely surveyed, so potentially suitable habitats in the area could be supporting undiscovered sensitive plant populations. These potential habitats are not specifically identified or mapped. Vegetation mapping cannot been done at a fine enough scale to accurately identify many sensitive plant habitats. Colonies proposed for treatment and proposals with additional ground disturbance (e.g. disking) will be surveyed and design features applied to avoid any detrimental effects to sensitive species and their habitat.

Spatial and Temporal Context for Effects Analysis

The spatial analysis boundary of this effects analysis is the treatment areas within each alternative for the prairie dog management project across the LMNG. A report of the individual status of designated R1 LMNG Forest Service sensitive species is completed every two years along with the acres of NFS lands surveyed. Not all occurrences will be visited every year. Selection of interval of visits is dependent on life history of plants and may be limited by available personnel and budgets.

Temporal analysis is completed for the life of the project including direct, indirect, and cumulative effects that may occur at the same time and place or at some future time and potentially removed from direct project activities.

Direct/Indirect Effects Boundaries

The spatial boundaries for analyzing the direct and indirect effects to 14 individual Forest Service R1 LMNG designated sensitive plant species (Forest Service 2011), populations, and potential habitat is within 150 feet of existing prairie dog colonies. Viability for each species is considered across the LMNG. Forest Service management practices should “avoid or minimize impacts” on sensitive species to ensure they do not become threatened or endangered because of Forest Service actions and to maintain viable populations of all native species throughout their geographic range on NFS lands (FSM 2670.22 and 2670.32). Where impacts cannot be avoided, the agency will analyze “the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole”. The line officer makes the decision to allow or disallow impact, but the decision must not result in loss of species viability or create significant trends toward federal listing (FSM 2670.32). For sensitive species, effects are considered adverse if they “contribute to a trend toward federal listing or loss of viability for the species” (FSM 2670.32).

Cumulative Effects Boundaries

The spatial boundary of cumulative effects is the LMNG because it is assumed that if the viability of the Forest Service R1 LMNG designated sensitive species are being maintained within the project area, the project would not adversely affect the species viability beyond the project area based on the global ranking and state ranking. Temporal boundary for this analysis is 10 to 15 years after implementation of the initial treatments of the prairie dog management project. The management project will have direct and indirect effects on individual species since there will be alteration of habitat and potential for the

introduction or proliferation of invasive species, which are the greatest threats to sensitive species and the native prairie ecosystem where they occur.

Affected Environment

Existing Condition

The project area lies within two Major Land Resource Areas (MLRA); 54, Rolling Soft Shale Plain, and 58C, Northern Rolling High Plains, Northeastern Part (USDA NRCS 2006). MLRA 54 would be analogous to the Rolling Prairie Geographic area within the LRMP. This MLRA's natural prairie vegetation is characterized by western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula*), and blue grama (*Bouteloua gracilis*). Little bluestem (*Schizachyrium scoparium*), prairie sandreed (*Calamovilfa longifolia*), and sideoats grama (*Bouteloua curtipendula*) are important species on shallow soils. Prairie rose (*Rosa arkansana*), leadplant (*Amorpha canescens*), and patches of western snowberry (*Symphoricarpos occidentalis*) are interspersed throughout the area. Green ash (*Fraxinus pennsylvanica*), chokecherry (*Prunus virginiana*), and buffaloberry (*Shepherdia argentea*) occur in draws and narrow valleys (USDA NRCS 2006).

MLRA 58C would be analogous to the Badlands Geographic area within the LRMP. This MLRA's natural prairie vegetation is characterized by western wheatgrass, needle and thread, green needlegrass, blue grama, and threadleaf sedge (*Carex filifolia*). Little bluestem and sideoats grama are important species on sloping, shallow soils. Big bluestem and sideoats grama, along with scattered green ash, chokecherry, and western snowberry, are important species in swales. North-facing slopes support Rocky Mountain juniper (*Juniperus scopulorum*), green ash, and chokecherry and an understory of little bluestem, porcupinegrass (*Hesperostipa spartea*), and needle and thread (USDA NRCS 2006).

Table 10 is a list of Forest Service Region 1 designated sensitive plant species on the LMNG (Forest Service 2011) that are found in the analysis area including a brief habitat description for each species. Eight of the species were dropped from the analysis because potential habitat for the species does not exist within or within 150 feet of a prairie dog colony or their habitat characteristics are not associated with prairie dog habitat. The type or intensity of the activity within the alternatives is expected to have no impact/effect on these species or their habitat and the associated conservation design or mitigations eliminate any potential for impact on the species. Six sensitive plants were carried forward in the analysis. These include Missouri foxtail cactus (*Escobaria missouriensis*), Hooker's Townsendia (*Townsendia hookeri*), Easter daisy (*Townsendia exscapa*), Dakota buckwheat (*Eriogonum visheri*), Sand lily (*Leucocrinum montanum*), and Alkali sacaton (*Sporobolus airoides*). These species are either potentially associated with an existing colony, within 150 feet of an existing colony; prairie dog colonies may provide habitat characteristics for the species, or the species may be affected by decisions made in the document.

Table 10. Forest Service R1 designated LMNG sensitive plant species within the analysis area.

Species/Scientific Name	Global/ State[1]	Habitat Description and Range	Known or Suspected in Analysis Area	Potential Impact/Comments[2]	Criteria for Exclusion[3]
Smooth goosefoot (*Chenopodium subglabrum*)	G3G4/ S1	Sandbars, terraces, and dune complexes along rivers and creeks. Exposed sandy substrates in uplands, blowouts, outcrops, colluvium, etc.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population (site: 011806EO2012SQUARETTOP04) to a colony (615-3) on D8 is approximately 0.5 miles and on D7 (site: B1) approximately 0.6 miles from colony 029-1.	**1, 2, 3**
Blue lips (*Collinsia parviflora*)	G5/ S2	Woody understories, including green ash/elm draws. Rocky Mountain jumper, mesic shrub communities, and occasional xeric shrub communities.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population (site: J4) to a colony (147-6) on D7 is approximately 1.6 miles. There are no known populations on D8.	**1, 2, 3**
Torrey's cryptantha (*Cryptantha torreyana*)	G5/ S1	Two population sites discovered during 2013 were located along scoria ridgelines. Species associated with butte landforms and has been reported on dry plains, rock outcrops, escarpments, pine slopes.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing prairie dog colony. Nearest population (site: RR1) to a colony (179.1) on D7 is approximately 1.0 miles. There are no known populations on D8.	**1, 2, 3**
Nodding buckwheat (*Eriogonum cernuum*)	G5/ S1	Exposed sandy substrates such as blowouts, sand dunes and swales in grasslands, hillsides, sandstone outcrops with low vegetation cover.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population (site: H2) to a colony (306-2) on D7 is approximately 3.2 miles. There are no known populations on D8.	**1, 2, 3**

Species/Scientific Name	Global/ State[1]	Habitat Description and Range	Known or Suspected in Analysis Area	Potential Impact/Comments[2]	Criteria for Exclusion[3]
Dakota buckwheat (*Eriogonum visheri*)	G3/ S2S3	Badlands habitats with exposed clay/silt substrates with low plant cover such as outwash zones around eroding buttes, saddles, steep convex slopes, erosional breaks on prairie slopes. Occasional populations among dense saltgrass communities.	Yes	**Species will be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. However; habitat for this species may be associated with habitat for prairie dogs. Nearest population (site:011808EO2010LELANDDAM14) to a colony (365-1) on D8 is approximately 0.4 miles and on D7 (site: A3a) approximately 0.6 miles from colony 166-1.	
Missouri foxtail cactus (*Escobaria missouriensis*)	G5/ SNR	Prairie slopes and plains, stony to loamy to clayey short-grass to mixed-grass prairies. Also reported in woodlands of ponderosa pine or *Quercus* spp.	Yes	**Species will be carried forward in analysis.** There is one known population on D8 within a prairie dog colony and one population within a 150 feet of a colony. Habitat of this species may be associated with habitat for prairie dogs. Nearest population (site: W1) to a colony (270-2) on D7 is approximately 0.4 miles.	
Sand lily (*Leucocrinum montanum*)	G5/ S2	Generally shortgrass communities with fine textured substrates but also found in crested wheatgrass communities. Reported in open coniferous woodlands and hillsides, sagebrush scrub, and sandy flats,	Yes	**Species will be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. However; habitat for this species may be associated with habitat for prairie dogs. Nearest population (site:011808EO2009YELLOWSTONE04) to a colony (333-3) on D8 is approximately 0.5 miles and on D7 (site: I1) approximately 3.4 miles from colony 250-1.	

Species/Scientific Name	Global/ State[1]	Habitat Description and Range	Known or Suspected in Analysis Area	Potential Impact/Comments[2]	Criteria for Exclusion[3]
Dwarf mentzelia (*Mentzelia pumila*)	G4/ S1	Exposed scoria formations and colluvium with low plant cover. Also reported on slopes and sandy plains; occasionally on hard clays and rocky soils.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population (site: E2) to a prairie dog colony (010-3) on D7 is approximately 1.2 miles. There are no known populations on D8.	**1, 2, 3**
Alyssum-leaved phlox (*Phlox alyssifolia*)	G5/ S1S2	Sandy or gravelly soil on and around Bullion Butte. Also reported on clay banks and limestone ridges of open prairie.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population (site: U1) to a colony (179-1) on D7 is approximately 1.6 miles. There are no known populations on D8.	**1, 2, 3**
Limber pine (*Pinus flexilis*)	G4/ S1	Semi-arid exposed rocky ridges and foothills in the Limber Pines RNA, likely of native-American origin.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population to a colony (010-3) on D7 is approximately 0.5 miles. There are no known populations on D8.	**1, 2, 3**
Lanceleaf cottonwood (*Populus x acuminata*)	GNA/ S2	Mesic woody draws, often with springs/seeps, occasional near springs on open hillsides, floodplains, and stream banks.	Yes	**Species will not be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. Nearest population (site: G2k) to a colony (106-3) on D7 is approximately 0.2 miles and on D8 (site: 011808EO2014FLATROCK05) approximately 3.5 miles from colony 398-1.	**1, 2, 3**
Alkali sacaton (*Sporobolus airoides*)	G5/ S2	Secondary succession on clay outwash where tolerant of saline conditions, also on dry to moist sandy or gravelly soil.	Yes	**Species will be carried forward in analysis.** There are no known populations on the LMNG that are associated or within 150 feet of an existing colony. However; habitat for this species may be associated with habitat for prairie dogs. Nearest population (site: F9) to a colony (152-1) on D7 is approximately 0.6 miles. There are no known populations on D8.	

Species/Scientific Name	Global/ State[1]	Habitat Description and Range	Known or Suspected in Analysis Area	Potential Impact/Comments[2]	Criteria for Exclusion[3]
Hooker's *Townsendia* (*Townsendia hookeri*)	G5/ S1	Butte formation habitats including rimrock, rocky substrates, dry plains, hillsides, gravelly benches and weathered scoria. Often clay matrix subsoil with low to moderate plant cover.	Yes	**Species will be carried forward in analysis.** There are no known populations on the LMNG within a prairie dog colony; however, there are two known populations within a 150 feet of a colony.	
Easter daisy (*Townsendia exscapa*)	G5/ SNR	Dry plains and hillsides, often with loamy or increased soil development and increased plant cover relative to *T. hookeri.*	Yes	**Species will be carried forward in analysis.** Species is potentially associated with habitat within or adjacent to prairie dog colonies. Nearest population (site:01108EO2014DISTRICTSW01) to a colony (384-1) on D8 is approximately 0.7 miles and on D7 (site: V34) approximately 6.5 miles from colony 179-1.	

(NatureServe 2016)

[1]G Global ranking
S State ranking
T Subspecies or variety ranking
1 Critically imperiled
2 Imperiled
3 Vulnerable
4 Apparently secure
5 Secure
NR Not ranked
U Unrankable

[2]D7=Medora Ranger District and D8=McKenzie Ranger District on the LMNG

[3]Criteria for exclusion of species from further analysis:

1-Potential habitat for the species does not exist within or within 150 feet of a prairie dog colony.
2-The type or intensity of the activity in the proposed action is expected to have no impact/effect on these species or their habitat.
3-The associated conservation design or mitigations eliminate any potential for impact on the species.

Species with Known Occurrences or Habitat within Prairie Dog Colonies on the LMNG

According to the most recent (2015) prairie dog survey information, there are 137 known prairie dog colonies on the LMNG occupying approximately 5,500 acres (or 0.5%) of the 1.025 million acres on the LMNG.

Overall the LMNG contains about 454,000 acres of suitable prairie dog habitat (based on soils, slope, vegetation, and hydrology), meaning that approximately 44% of the LMNG is capable of supporting prairie dogs. Proportionately by ranger district this breaks down to approximately 256,000 acres for the Medora Ranger District (49%) and 198,000 acres (40%) for the McKenzie Ranger District (Svingen 2006 and 2006a). This equates to an occupancy rate of about 1.1% of the suitable prairie dog habitat available on the LMNG.

Based on Forest Service LMNG sensitive species inventory (2015) there is only one known sensitive species occurrence within a prairie dog colony (375-2); Missouri pincushion (*Escobaria missouriensis*). However, there are two known populations of Hooker's *Townsendia* (*Townsendia hookeri*) and one Missouri pincushion population within 150 feet of prairie dog colonies 170-4, 339-1 and 333-1.

Table 11. Known sensitive plant populations within or 150 feet from an existing prairie dog colony, on the LMNG.

Colony #	Species (number of occurrences)	Location
375-2	Missouri pincushion (1)	NW ¼, Section 06, T147N, R100W
170-4	Hooker's *Townsendia* (1)	SW ¼, Section 29, T140N, R102W
333-1	Missouri pincushion cactus (1)	SW ¼, Section 23 T150N, R103W
339-1	Hooker's *Townsendia* (1)	NE ¼, Section 34, T150N, R104W

Missouri pincushion (*Escobaria missouriensis*)

Missouri pincushion cactus (USDA Plants Database) is broadly distributed throughout the central states encompassing the Great Plains, Columbia Plateau and eastern Great Basin. It is found in Texas, New Mexico, Arizona, Utah, Wyoming, Idaho, Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Louisiana, and Arkansas (NatureServe 2015). Missouri foxtail cactus has a global status of G5 (secure). In North Dakota, it is state-ranked as SNR (not yet ranked) (NatureServe 2015).

This species is associated with xeric sites within short- and tall-grass prairie communities, but has also been documented in ponderosa pine, pinyon-juniper, and Gambel oak communities. It is often restricted to loamy sites within sandstone derived soils (Flora of North America: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415329). Documented habitat on the LMNG include prairie slopes and plains, stony to loamy to clayey short-grass to mixed grass prairies.

Over the species range, habitat alteration, development, shrub encroachment due to fire exclusion, and sometimes overgrazing has extirpated populations from many of its historically known sites. The species can rapidly colonize disturbed habitats along with other early seral cacti. In North Dakota, Missouri pincushion cactus seems to thrive under the drier conditions caused by heavy grazing, but in the more arid parts of its range, more plants are usually seen where grazing is light or moderate (USGS 2016).

Figure 3. Missouri pincushion and habitat

Easter daisy (*Townsendia exscapa*) and Hooker's *Townsendia* (*Townsendia hookeri*)

Easter daisy is widely distributed across the western United States and Canadian provinces. It extends south from Saskatchewan, Alberta, and Manitoba, south to Arizona, New Mexico, and Texas. Its geographic range includes all western states except California, Oregon, and Washington. In North

Dakota, it is found in the extreme western part of the state associated with badlands/buttes habitats (Stevens 1920). Easter daisy, similar to Hooker's *Townsendia*, is a very short-tufted perennial found from western North Dakota to British Columbia to northern Mexico at elevations up to 10,000 feet. It has a branching taproot and root crown, and winters as a small, compact mound of evergreen leaves protecting the autumn-formed buds. They flower in April and May. Easter daisy grows on dry plains and hillsides, often with loamy or increased soil development and increased plant cover relative to Hooker's *Townsendia*.

Easter daisy is associated with a broad array of habitats including openings in pine forests, meadows, gravelly hills, and sandy soils (Flora of North America, vol. 20, p. 195; http://efloras.org/florataxon.aspx?flora_id=1&taxon_id=250067761). The species has been documented as a component of drier Great Plains (e.g. badlands shortgrass prairie) and sagebrush (several species) communities across its range (Stevens 1920, Kaul and Keeler 1983, Dickinson and Dodd 1976, Hamel and Reimer 2004, Reveal 1970). In western North Dakota it is found on dry plains and hillsides in or near badlands habitats (Stevens 1920), often with loamy or increased soil development and increased plant cover, as compared with *T. hookeri* which tends to occupy drier, rocky and less vegetated sites.

Easter daisy global status is a G5 (secure) and has a SNR (not ranked) in North Dakota. The species is not listed as a Species of Conservation Priority in North Dakota. The species is closely related to Hooker's *Townsendia* (*T. hookeri*) (Reveal 1970), which is rarer than Easter daisy (G5/S1).

Threats potentially facing Easter daisy include heavy livestock grazing, tree/shrub encroachment, and habitat loss due to energy/minerals development (Dickinson and Dodd 1976, Hamel and Reimer 2004). Foraging livestock commonly use Easter daisy's habitat. Grazing seems to have little effect on the abundance of this plant, but one usually finds a slightly higher population where grazing is light or moderate (USGS 2016).

Figure 4. Hooker's *Townsendia* and habitat.

Species with Potential Habitat but No Known Occurrences within or 150 feet of a Prairie Dog Colony on the LMNG

Dakota buckwheat (*Eriogonum visheri*)

Dakota buckwheat is a small, inconspicuous summer annual plant endemic to the badlands of North Dakota, South Dakota, and Montana (see Figure 4). Relatively little is known about this taxon's biology or ecological requirements. Its precise habitat requirements, the role of disturbance in its life history, and seed dispersal mechanisms of Dakota buckwheat are not known. The role of disturbance in the species' life history is unknown. It is adapted to soils that crack and swell and experience erosion from precipitation and wind. Apparently the seeds are primarily dispersed by surface run-off; plants tend to grow in micro drainages and places where water would accumulate, even if only fleetingly, during a

storm. It is vulnerable to habitat loss and degradation from mineral extraction, livestock grazing, or any other activity that results in soil disturbance (Ladyman 2006).

Figure 5. Dakota buckwheat plant and habitat.

Dakota buckwheat grows on barren, highly erodible, sedimentary rock outcrops in badlands or on smaller erosional features in mixed grass prairie where the underlying substrate is exposed. It is also found on badlands, sharp ridges, saddles, steep convex slopes, shale shelves, or on the dense clay outwash at the base of these slopes on the smaller erosional badlands features. It also has been found on smaller clay pan microsites with the upland rolling grassland types. It is only known to occur where bare soil exposure is greater than 50 percent.

Dakota buckwheat usually occurs in poor soil conditions with low or non-existent competition from other plant species. While disturbance may open areas to initial colonization by Dakota buckwheat, it also increases the probability of colonization by invasive non-native plants. Dakota buckwheat evolved in habitats where interspecies competitive pressures are very low, and evidence suggests that infestations of aggressive plant species are a significant threat to sustainable populations of this species over the long term (Ladyman 2006). Disturbance can also reduce or eliminate the seed bank, which appears to be the primary long-term survival strategy of the species (ibid.). Dakota buckwheat is likely to be palatable to non-selective herbivores, such as livestock, some species of wildlife, and arthropods, but the potential magnitude of the effect of browsing is not known. Dakota buckwheat global status is G3 meaning that species is vulnerable. It also has a North Dakota state status of S2 (imperiled).

Habitat for Dakota buckwheat occurs throughout the LMNG in distinct areas of exposed rock and clay substrates. These areas are not particularly hospitable for invasive plants or noxious weeds. Noxious weeds are not known to be threatening any populations, but some aggressive and invasive forb species such as sweetclover (*Melilotis officinalis*), tumbleweed (*Salsola iberica*), and kochia (*Kochia scoparia*) are common at many occurrence sites throughout its range (Ladyman 2006).

Dakota buckwheat habitats are not preferred areas for livestock because of scarce forage, but light trampling and trailing could slightly affect some populations. Trailing through some of this species habitat does happen occasionally, and the resulting effects of plant and soil damage are likely negative, but the impacts are short-lived, infrequent, and limited to only portions of populations or habitats. Livestock may consume some of the plants, but herbivory is more likely from small mammals and birds.

Sand lily (*Leucocrinum montanum*)

Sand lily is a perennial monocot with a deeply buried rootstock that flowers in May and June before drying up and disappearing for the remainder of the year. It grows in shortgrass communities to crested wheatgrass communities with fine-textured substrates. It is reported from open coniferous woodlands, sagebrush scrub, and sandy plains.

Only one currently active sand lily site is known on the Little Missouri National Grassland, but it appears to be a relatively large and stable population. No individuals have been observed in three historic sites of sand lily during several monitoring visits over the past 10 years. The global status of this species is G5 (globally secure). It is widespread, and abundant, although may be rare in parts of its range, particularly on the periphery, such as North Dakota. It is an S2 (imperiled) species in North Dakota (NatureServe 2015).

Habitat alteration is one of the greatest threats the species faces (North Dakota Natural Heritage Program 2013). The species is found in low structure vegetation, and may require moderate to heavy grazing to persist (North Dakota Natural Heritage Program 2013).

Figure 6. Sand lily and habitat.

Alkali sacaton (*Sporobolus airoides*)

Alkali sacaton is a widely distributed species over the western United States. It extends from North Dakota south Texas and includes all states to the west, as well as one Canadian Province (British Columbia) (NatureServe 2015). There are also outlying occurrences in New York, South Carolina, Arkansas, and possibly Missouri.

Alkali sacaton is considered peripheral in North Dakota, where it is known from several populations (NDNH database). Populations in North Dakota vary in size with the majority being fairly small (6 to 20 plants) although two of the populations contain several hundred individuals (Lenz 1993 and Heidel 1990 in USDA Forest Service 2000 NGP FEIS).

Known observations for the alkali sacaton suggest it is found near Badlands areas in southwestern North (NDNH 2013). Alkali sacaton is often associated with subirrigated saline drainage areas (Forest Service 2000) as well as being found on secondary successional habitat of clay outwashes in Theodore Roosevelt National Park (Heidel 1990 in USDA Forest Service 2000, North Dakota Natural Heritage 2013) and has also been recorded on depositional areas of sandy clay outwashes and alluvial deposits (Forest Service 2000 cites Lenz 1993, NDNH 2013). The highest densities occur along road cuts along a segment of I-94 (North Dakota Natural Heritage 2013). There are currently 12 recorded populations within the LMNG boundary.

The global status of Alkali sacaton is G5 (common, widespread, and abundant). In North Dakota the species is ranked as S2 (imperiled) (NatureServe 2015). The sub-ranking is likely due to the peripheral nature of the species in the state. Only four of the 17 western states and one Canadian province have this species listed as imperiled. It appears to be at risk in the northern and northeastern portion of its range (ND, WY, ID, and BC).

Alkali sacaton is resistant to moderate levels of disturbance by livestock grazing and fire management. It is considered an important forage species over much of its range and appears tolerant of moderate levels

of livestock grazing (Brakie 2007). The species is considered tolerant, but not resistant to fire events with recovery times estimated at 2-4 years (Johnson 2001.) Alkali sacaton is commonly used for seeding and stabilizing disturbed sites due to its tolerance to flood, drought, alkaline soils, grazing, and mining (North Dakota Natural Heritage 2013).

The greatest threat to this species is alteration of suitable habitats (North Dakota Natural Heritage 2013). Heavy levels of grazing and loss to wildfire may also result in adverse effects on the species (Johnson 2001).

Current Prairie Dog Colony Interactions with Sensitive Plant Populations

Table 12. Sensitive plant indicators and measures for the existing condition.

Resource Element	Resource Indicator	Measure	Existing Condition
Sensitive plant condition (occupied area)	Abundance	What is the current abundance of sensitive plant species?	Missouri pincushion – 1 occurrence With current prairie dog management, no trend is known since monitoring hasn't been accomplished on this population. Current population trends are assumed to be stable.
Population within a 150 feet of colony	Abundance	What is the current abundance of sensitive plant species?	Missouri pincushion – 1 occurrence Hooker's *Townsendia* – 2 occurrences With current prairie dog management, no trend is known since monitoring hasn't been accomplished on these populations which are recent finds. Current population trends are assumed to be stable.
Sensitive plant habitat	Suitable habitat	What is the current status of sensitive plant habitats?	Sensitive plant habitats are currently being maintained with current land management
Sensitive plants	Species viability	Determination category	Will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Sensitive Plant Measure 1 (Abundance)

Only one sensitive plant population, Missouri pincushion, is known to exist within a prairie dog colony on the LMNG. With current prairie dog management current population trends are unknown because these populations have not been revisited since their discovery.

Sensitive Plant Measure 2 (Population within 150 feet of colony)

Three sensitive plant populations are known to occur within a 150 feet of existing prairie dog colonies on the LMNG; Hooker's *Townsendia* at two dog towns and Missouri pincushion cactus at one town. With current prairie dog management current population trends are unknown because these populations have not been revisited since their discovery.

Sensitive Plant Measure 3 (Suitable Habitat)

Sensitive plant habitats can be found throughout much of the prairie dog management project area, ranging from scarcely vegetated areas to productive mix-grass prairies. These habitats are generally being maintained with current land management.

Sensitive Plant Measure 4 (Viability/Determination)

This biological evaluation reviews the proposed action and alternatives in sufficient detail to determine the level of effect that would occur to Forest Service Region 1 LMNG designated sensitive plant species (Forest Service 2011). One of four possible determinations is chosen based on the best available scientific literature, a thorough analysis of the potential effects of the project, and the professional judgment of the botanist completing the evaluation.

Environmental Consequences

Alternative 1 – No Action

The National Environmental Policy Act (NEPA) and National Forest Management Act (NFMA) require the No Action Alternative to assess the baseline environmental impacts. For this project, the no action alternative includes no active management or control of prairie dogs. Neither lethal nor non-lethal control measures would be used to manage prairie dog colonies, including wanted or unwanted colonies. Active measures that encourage expansion of prairie dog colonies would also not take place. This alternative serves as a baseline against which the action alternatives can be compared. For this alternative:

- Prairie dog management would be totally passive in nature and scope;
- All colonies currently encroaching onto adjacent non-Forest Service lands would likely continue to encroach;
- Contraction or expansion of the colonies would depend on climate, grazing patterns and intensities, predation, disease, and amount of prairie dog shooting present. Therefore, three LMNG prairie dog complexes may or may not retain their minimum 1,000 acres of habitat. The Southwest McKenzie County focal area may or may not slowly move toward the colony size objective of 1,000 acres.

Direct and Indirect Effects

Missouri pincushion

Over the species range, habitat alteration and development, shrub encroachment due to fire exclusion, and sometimes overgrazing has extirpated populations from many of its historically known sites. The species can rapidly colonize disturbed habitats along with other early seral cacti. The species may require disturbance events (e.g., livestock grazing, fire) to provide sites for colonization.

There is only one known population (site True 21-6) on the LMNG, on the McKenzie Ranger District, that is within a prairie dog colony. This site was identified in 2015 with a population of 16 individual plants. The population and prairie dog colony (375-2) are within MLRA 54 on a thin claypan ecological site in a state of annual/pioneer perennial. Indirectly this population may be impacted if the colony is eradicated by diseases. The existing plant community overtime would transition from an annual/pioneer perennial state to a native/invaded or invaded state that would increase competition from perennial plant species.

Based on a 25 percent expansion over a 5-year period and the data provided by the soil survey, this prairie dog colony would remain on the thin claypan ecological site. The expansion of this colony would transition the site from its current state into the annual/pioneer perennial state which may create additional habitat for the Missouri pincushion cactus over a 5-year period, since this species is an early successional species. The species can rapidly colonize disturbed habitats along with other early seral cacti.

There is one other Missouri pincushion cactus population (site Zenergy 26-25H 23-14H) within 150 feet of an existing prairie dog colony on the LMNG. Colony 333-1 is within MLRA 54 and consist of three ecological sites; loamy, thin loamy, and clayey. The ecological sites within the colony are assumed to be in an annual/pioneer perennial state and community phases which may provide suitable habitat for the Missouri pincushion based on the soil types and disturbance created by the prairie dogs.

Based on a 25 percent expansion over a 5-year period and the data provided by the soil survey, colony 333-1 would expand onto the loamy ecological site in which the Zenergy 26-25H 23-14H cactus population exist. The expansion of the prairie dog colony would transition this site from its current state into an annual/pioneer perennial state which may create additional habitat for the Missouri pincushion cactus over a 5-year period since it is an early successional species. Alternative 1 would have ***no impact*** with a possible trend toward beneficial impact on the Missouri pincushion.

Easter daisy and Hooker's *Townsendia*

Threats potentially facing Easter daisy include heavy livestock grazing, tree/shrub encroachment, and habitat loss due to energy/minerals development (Dickinson and Dodd 1976, Hamel and Reimer 2004). Foraging livestock commonly use Easter daisy habitat. Grazing seems to have little effect on the abundance of this plant, but one usually finds a slightly higher population where grazing is light or moderate (USGS 2013).

There are no known populations of Easter daisy or Hooker's *Townsendia* within an existing prairie dog colony; however, all colonies have not been surveyed for sensitive species. Based on the DPG's sensitive GIS layer (2015) there are two known populations of Hooker's *Townsendia* (site V2 (Medora Ranger District) and 011808EO2013YELLOWSTONE46 (McKenzie Ranger District)) within 150 feet of colonies 170-4 and 339-1, respectively. Colony 170-04 currently resides on a thin loamy ecological site and site V2 also resides on a thin loamy ecological site within MLRA 58C. Colony 339-1 currently consist of four ecological sites; loamy, thin loamy, loamy overflow, and claypan within MLRA 54. Expansion of these colonies would transition the existing states of the ecological sites to an annual/pioneer perennial, potentially creating additional habitat for Hooker's *Townsendia* and Easter daisy. There is the threat of herbivory of the *Townsendia* species by prairie dogs. Therefore Alternative 1 ***may impact individuals or habitat but will not contribute to a trend toward federal listing or cause a loss of viability*** for these *Townsendia* species.

Dakota buckwheat

Dakota buckwheat is likely to be palatable to non-selective herbivores, such as livestock, some species of wildlife, and arthropods, but the potential magnitude of the effect of browsing is not known. Based on the Forest Service 2015 sensitive species layer there are known population of this species that do occur within or adjacent to prairie dog colonies on the Grand River Ranger District, Grand River National Grassland, DPG. Based on Forest Service records this population was found in the mid 1980's. This population has been surveyed over the years and the viability of the population has not been lost as a result of the activities of prairie dogs. Based on these surveys and the distance of the known population on the LMNG from prairie dog colonies, there would be no impact to these existing known populations from the implementation of Alternative 1. However, ***there may be impacts to potential habitat throughout LMNG but will not likely contribute to a trend toward federal listing or cause a loss of viability of this species***.

Sand lily

Only one currently active sand lily population is known on the LMNG. This population appears to be stable based on monitoring and is approximately 0.45 miles from prairie dog colony 333-3. Habitat alteration is one of the greatest threats this species is facing (North Dakota Natural Heritage 2013). The species is found in low structure vegetation, and may require moderate to heavy grazing to persist (North Dakota Natural Heritage 2013). Alternative 1 would not have an effect on this population of sand lily based on a 25 percent prairie dog colony expansion over a 5-year period. This population has also been

monitored over the years and the viability of the population has not been lost as a result of the current management of prairie dogs. An expansion of this colony may impact undiscovered populations and potential habitat that may be adjacent to the existing colony based on the NRCS soil survey and NAIP images.

This alternative also ***may impact individuals (undiscovered) or habitat throughout the LMNG but will not likely contribute to a trend toward federal listing or cause a loss of viability of this species***. The global status of this species is G5 (globally secure). It is widespread, and abundant, although may be rare in parts of its range, particularly on the periphery. It is an S2 (imperiled) species in North Dakota (NatureServe 2015).

Alkali sacaton

The species is considered tolerant, but not resistant to fire events with recovery times estimated at 2-4 years (Johnson 2000). Alkali sacaton is commonly used for seeding and stabilizing disturbed sites due to its tolerance to flood, drought, alkaline soils, grazing, and mining (North Dakota Natural Heritage 2013). The greatest threat to this species is alteration of suitable habitats (North Dakota Natural Heritage 2013). Heavy levels of grazing and loss to uncharacteristic wildfire may also result in adverse effects on the species (Johnson 2000). Since prairie dogs may graze heavily on this species should they expand into a population of alkali sacaton, Alternative ***1 may impact individuals or habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability for this species***.

Table 13. Sensitive plant indicators and measures for Alternative 1.

Resource Element	Resource Indicator	Measure	Alternative 1 (No Action)
Sensitive plant condition	Abundance	Would there be no change, an increase, or a decrease in the known species abundance?	There will be **no impact** to the existing Missouri pincushion cactus population.
Population within and 150 feet of colony	Abundance	Would there be no change, an increase, or a decrease in the known species abundance?	There will be **no impact** to the existing Missouri pincushion cactus. There **may be impact** to the existing Hooker's *Townsendia* populations through foraging.
Sensitive plant habitat	Suitable habitat	Would there be no change, an increase, or a decrease in the amount or quality of suitable habitats?	Missouri pincushion cactus, Easter daisy, Hooker's *Townsendia*, Dakota buckwheat habitats **may benefit** from colony expansion because of the decrease in competition of other native perennial species due to expansion of the colony. Habitat for sand lily and alkali sacaton **may be impacted** by the expansion of colonies.
Sensitive plants	Species viability	Determination category	With both beneficial and adverse effects expected, the no action alternative **may impact** individuals (undiscovered) or habitat for 6 LMNG Forest Service-designated sensitive species, but will not likely contribute to a trend toward Federal listing or loss of viability to the populations or species.

Table 14. Summary of Determinations for LMNG Forest Service-designated Sensitive Plant Species for Alternative 1.

Sensitive Species	No Impact	May Impact[1]	Will Impact[2]	Beneficial Impact
Dakota buckwheat (*Eriogonum visheri*)		X		X
Missouri pincushion cactus (*Escobaria missouriensis*)		X		X
Sand lily (*Leucocrinum montanum*)		X		
Alkali sacaton (*Sporobolus airoides*)		X		
Easter daisy (*Townsendia exscapa*)		X		X
Hooker's *Townsendia* (*Townsendia hookeri*)		X		X

[1]May impact individuals or habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.
[2]Will impact individuals or habitat with a consequence that the action may contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Effects Common to All Action Alternatives (2, 3, and 4)

Under Alternatives 2, 3, and 4 various levels and methods of prairie dog management would take place on the LMNG. Each of the action alternatives would primarily address the "Good Neighbor Policy", but would also consider active measures to facilitate expansion of prairie dog populations where desired on the LMNG in accordance with the Grasslands Plan. Actions common to these alternatives are presented below.

Alternative 3 includes prairie dog control without the use of poisons. Methods include translocation, lethal traps (e.g. conibear, leghold, etc.), shooting, as well as vegetative barriers to discourage encroachment where unwanted. This alternative was developed based on comments received during scoping expressing concern over the use of poisons to kill prairie dogs and the effect to non-target wildlife and domestic species.

Adaptive Management

Alternatives 2, 3, and 4 include specific colonies listed for control as well as adaptive management to allow for control of future unwanted colonies that fit the criteria described in Chapter 2. Adaptive management is defined as, "A system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain" (36 CFR 220.3). It is a process that allows the responsible official to deal with uncertainty and changing conditions over time, and it provides for constrained flexibility to adapt to changing conditions or unanticipated resource response. Adaptive management is based on the assumption that current resources and scientific knowledge are limited and a certain level of uncertainty exists. Nevertheless, an adaptive management approach attempts to apply available resources and knowledge and adjusts management techniques as new information is revealed. In terms of natural resource management, adaptive management focuses on meeting or moving toward the desired condition objectives on the ground.

Project Design Features and Mitigation Measures

See design features section of Chapter 2.

Required Monitoring

DPG, LMRP Monitoring Program. Updated July 2016, Page 8, MON-BOT-02 and Planning Rule at 36 CFR 219.12(a)(5) requires monitoring of the following:

- *ii. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.*
- *iv. The status of a select set of the ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed threated and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.*

Sensitive Species Indicators (Measures)

Provide a report of the individual status of designated R1 LMNG Forest Service sensitive species every two years and the acres of NFS lands surveyed. Not all occurrences will be visited every year. Selection of interval of visits dependent on life history of plants.

Direct and Indirect Effects

Adaptive Management Tool Box

To address prairie dog management, this proposal examines two lethal control measures and nine non-lethal control measures to use in combination with each other as appropriate to meet the objectives for each colony and within the emphasis of each alternative (see Table 2).

Sensitive Plant Measure 1 (Abundance)

Based on the proposed action in Alternative 2, methods proposed in Alternatives 3 and 4, relative to the Forest Service sensitive species GIS layer, there are no known populations of sensitive species within a colony being proposed to be treated. The probability of prairie dog treatments damaging undiscovered sensitive plant populations is relatively low due to the size of the individual plants. Some incidental damage may occur to individuals by ATV/UTV during control operations; however, damages are not expected to result in substantial loss of individuals or to the population.

Sensitive Plant Measure 2 (Population within 150 feet of colony)

Based on the proposed action in Alternative 2, methods proposed in Alternative 3 and 4, relative to the Forest Service sensitive species GIS layer, there are no known populations of sensitive species within 150 feet of a prairie dog colony being proposed to be treated. An indirect effect of the action alternatives is possible if these three colonies are chosen to be treated in the future. If treated there would be an increase in competition from other perennial species which will result in a transition from the existing annual/pioneer state to either a native/invaded or invaded state. Treatment of these colonies, however, would reduce the chance of herbivory of the existing two populations of Hooker's *Townsendia* by prairie dogs.

Sensitive Plant Measure 3 (Suitable Habitat)

Potential habitat that may exist within the proposed treatment areas may be lost due to a transition of all or portions of the colonies from an annual/pioneer state to a native/invaded or invaded state. This transition would increase competition of perennial plant species, having a negative impact on some sensitive species, most of which are early successional species. However, treatment of prairie dogs may be beneficial to sand lily and Alkali sacaton.

Sensitive Plant Measure 4 (Viability/Determination)

Sensitive plant habitats can be found throughout much of the prairie dog management project area, ranging from scarcely vegetated areas to productive mixed-grass prairies. These habitats are generally being maintained with current land management. Alternatives 2, 3, and 4 ***may impact individuals (undiscovered) or habitat, but will not likely contribute to a trend toward Federal listing or loss of***

viability to the population or species. Sand lily and alkali sacaton may benefit from the action alternatives in areas where they have potential to occur based on soil survey and NAIP images.

Table 15. Sensitive plant indicators and measures for the action alternatives.

Resource Element	Resource Indicator	Measure	Alternatives 2, 3, and 4
Sensitive plant condition	Abundance	Would there be no change, an increase, or a decrease in the known species abundance?	No change to known species abundance. There are no known sensitive plant populations within or within 150 feet of the ***proposed treatment colonies***. Disturbances created by treatments **may impact** undiscovered population on the LMNG. However, minimal damages are expected to unknown populations based the amount of disturbance that will occur with the treatments being proposed.
Population within and 150 feet of colony	Abundance	Would there be no change, an increase, or a decrease in the known species abundance?	No change in known species abundance. There are no known sensitive plant populations within 150 feet of the ***proposed treatment colonies***. Disturbances created by treatments **may impact** undiscovered population on the LMNG. However, minimal damages are expected to unknown populations based the amount of disturbance that will occur with the type of treatments being proposed.
Sensitive plant habitat	Suitable habitat	Would there be no change, an increase, or a decrease in the amount or quality of suitable habitats?	There would be a decrease in habitat for some species with an increase in habitat for other species. Potential habitat that may exist within the proposed treatment areas **may be lost** for some species due to a transition of all or portions of the colonies to a native/invaded state. This transition would increase competition of perennial species of plants. However, there may be **beneficial effects** to sand lily and alkali sacaton.
Sensitive plants	Species viability	Determination category	Alternative 2, 3, and 4 ***may impact individuals (undiscovered) or habitat, but will not likely contribute to a trend toward Federal listing or loss of viability to the population or species*** for all sensitive species in the analysis area. Sand lily and alkali sacaton **may benefit** from Alternatives 2, 3, and 4 in areas where they have potential to occur based on the soil survey NAIP images.

Table 16. Summary of Determinations for LMNG Forest Service-designated Sensitive Plant Species for Alternatives 2, 3, and 4.

Sensitive Species	No Impact	May Impact[1]	Will Impact[2]	Beneficial Impact
Dakota buckwheat (*Eriogonum visheri*)		X		
Missouri pincushion cactus (*Escobaria missouriensis*)		X		
Sand lily (*Leucocrinum montanum*)		X		X
Alkali sacaton (*Sporobolus airoides*)		X		X
Easter daisy (*Townsendia exscapa*)		X		
Hooker's *Townsendia* (*Townsendia hookeri*)		X		

[1]May impact individuals or habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.
[2]Will impact individuals or habitat with a consequence that the action may contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Cumulative Effects – All Alternatives

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

The Great Plains have undergone continual transformations due to the influences of natural processes and human actions. Within the LMNG, vegetation types include native semi-arid grasslands, croplands, wetlands, and pasture lands within MRLA 54 and 58C. Approximately 116,360 acres of native plant communities have been disturbed on the LMNG by past cultivation (USDA Forest Service LMNG Brokenlands GIS Layer). Several of these areas were planted to introduced graminoid species such as crested wheatgrass (*Agropyron cristatum*), and smooth brome (*Bromus inermis*), or left as "go back" (grasslands that have been cultivated, were not seeded to non-native graminoids and forbs, and have been allowed to let ecological processes determine species composition). It is apparent that these non-native species have expanded further into the grasslands along with other invasive graminoid and forb species based on data collected by North Dakota State University (2008 – 2012). North Dakota State University plot data collected on both Medora and McKenzie Ranger District show communities within a native/invaded or invaded state. However, the expansion of these species can also be linked back to other past and present disturbances such as oil and gas, utility and road construction, livestock grazing, and recreation.

The greatest threat to R1 LMNG Forest Service-designated sensitive plant species is habitat alteration and invasive species. The continued loss of suitable habitat to implementation of agricultural practices, oil and gas development, utility construction, transportation systems, and recreation is expected over time.

Intensive agricultural practices are likely to continue or increase on adjacent private lands along with oil and gas exploration on lands of all ownerships. On National Forest System (NFS) lands impacts such as habitat fragmentation and accidental introduction of invasive species will continue, which may result in decreased native plant species diversity. Over the long term, minor disturbances may accumulate and detrimentally effect the viability of certain native plant populations.

There is only one known sensitive species population within a prairie dog colony and three additional sensitive species populations within 150 feet of an existing colony. Currently the action alternatives do not proposed treatment for these four colonies; however, an expansion of two of these colonies may impact two Hooker's *Townsendia* populations due to the change in the plant communities and possible herbivory by prairie dogs.

Potential habitat for four of the 14 R1 LMNG sensitive species which may exist within the proposed treatment areas may be lost due to a community transition within the colonies to a native/invaded state due to the effects of prairie dog herbivory. This transition would increase competition of perennial species. However, there may be a beneficial effect to sand lily and alkali sacaton. All alternatives within this analysis may impact individuals (undiscovered) or habitat, but will not likely contribute to a trend toward Federal listing or loss of viability to the population or species on the LMNG.

Drought is a recurring event within the project area and is characterized by the length and severity of a specific drought. Drought results in reduced plant productivity that creates favorable habitat conditions for prairie dog expansion/dispersal. This may create additional habitat for early successional sensitive plant species and also result in transition of the ecological sites into another state.

Thus far, plague has not been a determining factor of prairie dog population size or density on the LMNG. A plague positive flea was discovered in the South Unit Theodore Roosevelt NP in 1993 but the extent of the prairie dog die off was limited. A prairie dog die-off due to plague was also observed in the North Unit of the Park and in an immediately adjacent prairie dog colony on McKenzie RD in 1987. A die off of a colony with the presence of sensitive species would likely result in an increase in competition of herbaceous species; however, this unlikely scenario would not threaten the viability of the sensitive plant species since the species that occur within and adjacent to the colonies have a global ranking G4 and G5, indicating species are globally secure.

Since 2003, there have been over twenty-four documented occurrences of adverse effects to existing sensitive plant populations on the LMNG. The vast majority of these occurrences involved oil and gas developments, including direct disturbances to Missouri foxtail cactus, two *Townsendia* species, and Dakota buckwheat, the four most abundant of the sensitive species on the LMNG. In most cases the degree of adverse effects to sensitive plant occurrences have been decreased through avoidance or slight adjustments of the proposed developments. As a result, adverse effects occurred only on a portion of the sensitive plant population, rather than the entire population. These cumulative effects have not contributed to a loss of viability for any of the four species.

3.5 Range Resources

This report will divide the range resource into two main components: rangeland vegetation and livestock grazing management. The effects to the rangeland vegetation will be disclosed as predicted changes in vegetation composition via the Ecological Site Description (ESD) State and Transition Model and predicted effects to herbage production. Livestock grazing management will be reviewed as effects to the following: Available AUMs for livestock grazing, authorized use, season of use, grazing systems, and structural range improvements.

Relevant Laws, Regulations, and Policy

Federal Law and Regulations

- Forest Service Manual (FSM) 2210 summarizes laws and regulations governing range management and forest planning.
- National Forest Management Act (NFMA) of 1976 identifies information requirements concerning NFS grazing resources.
- 36CFR 222.3(a) states that unless otherwise specified by the Chief of the Forest Service, all grazing and livestock use on National Forest System lands must be authorized by a grazing or livestock use permit.
- 36 CFR 222.3 (c) (1) authorizes the Forest Service to use grazing agreements as a type of grazing permit. A grazing agreement is a type of grazing permit that authorizes eligible grazing associations organized under state laws of incorporation and/or cooperatives to utilize a specified amount of grazing on NFS lands for a period of 10 years.
- Section 19 (209) of the 1950 Granger-Thye Act states that grazing permits (including grazing agreements) and livestock use permits convey no right, title, or interest held by the United States in any lands or resources.

Other Guidance

Land and Resource Management Plan

The Dakota Prairie Grasslands Land and Resource Management Plan (LRMP) provides the following standards and guidelines relevant to Prairie Dogs, Vegetation, and Livestock Grazing (Table 17).

Table 17. Grasslands Plan Standards and Guidelines

Area	Plan Page	Resource	Standard or Guideline	Alternative Compliance with LRMP (Standard or Guideline)
Grasslands Wide	*1-19*	Livestock Grazing	3. Adjust livestock management activities annually, as needed, to take into account the effect of natural processes, such as droughts, fires, floods, and grasshoppers, on forage availability. **Guideline**	Not applicable since this project does not authorize grazing. Prairie dogs may affect grazing levels authorized in other projects however.
Grasslands Wide	*1-19*	Livestock Grazing	9. Prioritize and remove fences or water developments that are not contributing to achievement of desired conditions. **Guideline**	NA

Area	Plan Page	Resource	Standard or Guideline	Alternative Compliance with LRMP (Standard or Guideline)
Grasslands Wide	*1-20*	Livestock Grazing	11. Design and implement range management strategies for meeting desired vegetation objectives using existing monitoring information and stocking rate guidelines for livestock grazing (see Appendix I). **Standard**	NA since this project does not authorize grazing though prairie dogs may affect grazing levels authorized in other projects.
Badlands GA Rolling Prairie GA	*2-15 2-22*	Livestock Grazing	1. Use nonstructural range management techniques such as water management, herding, riding, and mineral management to achieve desired conditions. If nonstructural management methods are not successful, then new structural developments may be used to achieve desired conditions. **Guideline**	NA since this project does not authorize grazing though prairie dogs may affect grazing levels authorized in other projects.
Grasslands Wide	*1-16*	Burrowing Owls	46. Manage for active prairie dog colonies that are larger than 80 acres. **Guideline**	Alt 1 – No Action, expansion expected Alt 2, 3, 4 - expansion expected away from non-NFS lands
Grasslands Wide	*1-16*	Black-tailed Prairie Dog	47. Restrict prairie dog shooting where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansion. Restrictions shall be year-long or seasonal, and dates of seasonal restrictions shall vary depending on the species at risk. Coordinate and consult with the appropriate wildlife agencies prior to implementation of restrictions. **Guideline**	Any shooting restrictions to be authorized through separate site-specific NEPA when ripe for decision.
Grasslands Wide	*1-16*	Black-tailed Prairie Dog	49. Use livestock grazing and prescribed fire to enhance habitat suitability for prairie dogs where prairie dog expansion is desired. These areas are identified at the project level. **Guideline**	Not applicable because this project does not authorized grazing or prescribed fire.
Grasslands Wide	*1-16*	Black-tailed Prairie Dog	50. Manage for low vegetative structure in areas where prairie dog expansion is desired. Emphasize areas adjacent to existing prairie dog colonies as well as at abandoned colony sites. **Guideline**	Alt 1 – No Action Alt 2, 3, 4 Addressed with adaptive management in coordination with vegetation management projects.
Grasslands Wide	*1-16*	Black-tailed Prairie Dog	51. Manage for high vegetative structure around prairie dog towns where prairie dog expansion is not desired. Emphasize maintaining high structure between existing prairie dog colonies and private land. **Guideline**	Alt 1 – No Action Alt 2, 3, 4 Addressed with adaptive management in coordination with vegetation management projects

Area	Plan Page	Resource	Standard or Guideline	Alternative Compliance with LRMP (Standard or Guideline)
Grasslands Wide	*1-18*	Animal Damage Management	2. Limit the use of rodenticides (grain baits) for reducing prairie dog populations to the following situations: • Public health and safety risks occur in the immediate area. • Damage to private and public infrastructure or facilities, such as cemeteries and residences. • To respond to unwanted prairie dog colonization on land adjoining the national grasslands when consistent with U.S. Fish and Wildlife Service approved, state-wide prairie dog conservation strategies. **Standard**	Alt 1 – Not applicable Alt 2, 3, 4 all meet
Grasslands Wide	*1-18*	Animal Damage Management	3. Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program. **Guideline**	NA. To be covered under site-specific NEPA when ripe for decision.
Grasslands Wide	*1-18*	Animal Damage Management	4. Restrict the use of rodenticides (above-ground grain baits) for reducing prairie dog populations outside the period October 1 to December 31 to reduce risks to migratory birds. **Guideline**	Alt 1 – Not applicable Alt 2, 3, 4 all meet
Grasslands Wide	*1-18*	Animal Damage Management	5. Do not use burrow fumigants in prairie dog colonies. **Standard**	No use of fumigants proposed; all comply.
Badlands GA	*2-15*	MIS/Desired Condition	1. Emphasize establishment and expansion of prairie dog complexes in the Indian Creek and Boyce Creek drainages. **Guideline**	Expansion expected in all alternatives; all comply.
Rolling Prairie GA	*2-22*	MIS/Desired Condition	1. Emphasize establishment and expansion of prairie dog complexes in the Horse Creek drainage and in the vicinity of Theodore Roosevelt National Park, South Unit. **Guideline**	Expansion expected in all alternatives; all comply.
MA 3.63	*3-28*	Livestock Grazing	1. Use livestock grazing strategies and stocking rates to help achieve desired rates of prairie dog colony establishment and growth. **Guideline**	To be implemented in coordination with vegetation management projects.
MA 3.63	*3-28*	Fish and Wildlife	1. Use rodenticides to reduce prairie dog populations only in response to public health and safety risks. Mutual concurrence by the Forest Service and US Fish and Wildlife Service is required on a colony-by-colony basis before authorizing any poisoning. **Standard**	Alt 1 – No Action Alt 2, 3, 4 – no rodenticide use proposed in MA 3.63 at this time. Future proposed use would only be as a result of public health and safety risks.

Area	Plan Page	Resource	Standard or Guideline	Alternative Compliance with LRMP (Standard or Guideline)
MA 3.63	*3-29*	Recreation	1. Restrict shooting in prairie dog colonies unless needed to help reduce unwanted colonization of adjoining lands. Authorize shooting in selected areas only through mutual concurrence by the Forest Service and U.S. Fish and Wildlife Service. Coordinate and consult with the appropriate state wildlife agency prior to implementation of authorized shooting. **Guideline**	Any shooting restrictions to be covered under site-specific analysis if and when ripe for decision.

Desired Condition

The Grasslands Plan identifies desired conditions for the following Geographic Areas (GA) and Management Areas (MA):

Badlands Geographic Area

The vegetative desired condition, based on edaphic and environmental conditions, is to maintain or perpetuate a diversity of vigorous mixed grass and short grass communities. The full spectrum of cool season and warm season species would be represented, such as western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), needle-and-thread grass (*Hesperostipa comata*), little bluestem (*Schizachyrium scoparium*), threadleaf sedge (*Carex filifolia*), prairie sandreed (*Calamovilfa longifolia*), sand bluestem (*Andropogon hallii*), sideoats grama (*Bouteloua curtipendula*), and blue grama (*Bouteloua gracilis*).

Rolling Prairie Geographic Area

The desired landscape condition is to maintain the Rolling Prairie's scenic nature, while perpetuating diverse and healthy mixed grass and short grass communities. The full spectrum of cool season and warm season species would be represented, including: western wheatgrass, green needlegrass, needle-and-thread grass, little bluestem, threadleaf sedge, prairie sandreed, sand bluestem, sideoats grama, and blue grama.

3.63 MA – Black-Footed Ferret Reintroduction Habitat

Prairie dog colony complexes and compatible land uses are established and/or maintained for black-footed ferret reintroductions. Prairie dog populations are maintained or increased through vegetation management and/or relocation of prairie dogs with consultation with State Game and Fish agencies into suitable habitat. Plant and animal species and communities associated with black-footed ferrets and black-tailed prairie dogs are actively restored. The Forest Service works with other agencies and organizations to pursue conservation agreements or easements with adjoining land jurisdictions to achieve black-footed ferret recovery objectives. In areas where landownership patterns are not conducive to effective prairie dog management, landownership adjustments to achieve more favorable landownership patterns are pursued. Unwanted impacts to adjoining lands are minimized.

3.65 MA - Rangeland with Diverse Natural-Appearing Landscapes

These areas have relatively few livestock grazing developments, such as fences and water tanks, resulting in a mosaic of livestock grazing patterns and diverse vegetation composition and structure. Livestock graze most areas annually, but some areas receive little or no grazing due to topography. Riparian areas and streams will move toward properly functioning condition and have few human-caused alterations. Restored riparian areas and or streams will be evident. Prescribed fire is used as a management tool. Wildfires are aggressively controlled. Natural outbreaks of native insects and diseases are allowed to proceed without intervention unless there is a substantial threat to high-value resources. Natural-

appearing landscapes predominate; however, oil and gas development may occur and are visually subordinate to the landscape.

6.1 MA - Rangeland with Broad Resource Emphasis

The rolling prairie in this management area will be managed to preserve ecological integrity across the landscape, especially large blocks of native upland prairie. This management area will display low to high levels of livestock grazing developments. Livestock will graze most areas annually, but a spectrum of vegetation structure and a high degree of biodiversity will be present. Livestock grazing intensity will vary; however, moderate use will prevail over most of the management area. Natural disturbance processes, including grazing and fire, will be used to emulate the natural range of variability of vegetation structure and composition. Rest and prescribed fire will be incorporated into the landscape. Prairie dog colonies will increase in some areas of the MA.

Topics and Issues Addressed in This Analysis

Resource Indicators and Measures

Table 18. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: P/N, or key issue?	Source (LRMP S/G; law or policy, BMPs, etc.)?
Rangeland Vegetation	Ecological Site Description (ESD), State and Transition Diagram	Transitions in states and pathways between community phases -Acres following the restoration pathway (Category 3 Treatment Areas) -Acres following the transition pathway (Estimated Prairie Dog Expansion, over 10 years) Total Acres occupied by prairie dogs at Year 10	No	LRMP Ecological Site Descriptions Memo December 3, 2013
Livestock Grazing Management	Authorized Livestock Grazing	Potential to affect authorized use (AUMs), livestock operations, season of use, and grazing system	No	Forest Service Manual, LRMP

Methodology

Rangeland Vegetation Composition:

On December 3, 2013, a memorandum was issued to serve as the official notice to shift from Dakota Prairie Grasslands Plan (LRMP) (USDA Forest Service 2001) direction with objectives for seral stage percentages across the landscape by geographic area to the use of state-and-transition models described in ecological site descriptions (ESDs) for vegetative composition objectives across the Dakota Prairie Grasslands.

Rangeland plant communities are dynamic with their composition changing in response to climatic conditions and disturbance regimes. The USDA Natural Resources Conservation Service (NRCS) and their cooperators have developed ESDs that attempt to describe the composition and ecological function of these plant communities (Sedivec and Printz 2012). Included in the ESDs are state and transition

diagrams which illustrate the current understanding of how these plant communities respond to various disturbance regimes (available online at https://efotg.sc.egov.usda.gov/treemenuFS.aspx under section II). The state and transition diagrams, along with the ecological dynamics narratives, identify and describe the different plant community states, phases, thresholds, transitional pathways, and drivers that may occur on a site. Understanding these dynamics help us predict how a plant community will respond to changes in management (Sedivec and Printz 2012).

ESDs and state and transition diagrams were used to analyze the predicted plant community changes due to prairie dog colony expansion or removal. A GIS exercise was performed by clipping the existing prairie dog colonies with ecological sites across the project area (Table 22 and Table 23). This exercise illustrates the existing prairie dog distribution across ecological sites within the project area. Table 22 and Table 23 also display the predicted change in herbage production on each ecological site, which was calculated using the estimated production values within the ESDs. For this analysis, production of the ecological site's reference plant community Representative Value (RV) was compared to the RV production of the vegetative state expected from long term prairie dog occupation, commonly the Short Grass state or Annual/Pioneer Perennial state. It is important to recognize that not all of the project area is in reference condition, and that it may not be possible to return to the reference state depending on the ecological site.

Livestock Grazing Management

This section will describe the potential effects of the existing condition and proposed activities on livestock operations including effects on authorized use, season of use, grazing systems, and structural range improvements. The effects to available Animal Unit Months (AUMs) for livestock grazing were analyzed using ESDs and NRCS methodology (Sedivec and Printz 2012). The AUM analysis was completed for comparison purposes only. This project does not propose any changes to the grazing permit held by each Grazing Association; any change in number of head of livestock refers only to the number of livestock authorized annually, which may be affected by prairie dog activity. Authorized use is discussed annually as Forest Service staff and the Grazing Associations work cooperatively to develop the Annual Operating Instructions or Allotment Worksheets.

Substantial modification to livestock grazing management will be addressed through Allotment Management Plans, which are completed through separate NEPA. Updates to existing Allotment Management Plans are in progress across the LMNG, implemented through ongoing Vegetation Management Planning projects. These management plans include prescribed grazing strategies, installation of range infrastructure, and implementation of restoration activities designed to meet LRMP objectives for vegetative, hydrological, and wildlife resources in each project area. Not all planning areas contain prairie dogs colonies. However, where prairie dogs are present, actions implemented to meet LRMP goals and objectives may influence prairie dog colonies.

Grazing on the LMNG is permitted through 10-year grazing agreements held by each respective Grazing Association. Grazing on the McKenzie Ranger District is permitted to the McKenzie County Grazing Association (MCGA). The Medora Ranger District has three Grazing Associations: Horse Creek Cooperative (HCCGA), Medora (MGA), and Little Missouri (LMGA). The Grazing Association is the "permittee' in that the Association is issued a grazing permit to graze livestock on the National Forest System (NFS) lands. The Association, in turn, issues annual permits to its members to graze their livestock on one or more of the grazing allotments.

Information Sources

This analysis relies on the Natural Resources Conservation Service (NRCS) soil survey and ecological sites descriptions (NRCS 2012), as well as Forest Service GIS range allotment layers and prairie dog inventory shapefiles, which are considered to be the best available science.

Incomplete and Unavailable Information

Ecological Site Descriptions for Major Land Resource Area (MLRA) 58C were not completed at the time of this analysis; therefore state and transition models are not available for these ecological sites. However, a review of the Range Sites Descriptions for Badlands Vegetation Zone (which is comparable to MLRA 58C), has been completed. For this analysis, it is assumed that ecological sites within 58C will have a similar vegetation response to continuous season-long grazing, or heavy continuous grazing and/or clipping by prairie dogs within the state and transition model for MLRA 54. The annual herbage production values within MLRA 58C are expected to be slightly less than those sites found in MLRA 54; however, would have similar species composition. For ecological sites in 58C, estimated herbage production for the reference plant community is assumed from the Range Site Descriptions for Badlands Vegetation Zone. Because the range sites do not disclose estimated fluctuations in herbage production, this analysis used the Relative Value production of the vegetative state expected from long term prairie dog occupation from MLRA 54.

Spatial and Temporal Context for Effects Analysis

In comparison with the overall size of the project area, prairie dogs currently impact a very minor proportion of the LMNG. The project will minimally effect vegetation conditions and livestock management when viewed at the landscape level on the LMNG. As the scope of the project is narrowed to the areas colonized and impacted by prairie dogs, the effects are more readily apparent. This analysis will describe transitions or community pathways of the plant communities within an ecological site in response to prairie dog occupation, expansion, and treatment; as illustrated in the ESD's state-and-transition models. Effects to livestock management on individual grazing allotments will be highly variable dependent upon the overall size of the allotment in comparison with acres of prairie dogs within that specific allotment.

Direct/Indirect Effects Boundaries

The spatial boundaries for analyzing the direct and indirect effects to ecological sites and their plant communities is a quarter mile buffer around existing prairie dog colonies inventoried in 2015. Assuming predictable prairie dog expansion and impacts to vegetation would remain within the quarter mile of existing prairie dog colonies.

The spatial boundaries for analyzing the direct and indirect effects to Livestock Grazing Management are the 88 grazing allotments within the LMNG currently affected by prairie dogs, assuming predicted prairie dog expansion and new colonies would occur within these allotment boundaries.

The temporal boundary for this analysis is 10 years into the future. This time period allows for an adequate length of time to record vegetative changes in response to prairie dog management. By the end of this time period, foreseeable prairie dog expansion and contraction would have occurred and the predicted effects to rangeland vegetation and grazing management would be in progress and observable.

Cumulative Effects Boundaries

The project area (LMNG) serves as the area of analysis for cumulative effects because effects of other past, present, and foreseeable activities would interact with effects of the proposed project only within the project area.

Affected Environment

Existing Condition

Table 19. Resource indicators and measures for the existing condition

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Existing Condition
Rangeland Vegetation	Ecological Site Description, State and Transition Diagram	Transitions in states and pathways between community phases -Acres following the restoration pathway (Category 3 Treatment Areas) - Acres following the transition pathway (Estimated Prairie Dog Expansion, over 10 years) Total Acres occupied by prairie dogs at Year 10	5,559 Acres occupied by Prairie Dogs
Livestock Grazing Management	Authorized Livestock Grazing	Potential to affect authorized use (AUMs), livestock operations, season of use, and grazing system	Current Permitted AUMs: 374,784 Average Authorized Use (2012-2016): 345,354 AUMs

Rangeland Vegetation

The project area lies within two Major Land Resource Areas (MLRA); 54 (Rolling Soft Shale Plain) and 58C (Northern Rolling High Plains, Northeastern Part). Geographically, MLRA 54 is situated very similar to the Grassland Plan Rolling Prairie Geographic Area and MLRA 58C is similar to the Badlands Geographic Area. Below is a brief description of each MLRA:

> MLRA 54's natural prairie vegetation is characterized by western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula*), and blue grama (*Bouteloua gracilis*). Little bluestem (*Schizachyrium scoparium*), prairie sandreed (*Calamovilfa longifolia*), and sideoats grama (*Bouteloua curtipendula*) are important species on shallow soils. Prairie rose (*Rosa arkansana*), leadplant (*Amorpha canescens*), and patches of western snowberry (*Symphoricarpos occidentalis*) are interspersed throughout the area. Green ash (*Fraxinus pennsylvanica*), chokecherry (*Prunus virginiana*), and buffaloberry (*Shepherdia argentea*) occur in draws and narrow valleys (USDA NRCS 2006).
>
> MLRA 58C's natural prairie vegetation is characterized by western wheatgrass, needle and thread, green needlegrass, blue grama, and threadleaf sedge (*Carex filifolia*). Little bluestem and sideoats grama are important species on sloping, shallow soils. Big bluestem (*Andropogon gerardii*) and sideoats grama, along with scattered green ash, chokecherry, and western snowberry, are important species in swales. North-facing slopes support Rocky Mountain juniper (*Juniperus scopulorum*), green ash, and chokecherry and an understory of little bluestem, porcupinegrass (*Hesperostipa spartea*), and needle and thread (USDA NRCS 2006).

Prairie dog activities have a substantial impact on plant community species composition and function. Prairie dogs are not solely responsible for changes in vegetation, as their activities are known to modify the grazing patterns of other herbivores. Similarly prairie dogs are drawn to areas of low structure vegetation created by grazing of cattle and bison. Vegetation on prairie dog towns is typically characterized by grazing-tolerant grasses, annual forbs, high percentages of bare ground, and high plant species diversity (Archer et al. 1987). Areas inhabited by prairie dogs are subject to continuous and intense disturbance by grazing, clipping, and burrowing activities. The vegetation around burrow

entrances are repeatedly grazed and clipped very close to the ground. The clipping and foraging habits of black-tailed prairie dogs create a unique habitat of bare ground and short, sparse vegetation. Repeated clipping favors some forb species, as well as growth of shortgrass species, more resistant to constant grazing (May 2003).

Effects to Vegetation Plant Communities

The primary focus of the vegetation analysis will be how ecological site plant communities will respond to prairie dog expansion or removal. The effects were analyzed using the ESD state-and-transition models. Table 20 displays the predicted plant community change with continuous season-long grazing, heavy continuous grazing, and/or clipping by prairie dogs. Displayed are the dominant ecological sites found within existing prairie dog colonies on the LMNG. The reference state is represented on the far left side of the table, while the plant community that is expected to occur with long-term continuous season long grazing/clipping by prairie dogs is on the far right side. This analysis assumes that under heavy and continuous grazing and clipping by prairie dogs, and/or other herbivory, plant communities dominated by shortgrass species, forbs, and annuals will eventually occupy the site.

It is important to recognize that the transitional pathways and resulting plant communities are not linear and that they are represented in table format for ease of comparison and comprehension. Additional plant communities within an ecological site may also be present but are not represented in Table 20. Other factors also contribute to the rate at which the plant community changes occur: livestock grazing management, climatic conditions, and fire (prescribed and wildland). The ecological site descriptions for this project area can be found at https://esi.sc.egov.usda.gov/ESI_Rangeland/frmMain.aspx .

Not all ESDs directly describe the effects of prairie dogs on the ecological site. In this case, the effects of prairie dog activity are assumed to be similar to heavy, continuous season-long grazing by livestock on plant communities.

Table 20. Plant Communities and Transitional Pathways

MLRA 54**	Predicted Plant Community Change with Continuous Season-long Grazing or Heavy Continuous Grazing and/or Clipping by Prairie Dogs				
Ecological Site	**Reference Plant Community**	⟷ (Transition may not be linear)			**Departure from Reference***
Clayey	1.1 Green Needlegrass/ Western Wheatgrass	---	1.2 Blue Grama/ Western Wheatgrass	---	2.1 Club Moss
Claypan	1.1 Western Wheatgrass/ Blue Grama/ Needlegrasses	1.2 BlueGrama/ Western Wheatgrass	---	1.3 Annual Forbs/ Cactus/ Western Wheatgrass	4.1 Blue Grama/ Sandberg Bluegrass/ Inland Saltgrass
Loamy	1.1 Western Wheatgrass/ Green Needlegrass	1.2 Western Wheatgrass/ Blue Grama/ Sedge	1.3 Western Wheatgrass/ Annual Forbs	4.1 Blue Grama/ Sedge	5.0 Annual/ Pioneer Perennial
Sandy	1.1 Prairie Sandreed/ Bluestem	---	1.2 Threadleaf Sedge/ Blue Grama	---	2.0 Club Moss State
Shallow Loamy	1.1 Western Wheatgrass/ Needlegrass/ Plains Muhly	---	2.1 Grama/ Sedge	---	3.1 Club Moss
Thin Claypan	1.1 Western Wheatgrass/ Blue Grama	---	2.1 Blue Grama/ Buffalograss	---	3.1 Club Moss
Thin Loamy	1.1 Needlegrass/ Bluestem/ Western Wheatgrass	---	2.2 Little Bluestem/ Grama	---	3.3 Blue Grama/ Sedge

*Assumes continuous season-long grazing or heavy continuous grazing and clipping by prairie dogs
**ESDs for MLRA 58C were not completed at the time of this analysis.

The reference plant community is the baseline for analysis while recognizing the majority of the project area is not in reference condition and that it may not be possible to return to the reference state depending on the ecological site. Generally, the reference plant communities found on ecological sites within the project area contain primarily mid-stature grass species such as western wheatgrass or green needlegrass (Table 21). The reference plant communities would have occupied these sites under historic disturbance regimes. Plant community phases within the reference state would have the highest ecological function in terms of hydrology, species diversity, and nutrient cycling (Sedivec and Printz 2012).

The vegetation height and density of the ungrazed reference plant communities are typically not appealing to prairie dogs as it prevents them from seeing encroaching predators. A South Dakota study found that prairie dogs did not occur in the areas of the pasture at or near climax vegetation “reference” condition; instead prairie dogs inhabited areas of the pasture in earlier successional stages (Uresk and Paulson 1988). When the reference plant community is adversely impacted (i.e. heavy grazing, drought), a decline in vegetative vigor and composition is expected, giving the prairie dogs opportunity to inhabit the site.

Once established, prairie dogs can alter the vegetation structure and composition, though generally with the assistance of other large herbivores (Uresk 1987, Winter et al. 2002). Through time, plant communities change as prairie dog population density grows and their forage needs increase. In areas recently colonized (less than 10 years), there may be little difference in species composition and production, whereas repeated heavy grazing on older colonies often results in lower overall plant productivity and change in species composition (Johnson and Collinge 2004). Over time, favorable

grasses, such as western wheatgrass and green needlegrass decrease, and short stature grasses, such as blue grama and buffalograss will then become more established. Johnson et al. (2004) found prairie dog colonies had increased the presence of warm-season grasses, forbs, and dwarf shrubs, while off-colony sites were dominated by cool-season grasses. Ultimately, prairie dog colonies will see increases in undesirable grasses, forbs, and bare ground (Archer et al. 1987). Removal of prairie dogs following short term prairie dog occupation may allow the community to shift back towards reference community (NRCS 2012), as long as a disturbance threshold has not been crossed.

Continued long term occupation by prairie dogs will result in a transition to the Short Grass or Annual/Pioneer Perennial State. For example, Transition "T5" in the Loamy ESD state-and-transition model is initiated as a result of long term repeated disturbances such as long-term drought coupled with severe defoliation, or solely through severe long-term defoliation by large or small herbivores. Significant economic inputs, management, and time would be required to move this plant community toward a later successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community (NRCS 2012).

Once a plant community transition has occurred, it is difficult to revert back towards the reference state. When a threshold is crossed, major management changes and dollar investments may be required for restoration (Sedivec and Printz 2012). In cases of significant soil loss and introduction of invasive species, it may not be possible to return to the reference state. Other factors, including precipitation patterns, concurrent livestock grazing practices, the degree of soil loss and degradation, and the degree of loss of mid-grasses (western wheatgrass, green needlegrass), will directly affect the resiliency and overall ability of that ecological site to produce vegetation found in the reference state (Johnson and Collinge 2004).

Table 22 and Table 23 display the acres of prairie dogs found in each ecological site as well as the estimated production values and the estimated reduction in herbage production expected on each ecological site. ESDs and state and transition diagrams were used to analyze the predicted plant community changes due to prairie dog colony expansion or removal. For this analysis, production of the ecological site's reference plant community Representative Value (RV) were compared to the RV production of the vegetative state expected from long term prairie dog occupation, either the Short Grass state or Annual/Pioneer Perennial state. Herbage production would decrease with the shift in species composition from long-term prairie dog occupation (Johnson and Collinge 2004). Expected reductions in herbage production vary by ecological site, but range from 400 to 2,100 lbs/acre (NRCS 2012). A recent study on the Standing Rock Sioux Reservation focused on the effects of prairie dogs on three ecological sites: Loamy, Shallow Loamy, and Thin Claypan. The study concluded that regardless of the inherent productive capacity of an ecological site, prairie dog occupation reduced standing crop across the three ecological sites to similar levels. Therefore, the amount of forage lost as a result of prairie dog activity is much greater on the more productive sites (Hendrickson et al. 2016).

Table 21. Ecological Sites, their acreages, production, and estimated loss in herbage production on the LMNG within MLRA 54, within existing prairie dog colonies.

MLRA	Ecological Site	Prairie Dog Acres Inventoried (2015)	Reference Community Production RV (lbs/acre)	Departure from Reference Community, Long-Term Prairie Dog Use (lbs/acre)	Estimated Reduction in Herbage Production (lbs/acre)
54	Clayey	348	2,100	600	1,500
	Claypan	473	1,500	1,000	500
	Closed Depression	12	2,400	1,600	800
	Limy Sands	12	1,800	450	1,350
	Loamy	382	2,400	900	1,500
	Loamy Overflow	4	3,200	2,500	700
	Loamy Terrace	18	2,900	800	2,100
	Saline Lowland	11	2,500	1,100	1,400
	Sands	11	2,500	700	1,800
	Sandy	127	2,400	600	1,800
	Sandy Terrace	5	3,000	700	2,300
	Shallow Clayey	18	1,200	300	900
	Shallow Gravel	3	1,400	400	1,000
	Shallow Loamy	372	1,400	350	1,050
	Shallow Sandy	15	1,400	400	1,000
	Thin Claypan	847	800	200	600
	Thin Loamy	961	1,700	700	1,000
	Very Shallow	44	800	200	600

Table 22. Ecological Sites, their acreages, production, and estimated loss in herbage production on the LMNG within MLRA 58C, within existing prairie dog colonies.

MLRA	Ecological Site/Range Site	Prairie Dog Acres Inventoried (2015)	Reference Community Production Range Site (lbs/acre)	Departure from Reference Community, Long-Term Prairie Dog Use (lbs/acre)	Estimated Reduction in Herbage Production (lbs/acre)
058C	Clayey	70	1,500	600	900
	Claypan	79	1,100	1,000	100
	Limy Sands	33	1,600	450	1,150
	Loamy	460	1,650	900	750
	Loamy Terrace	73	2,500	800	1,700
	Sandy	51	1,700	600	1,100
	Sandy Terrace	18	2,500	700	1,800
	Shallow Loamy	184	1,400	350	1,050
	Thin Claypan	141	550	200	350
	Thin Loamy	621	1,500	700	800
	Very Shallow	31	600	200	400
	Wet Meadow	12	4,500	2,500	2,000

Livestock Grazing Management

Grazing allotments within the McKenzie Ranger District planning area range in size from approximately 37,233 acres to 38 acres with an average of approximately 3,866 acres in size. There is one permit on the district that is issued to McKenzie County Grazing Association encompassing 186 active grazing allotments. Currently 186,356 Animal Unit Months (AUMs) are permitted across the district.

Grazing allotments within the Medora Ranger District planning area range in size from approximately 28,099 acres to 57 acres with an average of approximately 2,158 acres in size. Currently 188,428 AUMs are permitted across the district. The Medora Ranger District has three permits with three Grazing Associations: Horse Creek Cooperative (HCCGA), Medora (MGA), and Little Missouri (LMGA). The HCCGA encompasses one active grazing allotment with 3,406 permitted AUMs. The Medora Grazing Association encompassing 131 active grazing allotments with 125,332 permitted AUMs. Lastly, the Little Missouri Grazing Association encompassing 104 active grazing allotments with 59,690 permitted AUMs.

Across the LMNG, prairie dogs are present on 88 active grazing allotments. Table 23 displays the number of allotments by Grazing Association as well as the acreage of prairie dogs within each association. See Appendix A of the specialist report, located in the project file, for a complete listing of allotments currently effected by prairie dog occupancy. The Horse Creek Cooperative Grazing Association currently has no prairie dog colonies inventoried.

Table 23. The number of allotments by grazing association and total inventoried prairie dog acres.

Grazing Association	Number of Allotments Effected	Total Inventoried PD Acres
LMGA	25	1,936
MGA	30	1,287
MCGA	33	2,267

Grazing Association	Number of Allotments Effected	Total Inventoried PD Acres
HCCGA	0	0

Across the LMNG each grazing allotment is different in size and livestock grazing management. Effects at the allotment level are highly variable and dependent on the overall size of the individual allotments in comparison with acres of prairie dog colonies present. Authorized use and grazing management adjustments are discussed each spring at the allotment level as Forest Service staff and the Grazing Association work cooperatively to develop the Annual Operating Instructions or Allotment Worksheets to identifying the authorized number of cattle and the grazing schedule for that particular year.

Competition between livestock and prairie dogs has been a long-time concern of livestock operators. Direct forage competition has been estimated by numerous studies. Hygnstrom et al. (1994) stated "Annual dietary overlap has been estimated from 64% to 90%. One prairie dog eats about 8 pounds (17.6 kg) of forage per month during the summer. At a conservative population density of 25 prairie dogs per acre (60/ha) and dietary overlap of 75%, it takes 6 acres (2.4/ha) of prairie dogs to equal 1 AUM". Other studies have found dietary overlap to be up to 60% in the mid-grass prairie (Hansen and Gold 1977; Uresk 1984). A Colorado study found that prairie dog colony density can be variable. This study found that colonies ranged from 32 to 120 prairie dogs/ha and the burrow density ranged from 100 to 674 burrows/ha (Johnson and Collinge 2004). Additionally, the density of active burrows has been found to be higher in areas heavily grazed by livestock (May 2003).

This analysis calculated the current impacts to available Animal Unit Month (AUMs) for livestock grazing by combining both the existing prairie dog distribution across ecological sites in the project area and the predicted decrease in herbage production by ecological site (Table 22 and Table 23). In addition, prairie dog forage consumption was accounted for using Hygnstrom's reference cited above (1 AUM/6 Acres of prairie dogs). Actual impacts will be variable by colony with differences depending on the prairie dog density and the age of the colony in regards to changes in species composition as well as with past and present livestock grazing management and climatic conditions.

Table 25 displays the current permitted AUMs, the average Authorized AUMs (2012-2016), and the estimated adjustment in available AUMs, as a result of decreased productivity and forage consumption across existing prairie dog colonies. Authorized stocking is adjusted annually, as needed, to take into account the effect of natural processes (e.g., droughts, wildfires, hail, prairie dogs, and grasshoppers) on forage availability and resource conditions. Appendix A of the specialist report, located in the project record, identifies the estimated effects by allotment.

AUM's were calculated following standard NRCS protocols (Sedivec and Printz 2012). Calculations assumed a harvest efficiency of 25 percent, one Animal Unit (AU) is equivalent to one mature cow weighing approximately 1,000 pounds with a calf up to six months of age; one AU consumes 913 pounds of air-dry forage in one month. For this analysis one Head Month (HM) will be compared equivalent to one AUM. HMs are used by the Forest Service for permitting and billing purposes.

Table 24. Permitted AUMs, Authorized AUMs, and estimated adjustment in available AUMs on existing prairie dog colonies by association.

Grazing Association	Permitted AUMs	Authorized AUMs (Average 2012 - 2016)	Estimated Adjustment in Available AUMs
LMGA	59,690	52,471	818
MGA	125,332	116,748	543
MCGA	186,356	173,792	958
HCCGA	3,406	2,343	0

While prairie dogs change the amount and type of vegetation, their clipping and foraging activities improve the nutritional qualities of the forage present (Agnew et al. 1986, Archer et al. 1987). Vegetation on prairie dog colonies may experience an increased plant species diversity and increased crude protein, as the vegetation is maintained in an early stage of phenological development (Uresk 1987). However, due to the short stature of the remaining vegetation, very little of this higher quality forage may be available for livestock consumption (May 2003). The attraction of this highly palatable forage may alter livestock distribution within an allotment by creating areas of over utilization, potentially resulting in modifications to the existing grazing system. The season of use on the allotment may determine whether or not this may be a concern. Guenther and Detling (2003) found cattle use on prairie dog colonies to be fairly random, although cattle exhibited a slight selection for prairie dog colonies during early summer, and slight avoidance during late summer. This is assumed to be attributed to higher nutritional content in the early summer and a lower preference in the late summer due to less availability.

Prairie dogs often establish towns in areas where livestock congregate, such as at watering sites or old homesteads (Hygnstrom and Virchow 1994). Burrows can cause damage to range improvements such as stock dams, in which case prairie dog control efforts would have been taken to prevent damage to the structure. There is also concern over injury to livestock on prairie dog towns including injury from stepping in prairie dog burrows, and accidental livestock injury as result of prairie hunting/shooting.

Environmental Consequences

Alternative 1 – No Action

The National Environmental Policy Act (NEPA) and National Forest Management Act (NFMA) require the No Action Alternative to assess the baseline environmental impacts. For this project, the no action alternative includes no active management or control of prairie dogs. Neither lethal nor non-lethal control measures would be used to manage prairie dog colonies, including wanted or unwanted colonies. Active measures that encourage expansion of prairie dog colonies would also not take place. This alternative serves as a baseline against which the action alternatives can be compared.

For this alternative, prairie dog management would be totally passive in nature and scope. All colonies currently encroaching onto adjacent non-Forest Service lands would likely continue to encroach. Contraction or expansion of the colonies would depend on climate, grazing patterns and intensities, predation, and hunting pressure. It is predicted that over the course of 10 years, prairie dog colonies would expand at a rate of 5% annually. This would bring the total projected prairie dog acreage to 10,482 acres at year 10, an increase of 4,923 acres (see effects section of Wildlife analysis in this document).

Vegetation communities currently impacted by prairie dogs would continue to transition towards or remain in the vegetative state expected from long term prairie dog use. Over time, expansion of prairie dogs is expected but it is difficult to determine where and when this will occur, as it will likely be highly variable by colony. Typical areas for prairie dog colonization include areas where cattle are attracted

including stock dams and other water sources. Any newly colonized areas would also transition towards the vegetative state expected from long term prairie dogs use (Table 21).

Existing conflicts with livestock grazing management activities will continue. As prairie dog acres increase, the effects to authorized use and livestock management will increase. Increases of prairie dogs could result in adjustments to authorized use or changes in management activities, dependent upon management objectives and where expansion occurs. Table 26 displays the estimated loss of AUM's from this alternative.

This alternative would also result in increased conflicts with neighboring land ownerships and land management and would not address the 2002 DPG-LRMP ROD (specifically the Good Neighbor Policy). Colonies currently encroaching onto adjacent non-NFS lands would continue to encroach and are likely to expand.

Table 25. Resource indicators and measures for all alternatives

Resource Element	Indicator/ Measure	Alternative 1	Alternative 2/3	Alternative 4
Rangeland Vegetation	Potential acres following the restoration pathway (Category 3 Treatment Areas)	0	1,110	1,984
	Additional acres following the transition pathway (Estimated Prairie Dog Expansion, over 10 years)	4,923	4,091	2,248
	Total Acres occupied by prairie dogs at Year 10	10,482	8,540	5,823
Livestock Grazing Management	Estimated Adjustment in Available AUMs	-2,053	-1,243	-110

Alternative 2 – Proposed Action

The proposed action includes implementation of the Good Neighbor Policy starting with identified encroaching prairie dog colonies and additional control areas using an adaptive management approach. This alternative utilizes an integrated approach to prairie dog management including lethal and non-lethal methods. See Chapter 2 for a description of the categories of control for prairie dog colonies.

Adaptive Management

The proposed action includes incorporating adaptive management. If the initial actions are shown through monitoring to not be meeting or moving toward the desired conditions, another management tool (or combination of tools) can be selected from the Adaptive Management Toolbox (see Chapter 2). The Adaptive Management Toolbox is a collection of all the different management actions proposed for all the colonies within the project area. It is important to understand that many of the tools in the toolbox are interrelated and no single tool would address any and all issues identified in this analysis. The potential interactions of tools are extensive and attempting to analyze the effects of all possible combinations of tools would be a near infinite exercise. The underlying basis for this analysis is that monitoring will occur and that management changes will follow, if needed, to move toward meeting management objectives.

Adaptive Management Toolbox (Table 2): There are a number of management tools that can be utilized to manage prairie dog colonies. These tools, both lethal and non-lethal, can be used alone or in combination with each other to influence direction and rate of expansion, reduce or remove encroachment onto neighboring lands, and/or maintain or increase prairie dog colonies in areas where prairie dogs are desired.

Project Design Features and Mitigation Measures

Rodenticide application will be completed in full compliance of the product label and LRMP direction:

- Only zinc phosphide treated grain bait will be used;
- Pre-baiting is required per label instructions;
- Rodenticide will only be placed on the ground between September 15 and January 31;
- Treated grain will remain on the ground no more than 2 days, after which it shall be pushed into the burrow (unless demonstrably neutralized);
- Any above ground carcasses will be disposed of in accordance with label requirements.

An agreement will be necessary where both parties (FS and adjacent landowner) control their respective portion of the colony at an appropriate time to achieve maximum efficiency.

Required Monitoring

Dakota Prairie Grasslands, Grasslands Plan Monitoring Program. Updated July 2016. See Appendices for specific project monitoring.

Direct and Indirect Effects - Alternative 2

In this alternative, it is predicted that over the course of 10 years, prairie dog colony acreage would expand to approximately 8,540 acres (see Wildlife section of this document). Initial implementation would include the removal of prairie dogs in areas of unwanted encroachment. Lethal treatment would occur on approximately 954 acres at implementation and retreatment would occur as needed (determined through project monitoring) or as new colonies arise in the Category 3 management zone. Initial treatment would include: eradicating 47 colonies (651 acres) with zinc phosphide and partial control with zinc phosphide on 16 colonies (303 acres). The partial control of the colony will typically control a 600 foot buffer from the non-NFS boundary to allow a vegetative barrier to establish. This may require multiple treatments within and around the barrier prior to the vegetative barrier becoming effective. The adaptive management toolbox will provide additional tools to supplement the lethal treatments in Category 3, preventing future unwanted encroachments.

Rangeland Vegetation

Although initial implementation would result in a removal of 954 acres of prairie dogs, over the course of 10 years expansion is expected on an additional 4,091 acres. This would result in a net increase of 3,137 acres of prairie dog colonies. Continued control will take place in Category 3 areas in the buffer with non-NFS lands. The increase in prairie dog occupied acres is expected in interior areas of the DPG even with continued control in perimeter areas (Category 3).

Over time, newly colonized areas are expected to transition towards the vegetative state expected from long term prairie dogs use. Refer to Table 20 for the predicted plant community change with continuous season-long grazing or heavy continuous grazing and/or clipping by prairie dogs.

Following prairie dog removal in the Category 3 boundary management areas, vegetative response will be variable depending on the success of the treatment, concurrent livestock grazing, precipitation patterns, and the degree of soil loss and degradation. Additional management toolbox tools like the fenced vegetation buffer or prescribed grazing may be necessary to assist in the recovery of the vegetation and effectiveness of prairie dog removal in these areas. As demonstrated by the NRCS state and transition diagrams, with long-term removal or reduction of prairie dogs and applying prescribed grazing, ecological sites once dominated by mid stature grass species and perennial vegetation could eventually return. Additional restoration activities may contribute to the recovery of the plant community: prescribed burning, herbicide application for noxious weeds, range seeding, or a combination thereof. Under favorable conditions, ecological sites have the potential to resemble the reference state identified for each site (NRCS 2012). Nonetheless, the rate of vegetation shift along the restoration pathway towards the Reference community will be highly variable and site specific.

Depending on the objective, adaptive management tools can be used either to discourage or encourage prairie dog colony expansion. Prescribed grazing is a wide-ranging tool with many variables such as intensity, duration, and season of use. Prairie dog expansion-based grazing activities would focus on increasing the grazing intensity that occurs on the site. Increased grazing intensity would accelerate the state and transition pathway to create habitat more appealing to prairie dogs. Heavy utilization is the key component, as prairie dogs prefer areas with low vegetative structure. Prescribed livestock grazing can be used as a tool to manipulate vegetative structure to induce prairie dogs to migrate into desired areas of colonization. A variety of practices could be used to entice livestock to the area. These include adjustments to season of use, modifying the grazing rotations, fencing, additional watering facilities, salt licks, herding, etc.

Many of the same types of practices can be used to discourage prairie dog expansion (adjusting grazing intensity, season of use, fencing, location of watering facilities and salt licks, and herding). Prairie dog deterrence based grazing activities would focus on increasing the vertical cover and density of vegetation. This would occur by either altering timing of grazing or reducing overall utilization of the area. These activities would be closely tied to the restoration activities identified in the state and transition model. Prescribed grazing that provides rest or deferment for areas of a pasture during the growing season would allow vegetation to recover and deter expansion (Hygnstrom and Virchow 1994). One study in particular showed that after a few years of successive deferment during the growing season, black-tailed prairie dog populations declined because the cattle were not present to reduce plant height to the suitability of prairie dogs (May 2003). Locating watering facilities and salt licks away from colonies would attract cattle away from the colonies, thereby potentially increasing vegetation height due to decreased grazing pressure. Herding could be used to push cattle away from areas of prairie dog colonies and would be effective in larger grazing allotments. Lastly, fencing can allow for rest or deferment from grazing pressure.

Vegetative barriers are another effective non-lethal method of control used to prevent unwanted expansion. Vegetative barriers can be used independently or in combination with lethal treatment or other management. The use of fenced vegetation barriers would accelerate the establishment of a vegetative buffer. Excluding livestock grazing could also accelerate the recovery time of the plant communities

previously inhabited by prairie dogs (Hygnstrom and Virchow 1994). Once the vegetative barrier has become established, the fence may be removed. Monitoring of colonies, vegetation, and barrier effectiveness will indicate when removal or additional management is needed. If fenced vegetation barriers are left idle for a long period, effects of the barriers areas would result in a negative shift in vegetation communities. Removing livestock grazing for an extended period (10+ years) has been shown to result in plant communities with excessive litter levels and tend to be invaded by non-native grasses such as Kentucky bluegrass, crested wheatgrass, and smooth brome (NRCS 2012).

Livestock Grazing Management

With the implementation of this alternative, a mix of partial and complete prairie dog control will be used in Category 3 areas depending on the site specific situation. Initial implementation would remove 954 acres of prairie dogs across 56 grazing allotments. The proposed treatments will completely remove prairie dogs from 27 grazing allotments across the project area. Livestock grazing rotations will need to be coordinated with lethal treatment activities, as livestock may need to be temporarily rotated or removed from the pasture during the treatment. Treatment can typically be completed in as little as four days. The use of rodenticide will follow the product label, LRMP guidance, and other applicable rules and regulations. Initial implementation will provide a temporary reduction in prairie dog acres, although expansion will occur elsewhere in the allotments or project area over time.

Over ten years, expansion is estimated across the project area on an additional 4,091 acres. Overall, increases of prairie dogs could result in additional adjustments to authorized use or changes in management activities, depending on where expansion occurs. Each allotment will be effected differently according to the overall size of the allotment in comparison with acres of prairie dogs. A reduced carrying capacity or adjustment in grazing management will likely occur depending on the extent of expansion within the allotment and desired conditions.

Livestock management is one of the largest influences on prairie dog colony expansion and contraction by making the rangeland vegetation either favorable or unfavorable to prairie dogs. Generally, grazing improves habitat for prairie dogs by reducing vegetation height and density. Prairie dog expansion can be reduced under livestock management programs that benefit cool season grasses as grass height and density increase. Likewise, expansion can be enhanced by higher utilization or more intensive management.

Some adaptive management tools have the potential to affect authorized use on the allotments, depending on the grazing management practice(s) applied or the size of the vegetative buffer needed. To deter prairie dog expansion, grazing activities would focus on increasing the vertical structure and density of vegetation. Prescribed grazing that provides rest or deferment for areas of a pasture during the growing season allows vegetation to recover. Adjusting livestock stocking rates is an effective means of managing prairie dog populations by maintaining plant stand diversity and height. Prescribed livestock grazing that ensures high vegetative structure after grazing may help regulate prairie dog population expansion. Prescribed grazing can also be effective in creating visual barriers along private land boundaries to reduce prairie dog colony expansion or to influence direction of expansion.

A variety of range improvements or management practices could be used to alter livestock distribution, drawing livestock to or away from an area. This might include: adjustment to season of use or grazing rotation, fencing, watering facilities, salt licks, herding, etc. For example new livestock watering facilities could be developed to encourage expansion in an area. The creation of cattle point attractants (i.e., water tanks and supplemental feed sites) in close proximity to prairie dog colonies (0.1-2.6 km) may promote expansion or establishment of new colonies (Licht and Sanchez 1993). Fencing can be used to control livestock grazing in specific areas with the purpose of allowing the development of a vegetative barrier that will minimize, or slow prairie dog expansion. On the other hand, relocating or adding watering facilities and salt licks away from colonies can help manage prairie dog activities by controlling where livestock concentrate (Hygnstrom and Virchow 1994).

Vegetative barriers are another effective non-lethal method of control used to prevent unwanted expansion and can be utilized either independently or in combination with lethal treatment or other management. The use of fenced vegetative barriers may be necessary if prescribed grazing techniques are ineffective. Fencing can be used to control livestock grazing in specific areas with the purpose of allowing the development of a vegetative barrier that will minimize, or slow, prairie dog expansion. Terrall (2006; Gray 2009) demonstrated that vegetative barriers can be effective in minimizing expansion. The length and width of the fenced vegetation barriers will vary depending on the size of the colony, topography, and other factors. A width of 300 feet was used as an estimate for calculating the acreage fenced vegetation barriers would affect, resulting in approximately 9.1 acres temporarily excluded from grazing for every quarter mile of barrier installed. Once the vegetative barrier has become established, the fence may be removed. Effectiveness monitoring will indicate when removal is needed. The adaptive nature of the proposed action does not specify where fenced barriers will occur. These will be determined site-specifically and reviewed by an interdisciplinary team to ensure compliance with the sideboards and design features associated with this project.

The use of visual barriers is also proposed. Visual barriers involve placing a barrier on the side of a prairie dog town to divert expansion. The barrier blocks the view of colony residents and discourages expansion past the barrier. These barriers would have no impact on vegetation conditions, although they may impact the movement of livestock in the area. Hygnstrom et al. (1994) found that visual barriers were inconsistent in reducing expansion and reinvasion rates of prairie dogs in Nebraska.

Resource Indicator and Measure 1

With the implementation of this alternative, there would be a relatively short term decrease of approximately 954 acres of prairie dog colonies across the LMNG. This would affect approximately 17.2% of the 5,559 acres of prairie dog colonies on the LMNG. After the implementation of the proposed action, the overall colony acreage would be approximately 4,605 acres. It is projected that prairie dog expansion would occur on an additional 4,091 acres over the next 10 years, bringing the total acres occupied by prairie dogs to 8,696 acres.

Resource Indicator and Measure 2

Implementation of this alternative would cause a relatively short term decrease in impacts to authorized use and livestock grazing management, as it would remove prairie dogs from 27 grazing allotments across the project area. Over time, increases of prairie dogs would result in additional adjustments to authorized use or changes in management activities, depending on where expansion occurs and what adaptive management tools are applied.

Cumulative Effects – Alternative 2

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, ongoing, and reasonably foreseeable activities in the project area that are relevant to the effects to the rangeland vegetation and livestock grazing management include:

- In general, gas and oil development with related infrastructure leads to loss of native soils and vegetation, available forage, and introduction of noxious weeds. The related disturbance associated with these developments also leads to an increase in the non-native, invasive grasses. As the non-native grasses and noxious weeds increase, vegetative states could shift to the native-invaded or invaded vegetative state. Recent technological developments have reduced disturbed area resulting from oil and gas development by minimizing pad size, placing multiple wells per pad, and other measures.
- Recreation activities such as sightseeing, hiking, cross country skiing, camping, snowmobiling, hunting, and fishing, are ongoing and expected to increase over the next 10 years. Recreation can

lead to a loss in forage if there is an abundance of off-road travel. Recreation can also lead to an increase in disturbance of rangeland vegetation, resulting in the same effects as described for gas and oil development (e.g. increased invasive species and noxious weeds). Recreation can affect livestock management as gates are inadvertently left open by recreationist, making it difficult to keep cattle in the authorized areas.

- Recreational prairie dog shooting is expected to continue. Recreational prairie dog shooting has the potential for collateral damage to rangeland infrastructure and loss of livestock. The current amount of recreational shooting on the LMNG is unknown.
- Treatment of noxious weeds will continue as authorized in the Noxious Weed EIS (USDA Forest Service 2007). Treatment of noxious weeds will help maintain or improve the existing vegetative state.
- Vegetation Management Planning (VMP) is in progress across the LMNG. These management plans include prescribed grazing strategies, installation of range infrastructure, and implementation of restoration activities designed to meet LRMP objectives for vegetative, hydrological, and wildlife resources in each project area. Not all planning areas contain prairie dog colonies. However, where prairie dogs are present, actions implemented to meet LRMP goals and objectives may be influenced by prairie dog colonies. Prairie dog management will be an issue in VMP analysis areas where they coincide. The North Billings VMP on the Medora RD and the Pastures 2, 10, and 11 VMP on the McKenzie RD are currently being implemented.

Rangeland Vegetation

Overall, Alternative 2 would reduce impacts to rangeland vegetation, when compared to the acres impacted by prairie dog activity in Alternative 1. When combined with the effects from other present and foreseeable future activities, as discussed above, Alternative 2 could add incrementally to the increases of undesirable plant species or expedite the transition between vegetative states due to expansion of prairie dog colonies.

Livestock Grazing Management

Livestock management will be effected by increased prairie dog colonies. Alternative 2 would have reduced impacts to grazing management and authorized use, when compared to the impacts in Alternative 1. The effects from other present and foreseeable future activities discussed above, could add incrementally to further reduce the amount of forage available to grazing livestock in the analysis area.

Alternative 3 – No Rodenticide Use

Similar to the Proposed Action, Alternative 3 proposes to use an integrated approach to prairie dog management. However, in contrast, the rodenticide management tool will not be made available. All other management tools, lethal and non-lethal, will be available to utilize to further the goals and objectives found in the LRMP, and the Purpose and Need of this project. This alternative was developed based on comments received during scoping expressing concern over the use of poisons to remove prairie dogs and the effect to non-target wildlife and domestic species.

Direct and Indirect Effects - Alternative 3

The direct and indirect effects to rangeland vegetation and livestock grazing of Alternative 3 would be similar to Alternative 2. The most appreciable difference is the mode of control. In Alternative 3, no rodenticide will be used. Assuming lethal trapping is more efficient and cost effective than live trapping and translocation, lethal trapping will likely be used. The non-rodenticide lethal treatments are expected to be less efficient (time and cost) than those identified in Alternative 2. The increased duration of the treatment activities have the potential to cause conflicts with grazing management as livestock may have to be temporarily excluded or relocated during treatment activities potentially for longer periods than with Alternative 2.

Cumulative Effects – Alternative 3

Cumulative effects would be similar to Alternative 2.

Alternative 4 – Prairie Dog Control out to ¼ mile from non-NFS lands

Alternative 4 proposes to initially control all prairie dog colonies out to ¼ mile from non-NFS lands where prairie dogs are not wanted and where the adjacent land owner will treat prairie dogs on their own lands. An integrated approach to management of prairie dogs within Category 2 would then commence. The adaptive management toolbox will be available, over time, to utilize towards furthering the goals and objectives found in the LRMP. This alternative is in response to concern that vegetative buffers may not be effective at preventing encroachment and that a more aggressive method was needed. Approximately 103 colonies are proposed for treatment, totaling 1,828 acres of initial treatment in this alternative.

See Chapter 2 for a complete description of the alternatives and the adaptive management toolbox.

Direct and Indirect Effects - Alternative 4

In this alternative, initial implementation would include the removal of prairie dogs in areas of unwanted encroachment ¼ mile from non-NFS lands. Lethal treatment would occur on approximately 1,828 acres at implementation and retreatment would occur as needed or as new colonies arise in the Category 3 management zone. Initial treatment would affect 104 prairie dog colonies across the LMNG. It is predicted that over the course of 10 years, prairie dog colony acreage would return to approximately 5,823 acres in interior areas (see Wildlife section of this document). The partial control of the colony will control up to a ¼ mile buffer from the non-NFS boundary to allow a vegetative barrier to establish. This may require multiple treatments within and around the barrier prior to the vegetative barrier becoming effective. The adaptive management toolbox will provide additional tools to supplement the lethal treatments, preventing future unwanted encroachments.

The direct and indirect effects to rangeland vegetation and livestock grazing of Alternative 4 would be similar to Alternative 2. The difference is the increase in acres controlled initially, resulting in a decrease of expected expansion in the future. Initial implementation would remove 1,828 acres of prairie dogs across 70 grazing allotments. The proposed treatments will completely remove prairie dogs from 30 grazing allotments across the project area. Initial implementation will provide a temporary reduction in prairie dog acres, although expansion will occur elsewhere in the allotments or project area over time. Over ten years, expansion is estimated across the project area, adding 2,248 occupied acres, which is slightly higher than current levels.

Cumulative Effects – Alternative 4

Cumulative effects would be similar to Alternative 2.

Summary

Rangeland vegetation and livestock management will be effected by increases in prairie dogs in all four alternatives. Alternative 1 would result in the greatest increase in prairie dogs and the greatest effects to authorized grazing, whereas Alternative 2 and Alternative 3 would have equally reduced impacts. Alternative 4 would only have a slight increase in prairie dogs. Use of the adaptive management toolbox may result in increased effects to grazing management depending on the management tools applied in Alternatives 2, 3, and 4.

Under all action alternatives, the use of the toolbox and adaptive management principles would assist in managing and controlling future prairie dog expansion. Similarly, the use of lethal control and the implementation of the adaptive management toolbox will reduce conflicts with neighboring land

ownerships. Alternative 1 would result in increased conflicts with neighboring land ownerships and land management and would not meet the purpose and need of the project.

Degree to Which the Purpose and Need for Action is Met

Alternative 1 only meets one of three needs of the project; overall, it does not meet the purpose and need of the project. Alternatives 2, 3, and 4 equally address the purpose and need of the project.

Table 26. Summary comparison of how the alternatives address the purpose and need

Purpose and Need	Alt 1	Alt 2	Alt 3	Alt 4
To be responsive to public concern for encroachment of prairie dogs on to non-NFS lands and comply with the good neighbor policy. Public concern focuses on public health, agricultural production, land values, and facilities on private and other non-NFS lands.	Does not meet	Meets	Meets	Meets
To meet or move towards the LRMP guidance to achieve two or more prairie dog complexes in both the Rolling Prairie and Badlands Geographic Areas on NFS lands to provide habitat for prairie dogs and associated species.	Moves toward meeting	Moves toward meeting	Moves toward meeting	Moves toward meeting
To take steps to prevent future unwanted prairie dog encroachments onto non-NFS lands.	Does not meet	Meets	Meets	Meets

Degree to Which the Alternatives Address the Issues

External and internal comments revealed issues that drove the development of alternatives. See Chapter 2 for more detail.

Issue 1: The FS should consider the use of non-lethal management tools.
Issue 2: Use of rodenticides and other poisons as control measures may negatively affect non-target wildlife and domestic animals.

Issue 3: The proposed action, which only controls prairie dogs presently encroaching or likely to encroach within two years, may not be effective at reducing encroachment on to private lands especially during drought years.

Issue 4: Prairie dogs should be controlled regardless of whether or not they are encroaching on private lands.

Table 27: Summary comparison of how the alternatives address the key issues

Issue	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
The FS should consider the use of non-lethal management tools	Are non-lethal tools used?	N/A	Yes	Yes	Yes
Use of rodenticides and other poisons as control measures may negatively affect non-target wildlife and domestic animals	Are poisons used?	No	Yes	No	Yes
The proposed action, which only controls prairie dogs presently encroaching or likely to encroach within two years, may not be effective at reducing encroachment on to private lands especially during drought years.	Is the alternative effective at controlling encroaching prairie dog colonies?	No	Yes	Yes	Yes

Issue	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
Prairie dogs should be controlled regardless of whether or not they are encroaching on private lands.	Are all prairie dogs on the LMNG controlled?	No	No	No	No

Summary of Environmental Effects

Alternative 1, as the No Action Alternative, does not fully address the Purpose and Need of the project. It does not address the unwanted encroachments of prairie dogs onto other ownerships. In addition, it would not meet the need to inhibit future encroachments. Through passive management, it would be the quickest of the three alternatives to address meeting the need and LRMP direction of having four prairie dog complexes on the LMNG. The acres of rangeland vegetation impacted would be greatest in this alternative and would have the greatest effect on authorized use (grazing).

Alternative 2, the Proposed Action, fully meets the Purpose and Need of the project. It uses zinc phosphide to control an estimated 954 acres of prairie dog colonies in areas of unwanted encroachment. All known unwanted encroachments will be controlled, using partial treatment or eradication of the colony depending on the situation. Alternative 2 would have reduced impacts to rangeland vegetation and livestock grazing management compared to Alternative 1.

Alternative 3, the No Rodenticide Alternative, fully meets the Purpose and Need of the project. The direct and indirect effects would be the same as Alternative 2.

Alternative 4 proposes to extend control out to ¼ mile from adjacent ownerships. This was developed in response to stakeholders comments that the current vegetation barriers are not effective at preventing encroachment. This alternative would initially control all prairie dogs within ¼ mile of adjacent ownerships. After initial actions are taken, colonies will be evaluated on a course of action that will minimize future encroachments through the use of various tools from the toolbox. Future expansion across the project area is estimated to be only slightly lower than current levels. Alternative 4 would have the smallest impact to rangeland vegetation and livestock grazing management.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Table 17 displays the extent to which the alternatives contribute to meeting Grasslands Plan objectives and guidelines. Alternative 1: Does not address the 2002 DPG-LRMP ROD. Alternatives 2, 3, and 4: Comply with all LRMP direction. A detailed analysis of effects by allotment is located in the project file.

Social and Economic Impacts Related to Livestock Grazing Management

Social and economic impacts are an issue for livestock grazing management due to possible reductions in authorized livestock, the cost of adjusting grazing management, and the cost of additional infrastructure.

Forage Loss

Livestock production from the national grasslands is very important to local agricultural families with national grassland grazing permits. Many grazing permittees have an interdependent relationship with the national grasslands. Therefore, any increase or decrease in forage for permitted livestock on the national grasslands may cause adjustments in herd size or other ranch operations. These adjustments may cause some economic hardship on individual ranches.

Reduced availability of forage on these allotments would force Association members who graze on allotments affected by prairie dogs to: (a) graze longer periods on their own properties; (b) find and secure private pasture and rangeland leases during summer months; or (c) purchase more hay and grains to replace forage in winter, early spring, or late fall. While individual replacement costs would depend on ranch-level decisions to mitigate forage losses, additional range or supplemental feed to offset the forage loss would likely be purchased at prices higher than the federal grazing value.

A private market AUM value was used to value lost cattle forage for all alternatives in Table 33. USDA National Agricultural Statistics Service (NASS), estimates the 2016 North Dakota private lease rates at $21 per AUM. USDA's NASS North Dakota Field Office is operated in cooperation with the North Dakota State University Extension Service, North Dakota Agricultural Experiment Station, and the North Dakota Department of Agriculture (USDA NASS 2017). Also related, North Dakota Department of Trust Lands, reports the five year average (2012-2016) pasture rent values by county (dollars/acre): Billings $18.80, Golden Valley $14.20, McKenzie $10.90, and Slope $15.80 (NDDTL 2017).

Decreased stocking on grazing allotments would result in a reduced amount of grazing fees collected on NFS lands. Likewise, a reduced amount would be available for the Conservation Practice (CP) Program within each grazing association. Under the CP Program, the value for grazing on National Grasslands may be reduced to reflect expenses incurred by the grazing associations to carry out required land use practices and allowable administrative costs. For this analysis one Head Month (HM) will be compared equivalent to one AUM. HMs are used by the Forest Service for permitting and billing purposes.

Table 28. Dollar value of grazing lost to foraging by prairie dogs

	Existing Condition	Alt 1	Alt 2	Alt 3	Alt 4
Estimated Adjustment in available AUMs	-2,318	-2,053	-1,243	-1,243	-110
Private Market Value of Lost AUMs ($21 / AUM)	$48,678	$43,113	$26,103	$26,103	$2,310
Federal Grazing Value of Lost HMs ($1.87/HM)*	$4,335	$3,839.11	$2,324.41	$2,32441	$205.7
*Using 2017 Grazing Fee. For comparison 1 Head Month (HM) will be equivalent to 1 AUM.					

Range Infrastructure and Adjustments to Grazing Management

Due to the adaptive nature of Alternatives 2, 3, and 4 the cost of range infrastructure improvements needed to implement prescribed grazing for the alternatives is currently unknown. Improvement costs may vary locally and are dependent on contractor availability. Funding sources for range infrastructure are unknown at this time. The monetary value of the increased livestock grazing management by the grazing associations and their members exist but are difficult to determine.

Adjacent landowners

Adjoining landowners are generally concerned about the effects of prairie dog movement from national grasslands on the effective life of rodenticide applications on their lands. Colonies treated with rodenticides re-populate sooner when prairie dogs move in from adjoining lands or other nearby active colonies. When this occurs, landowners generally apply rodenticides more frequently and to larger colony acreages, thereby increasing their expenses.

Landowners in the project area have expressed concerns about unwanted prairie dog colonization of their agricultural lands that adjoin national grasslands. In some cases, the colonies likely originate from national grasslands, but at other locations the colonies appear to have started on the private or other lands. Alternatives 2, 3, and 4, with their full suite of management tools, would substantially decrease unwanted prairie dog colonization of private or other lands. As a result, Alternative 4 provides the most effective response to adjoining landowners, while Alternative 1 provides the least effective response.

Summary

Livestock management will be effected by increased prairie dogs in all four alternatives. Alternative 1 would result in the greatest increase in prairie dogs and the greatest deleterious effects to grazing management and authorized use. Where the Proposed Action (Alternative 2) and Alternative 3 would have equally reduced impacts. Alternative 4 would result in the least impact to authorized use. Under Alternatives 2, 3, and 4 the use of the tool box and adaptive management principles would assist in managing and controlling future prairie dog encroachment.

Alternative 1, the No Action Alternative, does not fully address the Purpose and Need of the project. It does not address the unwanted encroachments of prairie dogs onto other ownerships and it would not meet the need to inhibit future encroachments. Alternative 1 would result in increased conflicts with neighboring land ownerships and land management and would not meet the purpose and need of the project. Alternative 1 would have the greatest potential reduction of authorized grazing use on NFS lands and would result in the highest impact on association members who would need to locate alternative forage. This alternative would not include additional range infrastructure to assist in managing and controlling future prairie dog encroachment.

Alternatives 2 and 3 would have equally reduced impacts to authorized use compared to Alternative 1. Alternative 4 would result in the least impact to authorized use. Under all three action alternatives the use of lethal control in Category 3 management areas and the implementation of the adaptive management toolbox will reduce conflicts with neighboring land ownerships. All action alternatives fully meet the Purpose and Need of the project. The use of the adaptive management tool box may have economic impacts to the association members depending on the quantity of management tools used and how they are funded and maintained.

3.6 Wildlife

Using an Adaptive Management approach, the Little Missouri National Grassland (LMNG) proposes to implement management actions to control unwanted prairie dog encroachment between NFS lands and adjacent ownerships while considering the objectives and direction in the Grasslands Plan concerning the prairie dog ecosystem over the longer term.

Prairie dog control has the potential to affect goals and objectives of the Dakota Prairie Grasslands Land and Resource Management Plan (LRMP) related to the prairie dog: viability; the establishment and maintenance of prairie dog complexes; and species associated with prairie dog habitat (i.e. burrowing owl).

With an assumed prairie dog colony expansion rate of 5% annually, under the proposed action, prairie dog colony acreage on the LMNG would recover in approximately four to five years after the reduction activity. Assuming no further control, in 10 years after initial control activities, potential occupied area could reach over 7,000 acres of prairie dogs on the LMNG, depending on the selected alternative. This project attempts to control the predicted expansion away from non-NFS lands using a variety of management tools.

The initial effort will be to first control situations where prairie dogs are creating unwanted encroachment or a hazard to adjacent homes due to shooting. Once that is completed, management will target individual colonies with non-lethal actions to inhibit or prevent future encroachment issues. The analysis indicates there will be no long-term effects to prairie dog overall population levels or known associated species from the implementation of any of the alternatives.

Introduction

Summary of past conditions (Svingen 2006):

- Prairie dogs were likely very common in this area prior to 1870, with estimates of approximately 10% of the potential habitat occupied (approximately 45,000 acres on the LMNG);
- Free-roaming bison herds were replaced by domestic livestock operations in the late 1800's;
- Extensive settlement (circa 1890's to 1920's) caused significant portions of the prairie to be converted to cropland, reducing habitat quality and quantity for prairie dogs;
- The drought years in the 1930's facilitated expansion of prairie dog towns. This also helped bring about extensive state-wide prairie dog extermination programs which continued for several decades;
- In 1972, compound 1080 was banned as a pesticide on federal lands by executive order. In 1976, the USFWS approved the use of zinc phosphide due to the general lack of secondary effects;
- Bishop and Culbertson (1976) demonstrated that prairie dog populations within the Medora Ranger District administrative boundary, which includes NFS and other land ownerships, peaked around 1940 at about 13,000 acres, or roughly one percent of all ownerships within the district. However, in the period between 1939 and 1972, prairie dogs showed an 89% decline in number of colonies and a 93% decline in colony acreage. Trends on NFS lands were similar to those seen on private and state lands;
- In 1999, the U.S. Forest Service suspended poisoning of prairie dogs except under special circumstances in a letter from Deputy Chief Furnish in 2000 (Furnish 2000). This direction was in response to a warranted but precluded finding on listing black-tailed prairie dog as threatened by USFWS. In February 2004, this moratorium was rescinded (Thompson 2004) due in part to inclusion of conservation measures taken by Federal, State, and private organizations. The Forest Service included prairie dog conservation measures in the DPG LRMP;

- On May 5, 2004, U.S. Department of Agriculture Undersecretary Dave Tenny (Tenny 2004) instituted the "good neighbor" policy as a part of the prairie dog management on the national grasslands of the Northern Great Plains. This direction was re-affirmed, subsequently by undersecretary Rey (2007);
- On August 18, 2004, the US Fish and Wildlife Service (USFWS 2004) issued a final rule declaring that the black-tailed prairie dog is not likely to become an endangered species in the foreseeable future and is taken off the candidate list.

The control and management of black-tailed prairie dogs (prairie dogs) continues to be a controversial topic. Views on the subject range from total preservation of prairie dogs to total eradication. Many view prairie dog colonies as a wasteland and the prairie dog as a competitor with livestock for forage resources. Others see prairie dog colonies as an important part of the Great Plains ecosystem that harbors important wildlife habitat for such species as the burrowing owl and the black-footed ferret. In the end, it is a clash of values and the management of prairie dogs will likely remain controversial.

The Forest Service has two-fold responsibility in the management of prairie dogs: One is to promote habitat that supports viable populations of desired species, including prairie dogs; secondly, the FS needs to be responsive to situations where prairie dog colonies extend between National Forest System (NFS) lands and adjacent non-NFS lands: in effect, be a "good neighbor".

This project proposes to adaptively address the encroachment issue and the expansion issue. In regards to the USDA promulgated good neighbor policy (GNP), there will be an aggressive movement to tackle this issue. However, due to a demonstrable growth in colony acreage over the last 20 years or so, passive management will initially be relied on to reach LRMP objectives for complexes and increases in prairie dog habitat acreage in Management Area 3.63 (Black-footed Ferret Reintroduction Habitat).

The LRMP identified that NFS lands will be managed to encourage the expansion of prairie dog colonies overall with the goal being to provide four colony complexes, each a minimum of 1,000 acres. The LRMP specifically names three sites: Indian and Boyce Creeks, the vicinity of the south unit of Theodore Roosevelt National Park, and the Horse Creek drainage (on the McKenzie Ranger District). A complex is defined as an area having at least ten prairie dog colonies, a minimum of 1,000 acres, and a nearest-neighboring colony of no more than six miles.

The prairie dog is a FS Sensitive Species and currently a DPG Management Indicator Species (MIS) and recently identified as a focal species for LRMP monitoring on the DPG. The Northern Great Plains Final Environmental Impact Statement (NGP) estimated that prairie dog habitat will expand from a 1999 level of less than 3,000 acres to between 5,400 to 9,400 acres on the Little Missouri National Grassland (LMNG) within 10-15 years of the signing of the LRMP.

Initial scoping for this project raised concerns about the use of rodenticides as a part of the adaptive management toolbox. These concerns were primarily centered on secondary poisoning but also encompassed safety for humans and domestic animals. These commenters requested that the FS use non-lethal methods as opposed to rodenticides (lethal). Therefore, though non-lethal tools are considered as part of the over-all strategy in the action alternatives, one alternative (Alternative 3) does not utilize rodenticides in the management strategy for prairie dog. Refer to Chapter 2 of the EA for a complete discussion of issues identified during scoping.

Another key aspect of the action alternatives is the use of management zones in the overall strategy to aid in prioritization, management strategy, and how and when to use the tools available to the manager via an interdisciplinary team (IDT) of FS personnel.

There are three categories of prairie dog habitat:

- Category 1 are zones of NFS lands more than ¼ mile from an adjacent non-NFS owner. These are the interior areas;

- Category 2 is that zone of NFS land that is less than a ¼ mile from a non-NFS landowner. This would be the edge areas; and
- Category 3 is specifically the interface between NFS land and non-NFS land where existing prairie dog colonies are currently encroaching onto adjacent nonfederal lands or expected to encroach on nonfederal land within two years;
    - Some commenters questioned the effectiveness of the current vegetation and other barrier strategies, stating that prairie dogs can disperse up to five miles. Thus they felt that the area of imminent encroachment expanded out further than anticipated for Alternative 2. Therefore, Alternative 4 extends the area of control to include all colonies, or portions thereof, on FS lands within ¼ mile of an adjacent ownership.

The location of any given colony, and the alternative selected, will determine the management of that colony for this project as considered and described in each of the action alternatives:

- Category 1: These colonies will be passively managed. There will be no expected management actions taken for these colonies, or portions of colonies, with two exceptions. These exceptions, as outlined in the LRMP, include damage to facilities and threats to public health and safety.
- Category 2: Colonies, or portions of larger colonies, in this category will be assessed for the need of management activity to ensure the colony does not become a Category 3 colony (encroaching) when lethal action may be necessary. For colonies within this zone, non-lethal methods will be utilized unless the colonies fall under the exceptions listed above determined on a case by case basis.
- Category 3: These are colonies that, if undesired by the adjacent land-owner, will need active management to alleviate the issue, including either lethal or non-lethal methods depending on the project alternative selected. There are two objectives here with the first being to eliminate the encroachment issue and, secondly, to assess the context of the colony setting and what tool or tools can be used so the colony does not encroach on non-NFS lands in the future.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

Listed below (Table 29) is the relevant prairie dog management direction from the Dakota Prairie Grasslands Land and Resource Management Plan (LRMP). Some of this direction is linked to the sensitive species status of the prairie dog, its role in providing habitat for other species, and the controversial nature of the species.

Table 29: A list of relevant direction for prairie dogs from the DPG LRMP

Area	Plan Page	Resource	Standard or Guideline
GW	***1-15***	**Black-footed Ferret**	28. Coordinate with state and federal wildlife agencies regarding black-footed ferret reintroduction as soon as prairie dog complexes reach sufficient size. **Standard**
GW	***1-16***	**Burrowing Owls**	46. Manage for active prairie dog colonies that are larger than 80 acres. **Guideline**
GW	***1-16***	**Black-tailed Prairie Dog**	47. Restrict prairie dog shooting where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansion. Restrictions shall be year-long or seasonal, and dates of seasonal restrictions shall vary depending on the species at risk. Coordinate and consult with the appropriate wildlife agencies prior to implementation of restrictions. **Guideline**

Area	Plan Page	Resource	Standard or Guideline
GW	***1-16***	**Black-tailed Prairie Dog**	49. Use livestock grazing and prescribed fire to enhance habitat suitability for prairie dogs where prairie dog expansion is desired. These areas are identified at the project level. **Guideline**
GW	***1-16***	**Black-tailed Prairie Dog**	50. Manage for low vegetative structure in areas where prairie dog expansion is desired. Emphasize areas adjacent to existing prairie dog colonies as well as at abandoned colony sites. **Guideline**
GW	***1-16***	**Black-tailed Prairie Dog**	51. Manage for high vegetative structure around prairie dog towns where prairie dog expansion is not desired. Emphasize maintaining high structure between existing prairie dog colonies and private land. **Guideline**
GW	***1-18***	**Animal Damage Management**	1. Require mitigation measures to protect the national grassland resources when animal damage control activities are conducted by other governmental entities. Emphasize public safety; threatened, endangered, and sensitive species conservation; water quality protection, or other resource values. **Standard**
GW	***1-18***	**Animal Damage Management**	2. Limit the use of rodenticides (grain baits) for reducing prairie dog populations to the following situations: • Public health and safety risks occur in the immediate area. • Damage to private and public infrastructure or facilities, such as cemeteries and residences. • To respond to unwanted prairie dog colonization on land adjoining the national grasslands when consistent with U.S. Fish and Wildlife Service approved, state-wide prairie dog conservation strategies. **Standard**
GW	***1-18***	**Animal Damage Management**	3. Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program. **Guideline**
GW	***1-18***	**Animal Damage Management**	4. Restrict the use of rodenticides (above-ground grain baits) for reducing prairie dog populations outside the period October 1 to December 31 to reduce risks to migratory birds. **Guideline**
GW	***1-18***	**Animal Damage Management**	5. Do not use burrow fumigants in prairie dog colonies. **Standard**
Bad	***2-15***	**MIS/Desired Condition**	1. Emphasize establishment and expansion of prairie dog complexes in the Indian Creek and Boyce Creek drainages. **Guideline**
RP	***2-22***	**MIS/Desired Condition**	1. Emphasize establishment and expansion of prairie dog complexes in the Horse Creek drainage and in the vicinity of Theodore Roosevelt National Park, South Unit. **Guideline**
MA 3.63	***3-28***	**Livestock Grazing**	1. Use livestock grazing strategies and stocking rates to help achieve desired rates of prairie dog colony establishment and growth. **Guideline**
MA 3.63	***3-28***	**Fish and Wildlife**	1. Use rodenticides to reduce prairie dog populations only in response to public health and safety risks. Mutual concurrence by the Forest Service and US Fish and Wildlife Service is required on a colony-by-colony basis before authorizing any poisoning. **Standard**
MA 3.63	***3-29***	**Fish and Wildlife**	2. Allow relocation of prairie dogs only after consultation with appropriate state and Federal wildlife agencies. **Standard**
MA 3.63	***3-29***	**Recreation**	1. Restrict shooting in prairie dog colonies unless needed to help reduce unwanted colonization of adjoining lands. Authorize shooting in selected areas only through mutual concurrence by the Forest Service and U.S. Fish and Wildlife Service. Coordinate and consult with the appropriate state wildlife agency prior to implementation of authorized shooting. **Guideline**

GW = Grasslands-wide direction; MA = Management Area. Bad and RP = Badlands and Rolling Prairie Geographic Areas; MA = Management Area.

Additional direction comes from the U.S. Department of Agriculture, Deputy Under Secretary for Natural Resources and Environment David Tenny as described in Chapter 2.

The State of North Dakota Century Code lists "any rodent" as a "pest"; presumably including the prairie dog:

> *17. "Pest" means any insect, rodent, nematode, fungus, or weed; or any other form of terrestrial or aquatic plant or animal life, viruses, bacteria, or other micro-organism, except viruses, bacteria, or other micro-organisms on or in living humans or other living animals." (North Dakota Century Code Chapter 4.1-33; also 4.1-34 #23: www.legis.nd.gov/general-information/north-dakota-century-code);*

By implication, the state of North Dakota does not consider prairie dogs as "wildlife" according to the state's definition:

> *29. ""Wildlife" means all living things that are neither human, domesticated, nor, as defined in this chapter, **pests**, including mammals, birds, and aquatic life."*

Desired Condition

For the DPG LRMP, Desired Conditions are included in the Goals statements (LRMP page 1-1). Steps to achieve these desired conditions are included in the LRMP Objectives.

LRMP Chapter 2:

Management Indicator Species

1. Emphasize establishment and expansion of prairie dog complexes in the Indian Creek and Boyce Creek drainages. **Guideline** (page 2-15)

Wildlife

1. Desired population trends and habitat quality and quantity for management indicator and associated species in this geographic area are as follows (see Appendix H for habitat descriptions).

Black-tailed Prairie Dog

- Establish two or more prairie dog colony complexes within 10 to 15 years. Individual complexes may extend into Theodore Roosevelt National Park or Badlands Geographic Area. (page 2-22)

LRMP Chapter 3:

Management Area: Given the broad spatial scope of the proposed project, most Management Areas naturally fall into the project area. However, 3.65 (Rangelands with Diverse natural-Appearing Landscapes) and 6.1 (Rangelands with Broad Resource Emphasis) encompass the vast majority of the colony acreage where control would occur (LRMP page 3-1).

3.63 Black-Footed Ferret Reintroduction Habitat; p. 3-27:

Desired Conditions

Prairie dog colony complexes and compatible land uses are established and/or maintained for black-footed ferret reintroductions. Prairie dog populations are maintained or increased through vegetation management and/or relocation of prairie dogs with consultation with State Game and Fish agencies into suitable habitat.

Plant and animal species and communities associated with black-footed ferrets and black-tailed prairie dogs are actively restored.

The Forest Service works with other agencies and organizations to pursue conservation agreements or easements with adjoining land jurisdictions to achieve black-footed ferret recovery objectives.

In areas where landownership patterns are not conducive to effective prairie dog management, landownership adjustments to achieve more favorable landownership patterns are pursued. Unwanted impacts to adjoining lands are minimized.

The project does not propose to control prairie dogs in MA 3.63.

3.65 Rangelands with Diverse, Natural-appearing Landscapes

This management area emphasizes maintaining or restoring a diversity of desired plants and animals and ecological processes and functions. It also provides a mix of other rangeland values and uses with limits on facilities to maintain a natural appearing landscape. There are no desired condition statements relative to prairie dogs within this management area.

6.1 Rangeland with Broad Resource Emphasis; p. 3-43:

One of the **Desired Condition** statements in this Management Area is: "Prairie dog colonies will increase in some areas of the MA."

Federal Law

The following Federal laws are relevant to this analysis.

Endangered Species Act: Ensures federal actions do not jeopardize and agencies seek to recover federally listed species that are considered threatened or in danger of extinction.

National Forest Management Act: A key wildlife related component of this landmark legislation is the direction within the multiple-use objective inherent in the FS to provide for a diversity of plant and animal communities through a diversity of habitats.

Migratory Bird Treaty Act: Protects migratory birds through regulating the taking of migratory birds.

Executive Orders

EO 13186

On January 10, 2001, President Clinton signed an EO 13186 outlining responsibilities of federal agencies to protect migratory birds. An MOU between the USFS and USFWS was completed in 2008.

Other Guidance or Recommendations

In 2004, USDA Undersecretary Tenny, after discretionary review of the DPG LRMP, directed the Regional Forester "to aggressively implement the spirit and intent of the good neighbor policy. Specifically, I am instructing the FS to work with local interests and landowners to use the full suite of management tools available to them to reduce the potential for prairie dog colonies to expand onto adjacent non-federal lands."

Topics and Issues Addressed in This Analysis

Resource Indicators and Measures

Table 30. Resource indicators and measures for assessing effects

Resource Element	Indicator/Measure
Direct and Indirect Effects to Black-tailed Prairie Dogs	Acres of prairie dog colonies controlled
Direct and Indirect Effects to Black-tailed Prairie Dogs	Number of colonies controlled
Rodenticide Usage	Acres of rodenticide usage
Direct and Indirect Effects to Black-tailed Prairie Dogs	Potential colony expansion: projected acres at 3 (2021) and 10 (2028) years (2015 survey base; 5% growth rate)
Direct and Indirect Effects to Black-tailed Prairie Dogs	Number of Complexes at year 0 and year 10 based on projected 5% expansion rate
Direct and Indirect Effects to Black-footed Ferret Reintroduction Habitat – 3.63 (no control)	Projected acres
Economics	Relative cost of tools
Economics	Relative cost of Alternatives

Methodology

Methods and Information Source

Prairie dog colonies on the LMNG have been surveyed in 1997, 2002, 2005, 2008, 2012, and 2015. The early surveys are summarized in the *Black-tailed Prairie Dog Conservation and Assessment* for each Ranger District (Svingen 2006). This assessment was consulted primarily for the survey information, potential number of acres impacted, and suggested management recommendations for each colony.

Table 31: Acres of Active Prairie Dog Colonies on the LMNG – 1997-2015

YEAR	1997	2002	2005	2008	2012	2015
Colony Acreage	2,763	3,842	4,793	6,928	5,200	5,559

Over the years, the surveys differ somewhat in their quality and/or completeness. The 1997 survey was an initial baseline survey and could be construed as being an “extensive” survey versus an “intensive” survey since knowledge was relatively incomplete at the time. This may have resulted in several missed colonies and, hence, a lower acreage of active colonies being reported. The 2002 data set (Knowles 2003) built off the 1997 data and expanded it to include many colonies located on private and state lands across the range of the prairie dog. The Knowles survey could be considered the first “intensive” survey of the LMNG. This survey benefited from a coordinated effort with NDGF to gather information for a NDGF state-wide assessment for the black-tailed prairie dog. Colonies have been missed on every survey but the latter ones are more complete. For this report, baseline information will come from the 2015 data set with the addition of a few colonies missed during the survey that are known by the FS.

Another inherent difficulty with prairie dog surveys is the actual on-the-ground interpretation of the “outer edge” of a particular colony. If this were to occur in the same year, this may result in slight differences of acreages between surveyors. However, since surveys only occur every three to five years, the results show relative differences (i.e. trends) between survey years fairly accurately, though perhaps, not precisely.

For example the general trend of prairie dogs was to increase during the drier years of the first decade of the 2000's and generally level off after the 2008 survey. The wetter years and harsh winters were likely a strong contributor for the declines in prairie dog acreage. This "trend" can be a general predictor of prairie dog colony trends for future planning prairie dog management under an Adaptive Management (AM) context.

Because of the dynamic nature of prairie dog expansion and/or contraction, the potential to miss colonies, and the different on-the-ground interpretations of the colony outer edge, the overall acreage figures should be interpreted as the "minimum known" number of acres and colonies of prairie dogs for that survey year. While numbers are not precise, they are useful for determining trends and rough area occupied by prairie dogs on the LMNG.

A spreadsheet model developed by biologists on the Nebraska National Forest (Abegglen, unknown date, located in the project file) will be used to determine (predict) effects to the total acres of active prairie dog colonies and to predict potential expansion.

With respect to toxicology of zinc phosphide to various non-target species, Zinc phosphide is assumed to be highly toxic to all wildlife. Effects are determined based on the likelihood of a given species ingesting the rodenticide, and if ingested in a lethal quantity, loss of that individual is assumed.

Incomplete and Unavailable Information

Prairie dog colony surveys typically miss some colonies, and thus, are not a precise measure of prairie dog occupancy. As time and knowledge improves, this information should become more precise, but it is projected that a few colonies may continue to be missed. Some of this due to access issues in combination with the checkerboard ownership pattern, terrain, and the semi-Roadless character inherent on the LMNG.

It is unknown why the trend in colony acreage in MA 3.63 has been fairly flat to very slowly increasing since the LRMP was signed in 2002. Colony expansion has been slower in this area than in the rest of the LMNG. However, shooting of prairie dogs in this area may be a factor. Note that no control actions for prairie dogs are included in any action alternative for this project.

Spatial and Temporal Context for Effects Analysis

Direct/Indirect Effects Boundaries

Project analysis boundary for wildlife effects is the LMNG.

Cumulative Effects Boundaries

The Cumulative Effects boundary includes the LMNG.

The temporal boundary is set at three years (for the next inventory) and 10 years. To capture at least three inventory periods for modeling purposes to develop a timeframe for potential achievement of four complexes and to ascertain a potential increase in active prairie dog habitat within MA 3.63.

Affected Environment

Existing Condition

General

The analysis area (i.e. NFS lands) covers both badlands and rolling prairie geographic areas and habitats. This combination provides a variety of available habitats and a diverse suite of wildlife species that occupy those habitats. Resident wildlife present on the LMNG include big game, small mammals, various raptors, prairie dogs, sharp-tailed grouse, grassland and forest birds, and reptiles and amphibians.

Vegetation is highly variable with many habitat types represented. Of particular importance to this project, however, are the prairie dog colonies themselves. Prairie dogs contribute an important habitat type, providing food and shelter for many wildlife species.

An abundance of wildlife species utilize prairie dog colonies to some degree. Knowles (1994) cited literature listing 134 or more species that have been reported on prairie dog colony habitat. There are several species that are strongly associated with prairie dog colonies, including burrowing owls, mountain plover, ferruginous hawks, badgers, and the black-footed ferret.

In this multiple-use landscape there are other on-going land management activities such as oil and gas exploration and development, recreational activities, and livestock grazing. The highly fragmented ownership pattern of the LMNG creates situations where prairie dog activity creates unwanted encroachments across ownership boundaries. Opinions about prairie dog management are as fragmented and diverse as the ownership pattern.

Species and Existing Habitats and Conditions

This analysis incorporates by reference the Final Environmental Impact Statement for the Northern Great Plains Management Plan Revisions (NGP FEIS; USDA Forest Service 2001) as well as the DPG LRMP. Information on species and habitats on or near the LMNG is partially taken from those documents.

A) Species with Abbreviated Analysis

The following species were analyzed using an abbreviated analysis in the document due to minimal risk of effects as described in the rationale stated under each species. Species not suspected for the LMNG will not be addressed. Those include Poweshiek skipperling and Poweshiek skipperling critical habitat, western prairie fringed orchid, and arogos skipper.

1) Federally listed Species for the affected Counties covered under the Project Area

A list of federally listed species for the project area was obtained through the USFWS Information for Planning and Conservation (IPaC) planning web site at: https://ecos.fws.gov/ipac/location/index

Pallid sturgeon (Endangered: *Scaphirhynchus albus*)

Pallid sturgeons prefer turbid, main stem shallow river channels with sand and gravel bars (USFWS 2014). In North Dakota, pallid sturgeons are currently known primarily from the Missouri-Yellowstone confluence, though they can occur anywhere in the Missouri River between the Garrison Dam and Fort Peck Dam and lower Yellowstone River (USFWS 2014). Lake Sakakawea is not identified within the Pallid Sturgeon Recovery Plan as a recovery priority management area (USFWS 1993). However, pallid sturgeons have been found to utilize portions of Lake Sakakawea where or when its characteristics approach riverine habitat (USFWS 2014). The sturgeon is typically a bottom feeder.

The closest existing prairie dog colony to the Yellowstone River is approximately one mile. The nearest FS land is approximately 1,000 feet.

Zinc phosphide, the chemical proposed for use in Alternatives 2 and 4, rapidly degrades to phosphine and zinc ions in the presence of water. Phosphine and zinc sorb strongly to soil and are common soil nutrients. Zinc phosphide and its degradation products appear to have a low potential for ground water or surface water contamination according to the EPA reregistration report (EPA 1998). Therefore, the selected rodenticide is not expected to pose a threat to pallid sturgeon.

Similarly, the proposed activities that comprise the adaptive management toolbox, including vegetation barriers, different forms of trapping, and potential colony collapsing, will not affect habitat for pallid sturgeon. As the hydrologist report indicates, there are no measureable impacts from the presence of prairie dogs near drainages. The assumed rapid recovery of vegetation and the level terrain, will not result in any impacts to the Yellowstone River or its immediate tributaries from, any activity associated with prairie dog management.

There is no suitable pallid sturgeon aquatic habitat within the project area. No direct or indirect impacts to the pallid sturgeon would occur as a result of the proposed project. There will be ***no effect*** to the pallid sturgeon from any of the action alternatives.

Whooping Crane (Endangered; *Grus americana*)

Whooping cranes do not breed on the LMNG or in North Dakota (Canadian FWS; USFWS 2007).

The whooping crane may occur incidentally as a rare spring and fall migrant within the analysis area. There are few documented stops for whooping cranes on NFS lands. While cranes can show up in all parts of North Dakota, the vast majority of sightings occur along the Missouri River corridor. The whooping crane's foraging and roosting stops on or near the LMNG are very uncommon and considered incidental (App. H, NGP 2001). Migrating whooping cranes primarily use a variety of wetland habitats for roosting and feed in nearby grain fields. Crane use within the LMNG is so rare that it is not possible to quantify and is considered discountable. In addition, within the affected prairie dog colonies, there is a lack of potential and suitable whooping crane habitat, including a lack of suitable foraging and roosting areas.

However, crane migration may occur during the time frame the LRMP allows for poison grain to be used. One of the food items used by cranes includes grain. In the very unlikely event that cranes stopover on the LMNG in a prairie dog colony that is being poisoned, eating the grain could cause death. However prairie dog colonies do not provide the type of habitat (wetlands and grain fields) sought out by whooping cranes.

Project design includes features listed in Chapter 2 will protect whooping crane in the unlikely event they should migrate through or land within a treated prairie dog town.

Effects of use of the adaptive management toolbox on whooping crane are similarly negligible since vegetation barriers, live and lethal trapping, and colony collapsing would not occur within preferred habitat for the species, nor would any have potentially lethal consequences to migrating cranes.

There is an extremely low risk (non-quantifiable) of migrating cranes stopping at a colony with poison grain. Because the risk is so low and design features are included, a determination of ***no effect*** for whooping cranes is warranted for all action alternatives.

Black-footed Ferret (Endangered; *Mustela nigripes*)

Large prairie dog colony complexes provide the sole habitat for the black-footed ferret. Prairie dogs are their primary prey and burrows provide denning locations for the ferret.

Black-footed ferrets do not currently occur on the LMNG (App. H, NGP 2001; USFWS, Fed Reg. 2015) and are currently known primarily from transplant locations in other regions. The LRMP directs the DPG to coordinate with the appropriate state and federal wildlife agencies when prairie dog complexes reach sufficient size to possibly support potential ferret reintroduction efforts. The LRMP has designated a

28,000 acre Management Area (MA 3.63) in northwestern McKenzie County for the purpose of ferret recovery. Once a focal area reaches 1,500 acres of prairie dog habitat, the DPG is to notify the FWS. But this does not automatically relate to reintroduction efforts. Currently, the prairie dog acreage within 3.63 is less than 600 acres.

The existing condition within the ferret reintroduction area includes a smaller than needed colony size, inadequate colony distribution and, an insufficient amount of prairie dogs colonies within the MA 3.63.There are currently no black-footed ferrets on the LMNG with no plans to reintroduce ferrets into North Dakota at this time. Therefore, due to lack of species presence and lack of adequate habitat, there will be ***no effect*** to black-footed ferret from the implementation of any of the action alternatives.

Gray Wolf (Endangered; *Canis lupus*)

The gray wolf occurrence on the LMNG is sporadic and transient. No breeding populations are known to occur on the LMNG. This species once occurred throughout the northern Great Plains and even across North America (USFWS 1987) but was eliminated by settlers due to livestock depredation and fear that wolves may attack humans. Current sightings of wolves are generally young wolves (i.e. juveniles) dispersing from Canada. It appears that most wolf dispersal occurs during winter (Licht 1994).

Approximate average road density on the LMNG is 1.3 miles of road per square mile. This exceeds the apparent tolerance for gray wolf. Estimates vary from 0.3 to 1.1 miles per square mile (Licht 1994 and Johnson 1999). Oil and gas and grazing activities introduce an appreciable amount of activity to the open environment of western North Dakota and the LMNG.

Areas where population densities are 10 people per square mile and above tend to be unsuitable for wolf occupancy (Licht and Fritts 1994). Population densities for Billings and Slope Counties are one person per square mile, thus human population density does not appear to be a factor. However other contributing factors suggested by Johnson (1999) suggest that wolves have trouble establishing territories in areas where average crop and pastureland exceeds 27% of land area and where forest cover is less than 60% of land area. While there is little cropland within the administrative boundaries of the LMNG, pastureland greatly surpasses the 27% threshold. Woody environments on the LMNG are closer to 10% across the unit and generally occur in stringers along drainages, though north slopes may be dominated by woody species such as juniper.

Though wolves have dispersed significant distances from Minnesota and Manitoba into the Dakotas (Licht 1994), habitat is marginal at best. The LMNG provides closer to 10% tree cover (NGP FEIS) versus the 60% preferred by wolves. Though human population densities are relatively low, there is a relatively high presence of human activity on the landscape due to livestock grazing and oil and gas operations. Additionally road density is higher than preferred levels. While a suitable amount of open space exists for wolves to occupy the LMNG, levels of human activity (farming, livestock grazing, oil and gas development, etc.) on the intermingled land ownership pattern of the LMNG, creates a less than optimal habitat for the establishment of this species.

Due to the extremely rare sightings of wolves in western North Dakota or the LMNG, the risk of non-target poisoning, or any effect from the management options in the toolbox, is extremely remote. Therefor the project will have ***no effect*** to the gray wolf from any of the action alternatives in this project.

Interior Least Tern (Endangered; *Sterna antillarum*)

The interior least tern is known to nest on midstream sandbars along the Yellowstone and Missouri River systems (USFWS 2014a). The species constructs bowl-shaped depression nests on sparsely vegetated sandbars and sandy beaches during the nesting period which occurs from mid-May through mid-August (USFWS 2014a). Least terns nesting on riverine sandbars usually forage for small fish close to the nesting colony (USFWS 2014a).

Terns generally migrate out of the area by late August and follow riverine courses (i.e. Missouri River). They forage for fish, therefore, treated grains would not be a part of their diet. In addition, the project does not occur within or affect suitable habitat for this species. Therefore the action alternatives for this project will have ***no effect*** to the least tern.

Piping Plover (Threatened; *Charadrius melodus*)

Suitable nesting habitat for piping plovers in the Missouri and Yellowstone River systems is characterized as sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and island margins that interface with the river channel. Piping plovers forage on open beaches, primarily consuming insects and crustaceans. Breeding piping plovers rarely travel more than one mile from their nest sites during the breeding season (USFWS 2002).

This species stays close to its habitat near river systems, specifically the Missouri and Little Missouri Rivers in the vicinity of the project area. Since the diet for this species is typically composed of invertebrates, and their habitat is located near rivers, the grain bait and prairie dog towns would not be an attractant to piping plover. Therefore, project activities proposed in the action alternatives will have ***no effect*** to the piping plover.

Piping Plover Critical Habitat

Critical habitat for this species is located on the shoreline of Lake Sakakawea and along the Missouri River. The shoreline of the lake is managed by the US Army Corps of Engineers rather than the Dakota Prairie Grasslands. In addition, prairie dogs do not occur in this habitat as they do not inhabit high water table areas or very sandy substrates.

Rufa Red Knot (Threatened; *Calidris canutus rufa*)

The red knot is a rare transient potentially present along the Missouri River during spring and fall migration through North Dakota (Newstead et al. 2013). Red knot stopover sites include wetland habitats similar to the interior least tern and piping plover. The species has been documented to use Lake Sakakawea as a stopover. However, the red knot has been documented to avoid stopovers in the Northern Great Plains during some migrations. It is known that stopovers are time-constrained, and that the rufa red knot requires stopovers rich in easily digestible food.

As the rufa red knot migration patterns follow wetland habitats within the Missouri River basin typically, and prefers easily digestible food (e.g. worms), prairie dog colonies will not be stopover points and grains are not a food source for this species. Therefore there will be ***no effect*** to the rufa red knot from any of the action alternatives for this project.

Northern Long-eared bat (Threatened; *Myotis septentrionalis*)

The northern long-eared bat is suspected to find summer breeding habitat on the LMNG. It is known to roost in trees with loose bark, cavities, and/or crevices. Evidence indicates that foraging habitat occurs in mature forests or in small forest clearings over water where they forage in the air and glean prey consisting of insects off of plants. Further east in its range, the species uses caves and/or mine shafts with high humidity and stable temperatures for winter hibernation sites.

The proposed project management activities will not overlap with any of this bats species' habitat parameters. Hence, there will be ***no effect*** to the northern long-eared bat from any of the action alternatives in this project.

Dakota Skipper (Threatened; *Hesperia dacotae*)

The Dakota skipper occurs in undisturbed or lightly disturbed native prairie. These high quality sites typically occur in a higher community such those with lightly invaded, undisturbed soils with an abundance of forbs and late seral mixed-grass species on the most productive ecological sites, typically the western wheatgrass/green needle grass communities. Prairie dog colonies typically occur in a

pioneer/annual community (soils with high amounts of bare ground and early seral grass species due to the result of either previous tillage or prairie dog burrowing activity).

To date, there also is no prairie dog habitat present in known occupied Dakota skipper areas. Recent observations of Dakota skipper have been made in the vicinity of one prairie dog town (SWCA 2017). Designated critical habitat for this species is located in northeast McKenzie County, approximately 30-35 miles from the nearest prairie dog colony.

Prairie dog colonies occur near the observations noted above. Therefore, a prairie dog colony may naturally expand into this habitat. However, control actions in any action alternative will have no effect on the observed potential sightings.

The single observation of Dakota skipper in Pasture 4 is immediately east of a prairie dog colony. There is also adjacent non-NFS ownership holdings West, North, and South. Though currently this colony is almost entirely an interior colony (Category 1), if it threatens to expand across those property lines, several adaptive actions are possible. The two most likely options used would be the construction of a vegetative barrier to inhibit expansion onto the adjacent ownership. In concert with or as an early effort, colony expansion could be encouraged to the east and towards the skipper observation. Directing prairie dog colony expansion toward the Dakota skipper habitat could result in "take" of Dakota skipper. This is because of the vegetation change that would take place as a result of prairie dog colonization. Prairie dogs would remove grasses and forbs needed by Dakota skipper to complete their life cycle; thus the habitat would no longer support skippers. An adverse effect determination for Dakota skipper would be made in this instance. To avoid this outcome, a design feature has been added to protect Dakota skipper habitat from such an impact.

There is no spatial overlap between prairie dog colonies and known occurrences of Dakota skipper; nor overlap with designated critical habitat; prairie dogs and Dakota skippers occur on very dissimilar community phases (i.e. habitats); but the areas where recent observations of Dakota skipper have been made may be subject to eventual prairie dog colony expansion. Therefore, to prohibit any effect from an action that may engender effects to the habitat, if effects are possible to any threatened or endangered species, and cannot be mitigated away, the activity will not occur. Hence, with the aforementioned design criteria, there will be ***no effect*** to the Dakota skipper from any of the action alternatives of this project.

Dakota Skipper Critical Habitat

A limited amount of Dakota skipper critical habitat occurs on the LMNG. This habitat occurs within northeast McKenzie County, where prairie dogs do not occur. In addition, should prairie dogs appear within any Dakota skipper critical habitat, any control efforts for prairie dog, or allowance of prairie dog expansion, would not include measures that would create an impact on Dakota skipper in accordance with project design features. Therefore the project would have ***no effect*** on Dakota skipper critical habitat.

2) Forest Service Sensitive Species

The list of sensitive species for the project area was obtained from the Region One Sensitive Species List (USFS 2011).

Bighorn Sheep (*Ovis canadensis*)

Bighorn sheep use steep and rugged badlands topography as their primary lambing areas and escape cover. Population and habitat use has been monitored by the North Dakota Game and Fish Department (NDGF) since sheep were reintroduced to North Dakota in 1956. With technological improvements and increased partnership involvement, this monitoring has intensified in recent years resulting in a much improved knowledge of key areas and herd dynamics. This information collection is continually on-going and evolving.

Proposed project activities may occur within the line of sight of key habitat (lambing areas); the application of poison oats would only occur in the fall, outside the lambing season (4/1-7/15); bighorn

sheep do not preferentially forage in prairie dog colonies. However, some non-lethal management activities may occur during lambing timeframes. Because some activities (e.g. fencing, non-lethal trapping, etc.) may occur during lambing season, the determination of effect for bighorn sheep from any of the action alternatives is ***may impact individuals or habitat but not likely result in a loss of viability or a trend towards federal listing*** to the bighorn sheep.

Bald Eagle (*Haliaeetus leucocephalus*)

This species was removed from the federal threatened species list as the species has recovered sufficiently to meet recovery goals. It is now included on the Regional Forester's Sensitive Species list (USFS 2011).

Bald eagles occur primarily as spring and fall migrants across the analysis area. Nesting in North Dakota typically occurs at Devils Lake and along the Missouri River north of Bismarck. There is one known active occurrence in northeast McKenzie County away from any known prairie dog activity.

Given that there is no nesting on the LMNG, though adjacent; use of the LMNG is typically migratory; the location is removed from prairie dog colonies; the duration of control operations would occur over a short timeframe (2-4 days); the likelihood of secondary poisoning is very low (APHIS Appendix P, Animal Damage Control FEIS, 1994); and the effects of secondary poisoning is minimal (lab studies feeding bald eagles poisoned prey were apparently unaffected – ibid.); for the proposed project activities, determination would be ***no impact*** to the bald eagle from all alternatives.

Baird's Sparrow (*Ammodramus bairdii*)

Baird's sparrow breeds in the northern Great Plains. This sparrow is a grassland specialist, preferring idle native or idle tame grasslands and lightly to moderately grazed pastures within an upland setting. Similar to the Dakota skipper, there is likely a preference for community phases in the 2.x phase. However, this species will also utilize crested wheatgrass communities, being attracted to the structure of the community, not just the composition.

Within their range, birds may change their breeding areas, and even the types of habitat preferred, in response to environmental conditions. In general, the species is most abundant in the western part of its range when wet cycles produce dense vegetation and during dry cycles, in the more productive portions of the eastern mixed grass prairie (DeChant 2002). General habitat requirements include moderately deep litter and vegetation height that may exceed 8 inches (average vegetation obstruction reading (VOR) $\geq$5.9 inches). Vegetative diversity such as scattered forbs, a mixture of grass heights, and patches of litter-covered ground, are important to Baird's sparrow. Areas with shrub patches are avoided. Baird's sparrows rely mostly on small insects for food during the breeding season. Grass and weed seeds and waste grain are also utilized (Green et al 2002).

This species is known to occur on the LMNG. The analysis area has patches of suitable habitat. Because Baird's sparrows utilize grasslands with higher structure vegetation, prairie dog towns are not suitable habitat. Baird's likely do not use (nest, forage, loiter, etc.) prairie dog colonies preferentially, plus most, if not all individuals, will have migrated out of the analysis prior to control (i.e. rodenticide) activities in late fall. Since this species does not breed or use prairie dog habitat, project activities will not impact Baird's sparrow habitat or populations.

However, adaptive activities and natural colony expansion may impact habitat. Through adaptive management, an effort may be made to encourage colony expansion in a direction away from a possible encroachment and into potential suitable habitat for Baird's sparrow or other species in general. And though the initial action may have no effect, adaptive actions may have an indirect effect in most locations due to the change in vegetation structure that would result from expanding colonies.

Given that the proposed project activities would typically occur outside the species preferred habitat; that the potential use of poisons will occur after most or all of the Baird's migration through North Dakota; and, lastly, that this sparrow avoids foraging in open areas (ibid.) there will be ***no impact*** to the Baird's

sparrow from the initial project activities. The expansion of prairie dog colonies, whether intentional or natural, is included in all project alternatives and ***may impact individuals or habitat but not likely result in a loss of viability or a trend towards federal listing*** due to possible expansion into potential Baird's habitat.

Burrowing Owl (*Athene cunicularia*)

Burrowing owls occupy their breeding grounds within the Great Plains from about early-mid April until September. They use well drained, level to gently sloping grassland habitats characterized by sparse vegetation and bare ground, such as moderately or heavily grazed pastures, but preferentially, utilize prairie dog colonies (Sidle et al 2001). Burrowing owls rely on burrowing mammals, such as prairie dogs and badgers, to excavate burrows utilized as nest sites. All prairie dog colonies are considered potential burrowing owl habitat on the LMNG.

Prey consists of primarily small mammals (e.g. deer mice and meadow voles) and invertebrates (e.g. grasshoppers and beetles) but they tend to be opportunistic and will also consume small birds, reptiles, and amphibians. Burrowing owls forage in a variety of habitats, including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas.

From Appendix P of the 1994 APHIS Animal Damage Control Program FEIS, risk of secondary poisoning from zinc phosphide appears low:

1. LD50 values are higher for larger animals (e.g. less for deer mouse vs. more for burrowing owl);
2. Zinc phosphide, or its common additive, has a strong propensity to cause vomiting, especially in birds, thus reducing hazards and exposure;
3. Scavengers and predators tend to avoid zinc phosphide contaminated portions in prey; and
4. Zinc phosphide is not stored in muscle or tissue of treated rodents.

Initially, it is projected that there will be relatively short-term reductions in colony acreage (Alternative 2/3: 954 acres; Alt 4: 1,828 acres) as the program implements the good neighbor policy and the associated control. However, it is demonstrable that colony acreage will recover, even under passive management (see prairie dog analysis section of this report). Therefore, there will be short-term habitat loss under all action alternatives but habitat will recover and perhaps exceed the current level within a few years.

Though secondary poisoning risk is low, most if not all individuals will also have migrated out of the area by October when the LRMP permits the use of rodenticide. There may be little, if any, impact on individual burrowing owls.

Impacts to burrowing owls are expected to be indirect and short-term via loss of potential nesting habitat. All colonies are considered potential habitat and the project will result in an overall short-term reduction in potential nest burrows, particularly if treated colonies are disked or dragged to reduce burrows for re-population by neighboring prairie dogs. However, eventual recovery of acres of prairie dog habitat is highly likely even under passive management. The determination for the burrowing owl is ***may impact individuals or habitat but will not lead to a trend toward federal listing or a loss of viability in the planning area.***

Even though all action alternatives will reduce, and impact, potential owl nesting habitat, there are differences between alternatives in rate of recovery. Of the action alternatives, Alternative 3 would likely recover prairie dog habitat quicker than Alternative 2 due to a reduced rate of prairie dog control. Alternative 4 would have the greatest impact to burrowing owl habitat due to increased prairie dog colonies controlled. Table 47 provides details.

Sage grouse (Sensitive Species and Management Indicator; *Centrocercus urophasianus*)

The greater sage grouse is a FS sensitive species and a Management Indicator Species (MIS) on the LMNG for sagebrush habitat with dense and diverse herbaceous vegetation (Appendix H, LRMP). Sage

grouse are known to occur in western Slope County where some prairie dog colonies occur. This overlap occurs only within the Boyce Creek/Indian Creek focal area.

Sage grouse habitat is dominated by sagebrush, preferably big sagebrush species. Most sage grouse activity occurs in sagebrush or in meadows or openings adjacent to sagebrush. Sage grouse nest on the ground, most often below sagebrush where tall grass cover plays an important role. They feed on soft material, almost exclusively big sagebrush, during the winter and a combined diet of sagebrush and various forbs during the spring and summer (Schroeder 1999). Seeds, such as oats, would not be a food item of choice, particularly from October through December as by this time all birds are almost exclusively keyed into foraging on big sagebrush.

In some locations, prairie dog colonies have negatively impacted sagebrush communities. It is possible that some colonies that are controlled, or removed, could provide suitable sage grouse habitat in time. However, this is expected to be minimal, as prairie dogs occupy an overall small percentage of the sage grouse area (<2%).

Though sage grouse and prairie dogs have co-existed on the northern Great Plains for hundreds to thousands of years, there is potential for conflict given the appreciably decreased area in which to co-exist and the altered disturbance regimes present prior to European settlement.

GIS mapping indicates an approximate total of 6,252 acres of potential sage brush habitat within the Primary Habitat Management Area (PPH) for the sage grouse. When the 2015 prairie dog survey information is over-laid onto this sage brush habitat information, an approximate total of 65 acres, or 1.03% of sagebrush habitat type is directly impacted from prairie dog activities. In contrast, every acre is potentially annually utilized by livestock.

Given that sage grouse do not consume seeds and are infrequent visitors to prairie dog colonies, habitat lost to prairie dog activity may recover as a result of prairie dog removal. However this recovery may be counter-balanced by prairie dog expansion in other sagebrush areas. Therefore the determination of effects to the sage grouse under all action alternatives is ***may impact individuals or habitat but is not likely to result in a loss of viability or a trend towards federal listing.***

Loggerhead Shrike (*Lanius ludovicianus*)

This species is known to occur on the LMNG and has been observed in some prairie dog colonies.

Loggerhead shrikes prefer open habitat characterized by grasses and forbs of low stature interspersed with bare ground and shrubs or low trees within an upland prairie setting. They will use prairies, pastures, sagebrush desert, and fencerows or shelterbelts of agricultural fields as well as a variety of other areas that are open with interspersed trees and shrubs.

The loggerhead shrike feeds primarily on large insects, but also preys on other invertebrates, small birds, lizards, frogs, and rodents (Yosef 1996). Seeds or grain are not a part of this species diet but may be consumed by prey items. The loggerhead shrike likely migrates out of North Dakota by October. Secondary poisoning, or even non-target poisoning from the use of zinc phosphide is highly unlikely.

Given that this species preys on smaller avian and mammalian species (e.g. voles; potential consumers of poison), as well as insects; the shrike is likely migrated out of the area by October, proposed project activities from all action alternatives ***may impact individuals or habitat but is not likely result in a loss of viability or a trend towards federal listing.***

Long-billed Curlew (*Numenius americanus*)

The long-billed curlew is known to occur on the LMNG. In summer, the curlew uses expansive, open, level to gently sloping or rolling grasslands with short vegetation such as short-grass prairie or recently grazed mixed-grass prairie. Proximity to water may be an important factor in habitat selection. After eggs hatch, adults and broods continue to forage in short-grass and mixed-grass habitats, but they increase their use of areas with more vegetative cover, such as cropland and weedy areas. The species is fairly opportunistic, feeding on various insects, crayfishes, crabs, snails, and toads (Dechant et al. 1999) and are entirely carnivorous (Dugger 2002). This species migrates south in late summer.

They will use prairie dog colonies at times for foraging and breeding where they will forage for invertebrates. Hence, management activities that result in a reduction in colony acreage may result in lost foraging opportunities. But as prairie dog populations recover overall, it is projected to result in a net gain of prairie dog occupied habitat.

This species is entirely carnivorous, preying on insects and small aquatic items and will have migrated out of the area prior to activities, including applications of rodenticide in October through December. There may be some lost foraging opportunities via an overall loss of prairie dog habitat, though this impact will be short-term as overall colony acreage will recover and likely increase. All action alternatives will have ***no impact*** on the long-billed curlew.

Sprague's Pipit (*Anthus spagueii*)

Sprague's pipit uses grasslands of intermediate height with sparse to intermediate vegetation density. Although they will use tame pasture, they are significantly more abundant in native prairie. Important nesting habitat features include sparse vegetation, low to moderate litter cover, and little or no woody vegetation (Dechant at al. 1998a). Diet is almost entirely arthropods throughout the year. Diet may also include some seeds during later periods on winter range (Robbins 1999). Sprague's pipits have generally migrated out of the area prior to October. However, at Lostwood National Wildlife Refuge in ND, Sprague's pipits were still present in late September in most years.

Given that this species' primary diet is arthropods and rarely seeds or vegetation, most individuals would have migrated out of the area, and it is highly unlikely impacts will occur from poisoning activities, all action alternatives for the project ***may impact individuals or habitat but is not likely to result in a loss of viability or a trend towards federal listing*** to Sprague's pipit. Alternative 3 will have a smaller effect, if any, due to no rodenticide application. But lethal traps may be applied at all times of the year and pose a very low potential effect to individuals.

Ottoe Skipper (*Hesperia ottoe*)

The Ottoe skipper is a species of undisturbed, diverse mid-grass to tall-grass prairie on the LMNG (higher Ecological States and Community Phases of 2.1 – 2.2). Drier prairie sites such as hilltops may be favored as compared to Dakota skippers. Larvae feed on grasses, particularly little bluestem. Adults fly from June into August. Favored nectar sources include blazing star, hoary vervain, and purple coneflower. This species is known from all counties of the LMNG (Royer 2004).

However, similar to the Dakota skipper, some sites may be subject to eventual herbivory and vegetation change from prairie dog expansion. This could be the result of natural expansion or the result of expansion due to adaptive management activities. Therefore, all action alternatives ***may impact individuals or habitat but are not likely to result in a loss of viability or a trend towards federal listing*** to the ottoe skipper.

Regal Fritillary (*Speyeria idalia*)

The regal fritillary is most commonly associated with tall-grass to mixed-grass bluestem prairies. Preferred habitats include big and little bluestem, western wheatgrass, and green needlegrass with a variety of *Asteracea* species that serve as adult nectar sources. Adults also use swampy and sub-irrigated

meadows. Larvae feed only on species of violets. Adults fly from mid-June through early August. The principle requirement in all habitats appears to be the presence of extensive grasslands with high densities of violets and other nectar sources. Because violets are of short stature and rapidly displaced by tallgrass species, some form of disturbance is needed. The regal fritillary is known to occur on the LMNG in McKenzie and Slope Counties (Royer 2004), but has not yet been recorded in Billings County.

Royer (2002) states that it is unlikely this species breeds regularly north of I-94 and west of the Missouri River.

Given that this project will not occur in potential habitat and that there will be no ground disturbance outside of existing prairie dog colonies, the proposed project will not impact this species. However, similar to other grassland butterflies and some ground-nesting avian species, some sites may be subject to eventual herbivory and vegetation change from prairie dog expansion. This could be the result of natural expansion or the result of expansion due to adaptive management activities. Therefore, all action alternatives ***may impact individuals or habitat but are not likely to result in a loss of viability or a trend towards federal listing*** to regal fritillary.

Tawny Crescent (*Phyciodes batesii lakota*)

Subspecies *Phyciodes batesii lakota* is found across the LMNG (Royer 2003). However, there are no known tawny crescent occurrences within nearly a mile of a prairie dog colony. In the Dakotas, "tawnys" appear to be restricted to moist forest margins, particularly in riparian and woody draw situations, and moist valley bottoms that border riparian woodlands. From these situations, adults range outward and upward to take nectar throughout the day. Typical habitat in North Dakota is moist clearings in natural aspen stands or green ash woodlands. There appears to be an ecological preference for natural woodland margins in North and South Dakota, including a strong association between this species and green ash forest margins (woody draws) that border bluestem/needlegrass prairie. Aster species serve as larvae hosts; white panicle aster (*A. simplex*) is the favored host in the Dakotas. Adults emerge around the first week of June. Dogbane and leafy spurge are favored nectar sources for adults. This species is thought to be more abundant/widespread than previously thought.

Given that this project will not occur in potential habitat (high quality woody draws); that there will be no ground disturbance in or near woody draws; and grain is not a food source, the proposed project will not impact this species. Given a 10-15 year analysis time span and the distance between known prairie dog colonies and known tawny crescent sites, the likelihood of impacts to tawny crescent habitat and populations is remote. Therefore, for all action alternatives ***no impacts*** to the tawny crescent butterfly.

Northern Redbelly Dace (*Phoxinus eos*)

The northern redbelly dace is a small member of the minnow family. It has been found in some tributaries of the Missouri River in North Dakota including Heart, Knife, and Cannonball Rivers. Northern redbelly dace prefer slower stretches of rivers and creeks, with clear water and some vegetation. Loss of suitable habitat due to land use practices around rivers and streams is a concern (Ashton and Dowd 1991). Species occurrences and habitat for this species is not found in the activity areas.

There will be ***no impact*** to habitat or populations of this dace from any action alternative.

3) Management Indicator Species

Plains Sharp-tailed Grouse (*Tympanuchus phasianellus jamesi*)

Plains sharp-tailed grouse are found primarily in mixed grass prairies. Interspersed shrubs and shrub communities also contribute to habitat suitability and quality for this species. They are the management indicator for high structure grassland habitat.

Main food items in the fall and winter include buds, seeds (especially cereal grains), herbaceous matter, and fruits such as berries (Connelly et al 1998).

Peak breeding activity for sharp-tailed grouse occurs in about the middle of April with intensified lek activity occurring for several weeks either side of mid-April. Males will visit leks in September-October to establish breeding territories and March-May for breeding activities. They generally leave two to four hours after sunrise to forage (ibid.).

Gallinaceous birds (such as sharp-tailed grouse) can be effected by zinc phosphide (Littrell 1990). However, Witmer and Fagerstone (2003) review of toxicants used in black-tailed prairie dog control programs, concluded that registered pesticides are very safe for the approved use when label directions are followed carefully and "[R]isks to non-target wildlife is usually small when compared to other pesticides." Uresk et al (1987) found in field tests that ground feeding birds such as grouse (which included sharp-tailed grouse) showed no difference in adjusted relative densities between control and treated sites. And Tietjen (1976) and Matschke et al (1983) (both in Uresk et al 1987) report no significant mortality in seed-feeding birds in zinc phosphide applications.

Therefore, given that sharp-tailed grouse during the proposed control timeframes will generally be utilizing uplands with berry/fruit producing shrubs/trees (e.g. buffalo berry, juniper, or Russian olive); prefer higher vegetative cover; within most areas of grouse habitat, prairie dog habitat is a small portion of the habitat; and lastly, no demonstrated appreciable effect on grouse densities (Uresk 1987); it is highly unlikely that the proposed project will noticeably impact populations of this species. There is the possibility that individual grouse may consume poison grain but this should be very minimal.

Prairie Dog: See prairie dog detailed analysis below. Summarized in Table 32.

Sage Grouse: Analyzed in the sensitive species section above. Summarized in Table 32.

4) Raptors

Merlin (*Falco columbarius*)

Potential habitat does exist within the analysis areas (i.e. focal areas). Rosenfield et al. (2002) located only four merlin nests in McKenzie and Slope Counties in 2001. Prey is largely small to medium sized avian species (generally under 50 grams; Warkinton et al. 2005) such as horned larks.

Although unlikely, a merlin could be affected by potential secondary poisoning if a prey item (e.g. horned lark) had just consumed some treated grain. However, zinc phosphide breaks down very rapidly in the digestive tract of the primary consumer reducing the likelihood of secondary poisoning to predators and/or scavengers and secondary risks are very minimal (p. 264, Appendix P, Animal Damage Control FEIS, 1994).

There would likely be no effect, or very minimal effect, on merlins from the proposed project.

Ferruginous Hawk (*Buteo regalis*)

There are few known ferruginous hawk nests on, or around the LMNG. All known nests are greater than three miles from known prairie dog colonies. Migration can occur from August through November. In the eastern part of this species range (east of the continental divide) primary food items are ground squirrels and prairie dogs (Bechard 1995). However, there is a low risk of secondary poisoning because zinc phosphide breaks down rapidly in digestive tract of the primary consumer and prairie dogs generally die in their burrows (pg. 4-73, Animal Damage Control FEIS, 1994) further reducing the risk to predators and scavengers (e.g. coyotes and with more risk to badgers). In addition, ferruginous hawks and golden eagles have been repeatedly observed feeding on prairie dog carcasses and stripping and setting the gastro-intestinal tract aside, without consuming any of the guts or their contents (USDA FS Nebraska National Forest 2008, page 3-80). Other predators and/or scavengers (e.g. coyotes and badgers) may consume any potential carcasses on the surface prior to raptors. Though recognized as occurring, secondary poisoning in ferruginous hawks is not considered to be a significant threat from zinc phosphide (Collins and Reynolds 2005). The larger threat is related to the loss of prey items (ibid.). However, at the larger scale, this indirect impact would be a short-term loss of overall acreage of a potential prey item. Prairie dog expansion in other areas will off-set these short-term losses.

Similar to merlin, consumption of zinc phosphide-poisoned prey (secondary poisoning) is unlikely to affect individuals and/or the population.

The proposed project will have a minimal impact on ferruginous hawks.

Peregrine falcon (*Falco peregrinus*)

The peregrine falcon migrates statewide during the spring and fall, primarily along major river courses, such as the Little Missouri River. The last recorded nesting of peregrine falcons on the LMNG was at Bullion Butte in (1954 on the Medora Ranger District). There are no known active peregrine falcon nest sites on the LMNG.

Peregrine falcons exhibit a strong dietary preference for birds (77-99% by frequency) with bats the most common mammal (White 2002). Prairie dogs are not listed as a prey item.

Given that there is no known active breeding by peregrine falcons in the analysis area, use of the LMNG by peregrine falcon is transitory during migratory, and a prey base highly skewed towards birds and not prairie dogs, there would be no impacts to the peregrine falcon.

Golden Eagle (*Aquila chrysaetos*)

There are many historical and known golden eagle nests within the analysis area. Primary control activities will not occur during the nesting timeframe so breeding activities will not be affected. Primary prey items include rabbits, hares, ground squirrels, and prairie dogs (Kochert et al. 2002). As discussed

for other raptors, the risk of secondary poisoning is minimal. Zinc phosphide breaks down rapidly (Appendix P, Animal Damage Control FEIS, 1994, located in the project file) in the digestive tract of affected primary consumers (i.e. prairie dogs) and prairie dogs typically die in the burrow, further reducing the potential risk of secondary impacts. In addition, ferruginous hawks and golden eagles have been repeatedly observed feeding on prairie dog carcasses, and stripping and setting the gastro-intestinal tract aside, without consuming any of the guts or their contents (USDA Nebraska National Forest 2008, page 3-80). In very complex interaction, other predators and/or scavengers (e.g. coyotes and badgers) may consume carcasses on the surface prior to raptors. However, indirect impacts to the golden eagle would primarily be limited to a short-term loss of overall acreage of a potential prey item, prairie dogs. Also prairie dogs are just one of several food sources for golden eagles.

Eagles do not eat oats and would therefore not consume treated bait. There is a low potential of impacts to golden eagles from the proposed project. This project therefore complies with the Bald and Golden Eagle Protection Act of 2004.

Prairie Falcon (*Falco mexicanus*)

There are several known or historical prairie falcon nests across the LMNG. This falcon preys on small mammals including ground squirrels (e.g. thirteen lined) and horned larks with meadowlarks as secondary prey items during breeding season. During winter, prairie falcons turn to horned larks and meadowlarks as primary prey (Steenhof 1998). Prairie dogs are an unlikely prey for this species. In addition, zinc phosphide breaks down very rapidly in the digestive tract of the primary consumer (prairie dog) (Appendix P, Animal Damage Control FEIS, 1994) reducing the likelihood of secondary poisoning to predators and/or scavengers.

There is a very low potential of impacts to prairie falcons from proposed project.

Table 32: Summary table displaying species effects call

Species	Designation[1]	Habitat on or Near LMNG	Occurrence within Analysis Area[2]	Occurrence within Impact Area (prairie dog towns)	Potential for Project Area Impacts on Habitat or Population	Effects Determination from Action Alternatives
Pallid Sturgeon (*Scaphirhynchus pallidus*)	E	Resident of the Yellowstone and Missouri River	Known	Absent	None	No Effect
Whooping Crane (*Grus americana*)	E	Small ponds, upland grasslands and rivers. Use is rare and incidental during migration.	Known, transient	Unlikely	None	No Effect (w/Design Criteria)
Black-footed Ferret (*Mustela nigripes*)	E	Prairie dog colonies; large complexes of colonies required to support populations.	Unknown	Absent	Habitat: Moderate	No Effect
Gray Wolf (*Canis lupus*)	E	Large, relatively undisturbed landscapes with large ungulates for prey	Unknown; Transient	Absent	None	No Effect
Interior Least Tern (*Sterna antillarum*)	E	Sand bars along the Missouri River	Known; Transient	Absent	None	No Effect

Species	Designation[1]	Habitat on or Near LMNG	Occurrence within Analysis Area[2]	Occurrence within Impact Area (prairie dog towns)	Potential for Project Area Impacts on Habitat or Population	Effects Determination from Action Alternatives
Piping Plover (*Charadrius melodus*)	T	Sandbars and isolated gravelly areas along the Yellowstone and Missouri Rivers	Known; Transient	Absent	None	No Effect
Rufa Red Knot (*Calidris canutus rufa*)	T	Migratory and transient through ND, Use wetlands habitats; documented on Missouri River	Known; Transient	Absent	None	No Effect
Northern Long-Eared Bat (*Myotis septentrionalis*)	T	Uses trees with cavities and/or loose bark for summer roosting	Known	Unlikely	None	No Effect
Dakota Skipper (*Hesperia dacotae*)	T	High quality, diverse, and native prairie	Unconfirmed	Unlikely	Habitat: Low	No Effect (w/Design Criteria)
Bald Eagle (*Haliaeetus leucocephalus*)	S	Large trees for perching and roosting, areas with carrion, small mammals or fish. Use is strictly during migration.	Known; Transient	Unlikely	None	No Impact
Baird's Sparrow (*Ammodramus bairdii*)	S	Idle native or tame grasslands or lightly to moderately grazed pastures.	Known	Unlikely	Habitat: Moderate	May Impact
Burrowing Owl (*Athene cunicularia*)	S	Well drained, gentle grassland with sparse vegetation; usually rely on burrowing mammals for nest sites; prairie dog colonies good habitat.	Known	Present	High	May Impact
Sage Grouse (*Centrocercus urophasianus*)	S; MIS	Sagebrush shrubland.	Known	Unlikely	Habitat: Low	May Impact
Loggerhead Shrike (*Lanius ludovicianus*)	S	Open habitat with low stature grasses and forbs and shrubs or low trees.	Known	Likely	None	May Impact
Long-billed Curlew (*Numenius americanus*)	S	Expansive, open, gentle grassland with short vegetation.	Known	Present	None	No Impact

Species	Designation[1]	Habitat on or Near LMNG	Occurrence within Analysis Area[2]	Occurrence within Impact Area (prairie dog towns)	Potential for Project Area Impacts on Habitat or Population	Effects Determination from Action Alternatives
Sprague's Pipit (*Anthus spragueii*)	S	Grasslands of intermediate height and sparse to intermediate vegetation.	Known	Present	Habitat: Moderate	May Impact
Black-tailed Prairie Dog (*Cynomys ludovicianus*)	S, MIS	Gentle grassland terrain; short grass communities; not forested or wet.	Known	Present	High	May Impact
Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*)	S	Badlands and other steep grassland for escape cover, with shrubs, grasses, sedges and forbs for food.	Known	Unlikely	None	May Impact
Ottoe Skipper (*Hesperia ottoe*)	S	Undisturbed mid-grass to tall grass prairie, drier sites/hilltops.	Known	Unlikely	Habitat: Low	May Impact
Regal Fritillary (*Speyeria idalia*)	S	Tallgrass to mixed grass bluestem prairies.	Known	Unlikely	Habitat: Low	May Impact
Tawny Crescent (*Phyciodes batesii*)	S	North-facing or other mesic sites – green ash forest margins that border bluestem prairie.	Known	Unlikely	Habitat: Low	No Impact
Northern Redbelly Dace (*Phoxinus eos)*	S	Requires slower and clearer waters with some vegetation. Can also be found in impoundments like beaver ponds and pools in headwaters. Has been found on the Cannonball River on the LMNG.	Known	Absent	None	No Impact
Plains Sharp-tailed Grouse (*Tympanuchus phasianellus*)	MIS	Mixed grass prairie	Known	Unlikely	Low	No Appreciable Impacts
Golden Eagle	R	Nests: Trees, Cliffs	Known	Present	Low	No Appreciable Impacts
American Peregrine Falcon (*Falco peregrinus*)	R	Peregrine falcons will use almost any habitat type that provides hunting opportunities.	Known, Transient	Unlikely	None	No Impact
Prairie Falcon	R	Cliffs	Known, Transient	Unlikely	None	No Appreciable Impacts

Species	Designation[1]	Habitat on or Near LMNG	Occurrence within Analysis Area[2]	Occurrence within Impact Area (prairie dog towns)	Potential for Project Area Impacts on Habitat or Population	Effects Determination from Action Alternatives
Merlin	R	Forested draws	Known; Transient	Unlikely	None	No Appreciable Impacts
Ferruginous Hawk	R	Nests: Isolated buttes, trees, etc.	Known; Transient	Present	Low	No Appreciable Impacts

[1]E=Endangered, T=Threatened, S=Sensitive, C=Candidate, MIS=Management Indicator Species, R=Raptor
[2]K=Known, P=Possible, PSH=Potential Suitable Habitat, UQ=Unlikely or Questionable

Resource Indicators and Measures for Existing Condition

Table 33. Resource indicators and measures

Resource Element	Resource Indicator (Quantify if possible)	Measure	Baseline
Prairie Dog Indicator 1	Total Occupied Habitat	Total occupied acres	142 colonies/5,559 acres
Indicator 1a	Total occupied habitat in MA 3.63	Occupied Acres in MA 3.63	567
Prairie Dog	Complex	Number of Complexes	3
Prairie Dog	Encroachment	Number of Encroachments	66

B) Species Carried Forward in Detailed Analysis

Black-tailed Prairie Dog

Introduction

In addition to being a sensitive species, black-tailed prairie dogs are a management indicator species (MIS) for prairie dog colony habitat and low structure grassland habitat on the DPG (App. H, LRMP). Lastly, recently, the prairie dog became a Focal Species for LRMP under the 2012 Planning Rule.

Most of the gentler terrain (less than 30%) with low structure vegetation would provide potential suitable habitat for this species. Forested and wetland vegetation types are considered unsuitable for prairie dogs. Slopes with suitable vegetation and soils that are less than 10% are considered preferred, slopes from 10-30% are considered secondary, while slopes exceeding 30% on average, are considered generally unsuitable. Colonies will often originate with disturbance such as farming, oil well development, or heavy livestock use.

Alternative 2, the proposed action, would implement control activities using zinc phosphide on approximately 954 acres of prairie dogs out of approximately 5,559 acres across the LMNG, which equates to approximately 17 percent of the total amount of prairie dog colonies. Prairie dog habitat has increased from a low point in the 1970's to the point where now there are three prairie dog complexes meeting LRMP requirements for complexes on the LMNG. The prairie dog population is moving towards meeting other prairie dog objectives via passive management.

Under the Sensitive Species determination, all action alternatives ***may impact individuals or their habitat but will not contribute to a trend towards federal listing or cause a loss of viability*** to black-tailed prairie dogs.

The determination for Alternative 4 is similar; however control actions on prairie dog towns would be more aggressive. Approximately 35 percent of total prairie dog acreage on the LMNG would be initially controlled. This could have short-term implications for longer term expansion because of some reduced connectivity from the loss of acres and additional colonies. Post treatment, there will still be more acres than 1997 population levels, but close to 2002 population levels (Table 34), and a wide distribution within two remaining complexes – Boyce Creek/Indian Creek and the South Unit Theodore Roosevelt National Park complex, which the FS colonies are associated with.

Figure 7. A crosscut view of a fictitious prairie dog colony.

Resource Indicator and Measure 1 – Prairie Dog Habitat Total Acres

The table below (Table 40) summarizes the prairie dog inventory results since 1997.

Though the planned program is to inventory every three years, the DPG has inventoried the prairie dog ecosystem on NFS lands every three to five years. A few colonies are missed every inventory so all of these are based on incomplete data. As such, a few known-but-missed colonies are digitized into the database every year. In 2015, at least four colonies were added to the database. This increased the total acreage by approximately 47 acres for a total of 5,559 acres for the 2015 inventory.

Table 34. LMNG prairie dog colony acreage from various surveys 1997-2015

Survey Year	1997	2002	2005	2008	2012	2015
Colony Acreage	2,763	3,842	4,793	6,928	5,200	5,559
Overall Expansion Rate	Base	6.8%	7.1%	8.7%	4.3%	4.0%

Annual Expansion Rate	N/A	6.8%	7.6%	13.0%	-6.9%	2.3%

(Overall Expansion Rate uses 1997 as the base year)

Despite the incompleteness of the surveys, it's noteworthy that the data shows an overall upward trend. The 2008 high may have been the culmination of several drier than average years. The lower figure in 2012 may have been the result of control treatment in 2010 and successive harsh winters and variable precipitation over the analysis area. In 2010 an appreciable number of acres were controlled on the LMNG; approximately 750 acres on the Medora RD and approximately 374 on the McKenzie RD. Perhaps just as noteworthy were the harsh winters that materialized in 2010-2012. Since prairie dogs don't hibernate, a combination of snow, cold temperatures, and the length of the winter season may have provided enough physiological stress to individuals to cause mortality.

The following few years have experienced variable weather patterns but were trending toward a wetter cycle. However, the latitudinal variability in the LMNG makes it difficult to characterize the overall annual weather patterns for the unit. However, the trend in prairie dog habitat appears to be upward again, in turn helping to demonstrate that Svingen's (2006) estimate of 5-10% annual growth still holds true and is adequate for further analysis.

Resource Indicator and Measure 2 - Number of Complexes

FOCAL AREAS

The term "focal area" is described in Svingen (2006, 2006a). It refers to an area where a loose grouping of somewhat interconnected prairie dog colonies occurs. There are six of these identified across the LMNG. This term is not the same thing as a Complex (see next section). The three focal areas on the Medora RD include:

- South Unit Theodore Roosevelt National Park (SUTRNP);
- Boyce Creek-Indian Creek (same as SW Slope); (BCIC); and
- Northeast Slope.

On the McKenzie RD these include:

- Southwest McKenzie;
- Northwest McKenzie; and
- North Unit Theodore Roosevelt National Park (NUTRNP).

The focal area termed "miscellaneous" in this document refers to those prairie dog colonies that are typically isolated from other colonies and/or Focal Areas. Miscellaneous colonies occur on both districts.

Much of the following analysis will be structured around Focal Areas. See Table 35 below.

Table 35. Summary table showing acres of prairie dogs by Focal Area

FOCAL AREA	ACRES
Miscellaneous	702
South Unit - Theodore Roosevelt National Park	1,037
North Unit - Theodore Roosevelt National Park	90
Northeast Slope	174
Southwest Slope (Boyce Creek/Indian Creek)	1,527
Southwest McKenzie	960
Northwest McKenzie	1,070
Totals	5,560

Prairie Dog Suitable Habitat:

There are approximately 454,000 acres of suitable habitat acres on the LMNG (Table 36, Svingen 2006, 2006a). Variables that went into calculating the amount of suitable habitat include (NGP Appendix B):

- Suitable soils (most soils are suitable in the planning area);
- Suitable vegetation (forested and wetland types considered unsuitable);
- Suitable slope percent (<10% preferred; 10% to 35% marginal; and >35% unsuitable);
- Suitable hydrology (water, wetlands, and high water table = unsuitable).

The current 2015 data set of 5,559 acres prairie dog colonies area represents approximately 1.2% of the suitable habitat on the Medora RD.

Table 36. Summary table showing existing acres prairie dog colonies and percentages across the two ranger districts and the LMNG

	Medora RD	Medora RD Suitable Habitat	McKenzie RD	McKenzie RD Suitable Habitat	LMNG	LMNG Suitable Habitat
Total Acres	526,113	257,000	501,000	197,000	1,027,000	454,000
Prairie Dog Colony Acres	3,295	3,295	2,264	2,264	5,559	5,559
Number of colonies	79		63		142	142
Percentage	0.63%	1.29%	0.45%	1.15%	0.54%	1.23%

Complexes

One of the objectives in the LRMP concerning the prairie dog ecosystem is the development of four prairie dog complexes across the LMNG. The purposes of a complex are generally to help support prairie dog species viability and help provide sufficient habitat for associated species. A complex is defined as "a group of at least ten prairie dog colonies with nearest-neighbor, inter-colony distances not exceeding 6 miles and with a total colony complex acreage of at least 1,000 acres (Appendix G, LRMP)." Two areas on the Medora Ranger District are specifically named within the LRMP as potential complex sites: the NFS lands around and including the South Unit of Theodore Roosevelt National Park (SUTRNP; pg. 2-22, LRMP) and the Boyce Creek and Indian Creek areas in western Slope County (BCIC; pg. 2-15,

LRMP). Both of these meet the desired objectives for a complex (Table 37). The Horse Creek Drainage is named in the LRMP. This is the same area as NW McKenzie Focal Area and also contains MA 3.63.

South Unit Theodore Roosevelt National Park (SUTRNP): There should be a stronger emphasis placed on the area north of Interstate 94 since the interstate accentuates a break in colony interconnectedness (Knowles 2000). The Little Missouri River also bisects this focal area but should not pose quite as significant a barrier as the interstate. Overall, there are currently approximately 2,400 acres of prairie dog habitat in this focal area, meeting the criteria of more than 1,000 acres which constitute a complex.

Boyce Creek/Indian Creek: The BCIC complex area is in SW Slope County. The colony acreage on NFS lands is approximately 1,522 acres.

NW McKenzie Complex: Located in northwest McKenzie County, this area also encompasses MA 3.63. There is a total of approximately 1,069 acres of occupied prairie dog habitat.

SW McKenzie: Located in the southwest corner of the McKenzie RD. According to 2015 survey data this focal area is just short of being a complex at 959 acres.

Table 37. DPG LRMP Prairie Dog Complex Acreage Objective and actual acres by complex/focal area.

PRAIRIE DOG COMPLEX	LRMP OBJECTIVE	ACRES
NW McKenzie	1,000	1,069
SW McKenzie*	1,000	959
SUTRNP	1,000	2,412 (NFS+NPS)
Boyce Creek/Indian Creek	1,000	1,522

* Has not met the Complex objective based on 2015 survey data

DPG Prairie Dog Monitoring

The DPG has been systematically surveying prairie dog colony acreage since 1997. This has been implemented every 3-5 years (see Table 34).

Utilizing Global Positioning System (GPS) technology, the surveyor uses the outermost active burrows to delineate the colony boundary and focus on collecting the data just on the NFS lands. The GPS data was then compiled and summarized. Information provided includes the total number of colonies, the specific colony acreage, the overall complex acreage, and locations. This provides a complete dataset from which varying analyses can be performed.

Also, utilizing this same information, Management Area 3.63 can be assessed separately using Geographical Information System (GIS).

State Level Prairie Dog Colony Monitoring

In 2002, Knowles (2003) performed a comprehensive survey of the prairie dog population in North Dakota. To summarize, Knowles found:

- A minimum of 20,074 acres of prairie dogs in a minimum of 540 colonies across the State (all ownerships);
- Two distinct populations in the State, one centered at the Standing Rock Indian Reservation and one along the Little Missouri River (i.e. LMNG):
    - A minimum of 224 colonies and 9,014 acres are within the Standing Rock Complex (includes all ownerships);
    - A minimum of 316 colonies and 11,060 acres are within the Little Missouri Complex (includes all ownerships).

Shaughnessy (2014) filed a final report with the NDGF on the results of a second state-wide survey. No specific acres or number of colonies was reported.

Resource Indicator and Measure 3 – Number of Encroachments

Based on 2015 inventory data, there are approximately 66 colonies that are encroaching or imminently encroaching.

Environmental Consequences

Alternative 1 – No Action

Under this alternative, the following potential effects may be seen:

- Overall, the number and extent of encroachments would likely continue to increase across ownership boundaries;
- As prairie dog colonies increase in size and number there is increased potential habitat for species associated with prairie dog colonies;
- An increase in dispersal and new colonies across all ownerships would occur;
- There would be more opportunities for prairie dog recreational shooters; and
- Because there are essentially no actions taking place, the relative cost of the alternative is the lowest of the three alternatives.

Annual weather fluctuations and changes in livestock management could influence expansion or contraction rates. The low occupancy rate of suitable habitat (approximately 1%) in combination with no expected short-term changes in livestock grazing and continuation of drought cycles supports the conclusion that expansion of prairie dogs across the landscape is likely.

Given the assumed expansion under this alternative, the FS would continue meeting LRMP objectives for population growth. Habitat would be provided for associated species. This alternative would not address the good neighbor policy of aggressive management of unwanted prairie dog encroachment between FS and neighboring landowners.

Table 38. Resource indicators and measures for all alternatives

Resource Element	Indicator/ Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Direct and Indirect Effects to Black-tailed Prairie Dogs	Acres of Control	0	954	954	1,828
Direct and Indirect Effects to Black-tailed Prairie Dogs	Number of colonies controlled	0	63	63	103
Rodenticide Usage (initial use only; additional treatments would be less)	Acres Rodenticide used	0	954	0	1,828

Resource Element	Indicator/ Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Direct and Indirect Effects to Black-tailed Prairie Dogs	Total colony acres: projected acres at 3 and 10 years (2015 survey base; 5% growth rate)	3 years: - 7,450 ac (2021) 10 years – 10,482 ac (2028)	3 years – 5,150 ac (2021) 10 years – 7,245 ac (2028)	3 years – 5,150 ac (2021) 10 years – 7,245 ac (2028)	3 years – 4,139 ac (2021) 10 years – 5,823 ac (2028)
Direct and Indirect Effects to Black-tailed Prairie Dogs	Number of Complexes at year 0 and year 10	0 years – 3 10 years - 4	0 years – 2 (post implementation) 10 years – 4	0 years – 2 (post implementation) 10 years – 4	0 years – 2 (post implementation) 10 years – 4
Direct and Indirect Effects to Black-footed Ferret Reintroduction Habitat – 3.63 (w/o control) in year 2028	Total colony acres in MA 3.63	1,069	1,069	1,069	1,069
Economics	Relative cost of tools	Low – no management	Moderate (due to integrated use including zinc phosphide)	Highest cost of all alternatives (due to integrated use of tools excluding rodenticide)	Moderate (due to integrated use including zinc phosphide over a larger number of colonies than the Alternative 2 or 3)

Resource Indicator and Measure 1 and 2

Svingen (2006, 2006a) used a 5-10% expansion rate to estimate the acreage of prairie dog habitat. As demonstrated in an earlier analysis, this rate is a reasonable estimate. Using 5% as the long-term expansion rate over the next 10 years from a starting value of 5,559 acres (2015), there could be an estimated increase to 8,624 acres of prairie dogs in 10 years, assuming no management activities. This is within the projected 5,400-9,400 acres estimated in the Northern Great Plains FEIS analysis.

Quite likely four complexes will have been achieved. Management Area 3.63 prairie dog habitat acres would be approximately 900 acres given a 2015 inventory of 567 acres.

Migratory birds: As there are no actions proposed for this alternative, there will be no impact to migratory birds from this alternative.

Alternative 2 – Proposed Action

Alternative 2 proposes to use an integrated approach to prairie dog management. All management tools will be available, over time, to utilize towards furthering the goals and objectives found in the LRMP.

An important tool for use in unwanted encroachments will be the use of the rodenticide zinc phosphide.

The Proposed Action proposes to:

- Use an integrated approach to address the issue of unwanted encroachments by:
    - Retreating 20 previously treated colonies with zinc phosphide to continue to move toward meeting the objectives from previous decisions;

  - Complete control measures on 47 additional colonies (744 acres; includes part of the 20 colonies above) with zinc phosphide;
  - Partial control with zinc phosphide (with/without vegetative barrier) on 16 colonies (286 acres) to move them from Category 3 (encroaching) into a Category 2 (not encroaching) situation. The partial control of the colony will typically control back 600 feet from the private boundary (gross acres) to allow a vegetative barrier to establish (generally approximately 300 feet in width - net acres);
  - The colony will recolonize back to the vegetative barrier and expansion should be inhibited or slowed appreciably. This may require multiple treatments within and around the barrier prior to the vegetative barrier becoming effective;
  - Once the initial backlog of encroachments are controlled, assess colonies in Category 2 on specific non-lethal tools that will be used to ensure encroachment does not occur in the future.
- Place signs near select colonies to remind shooters that a residence is nearby. In addition, inform law enforcement (e.g. County and State NDGF) of the potential risks to nearby residences.
- Inform local residences within one mile of a colony to be controlled with poison of the activity when it occurs.
- Within MA 3.63:
  - Consider site-specific NEPA or additional analysis to adopt certain actions if passive management does not result in a minimum of 5 percent rate of growth after 10 years (923 acres by 2028).
  - Use of colony-specific shooting restrictions is included in the adaptive management toolbox.

Initial specific colony prescriptions for this proposed action are summarized in Table 39 below. Prescriptions may change using an adaptive management approach based on changed conditions determined through monitoring. Acreage figures are approximate generated through GIS data from the 2015 prairie dog survey. Acreage figures, while not precise, are useful for effects analysis and comparison of alternatives.

Table 39: Proposed Initial actions by alternative necessary to address unwanted encroachments and public health and safety.

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
005-1	Medora	14.3	All	14.3	14.3	NESL	Within a quarter-mile of residence and recreational shooting issue
006-1	Medora	0.0	¼ mile	0.0	8.7	BC/IC	Only treated under Alt 4
006-2	Medora	1.0	All	1.0	1.0	BC/IC	Previously treated
007-1	Medora	0.0		0.0	1.8	BC/IC	Only treated under Alt 4
007-2	Medora	1.0	All	1.0	1.0	BC/IC	Isolated and small; on only isolated 160/80
007-3	Medora	0.6	All	0.6	0.6	BC/IC	Isolated and small; on only isolated 160/80

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
010-1	Medora	0.0		0.0	27.2	BC/IC	Only treated under Alt 4
010-3	Medora	0.1	All	0.1	0.1	BC/IC	Previously treated
015-1	Medora	0.0		0.0	17.3	BC/IC	Only treated under Alt 4
015-3	Medora	0.0		0.0	0.1	BC/IC	Only treated under Alt 4
019-1	Medora	12.1	All	12.1	12.1	BC/IC	Previous treatment, needs to be finished
020-1	Medora	24.0	All	24.0	24.0	BC/IC	Isolated and tough to manage; Previously adj. Landowner "No" to treatment
022-1	Medora	92.2	All	92.2	92.2	MISC	Large but isolated half section
026-1	Medora	3.6	All	3.6	3.6	BC/IC	Previous treatment, needs to be completed
029-1	Medora	19.4	All	19.4	19.4	MISC	Isolated; previously treated
031-1	Medora	0.3	All	0.3	1.1	MISC	Previously treated
033-1	Medora	1.1	All	1.1	1.1	NESL	Previously treated
034-1	Medora	10.3	All	10.3	10.3	NESL	Isolated quarter section
039-1	Medora	8.4	Partial	1.5	43.2	BC/IC	Previously treated; fenced veg barrier; but isolated
041-1	Medora	0.2	All	0.2	0.2	NESL	Isolated half section
054-1	Medora	46.0	All	46.0	46.0	MISC	Isolated and not connected to other colonies
059-1	Medora	39.4	Partial	19.0	74.8	NESL	Well documented burrowing owl use; constrained by Adobe Wall to south; propose taking off eastern portion in #117
073-1	Medora	0.0		0.0	10.9	NESL	Only treated under Alt 4
075-1	Medora	4.9	All	4.9	19.4	NESL	Very close to residence
093-1	Medora	60.0	All	60.0	60.0	MISC	Isolated and not connected to other colonies

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
106-1	Medora	0.0		0.0	92.6	BC/IC	Only treated under Alt 4
106-3	Medora	0.0		0.0	13.6	BC/IC	Only treated under Alt 4
107-2	Medora	0.0		0.0	26.9	BC/IC	Only treated under Alt 4
107-3	Medora	45.0	Partial	45.0	64.7	BC/IC	Very large colony; east edge previously treated but bumps up against high/dense veg on private – maintain this strategy?; West edge impinging on State section; Propose treat back from boundary a ¼ mile and take advantage of terrain to slow re-population of area; 45 acre estimated.
118-1	Medora	3.5	Partial	3.5	31.5	BC/IC	Previous treatment with veg barrier; working but PDs doing end-around on both sides; but south side somewhat constrained by creek; best option may be to extend barrier fence.
146-1	Medora	31.0	Partial	19.0	55.2	SUTRNP	Two isolated satellites on east-side of larger colony and along the NW-SE allotment fence in NE corner of Sec 33
146-2	Medora	3.6	Partial	2.0	37.3	SUTRNP	Retreat w/veg barrier; prairie dogs doing end around but with some small incursions into vegetation barrier.
147-1	Medora	0.0		0.0	2.1		Only treated under Alt 4
147-2	Medora	2.7	Partial	2.7	2.7	SUTRNP	Previously treated on portions on the southern end
147-5	Medora	1.9	All	1.9	1.9	SUTRNP	Previously treated
147-6	Medora	1.9	All	1.9	1.9	SUTRNP	Very little expansion opportunity
149-1	Medora	20.9	All	20.9	20.9	SUTRNP	Little expansion opportunity; previously GE nest adj. to this colony
149-2	Medora	1.6	All	1.6	1.6	SUTRNP	Retreat to eliminate

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
152-1	Medora	0.0		0.0	6.6	SUTRNP	Only treated under Alt 4
152-2	Medora	13.1	Partial	7.5	18.8	SUTRNP	Previously controlled but lots of expansion potential to north and east.
160-1	Medora	4.6	Partial	1.0	41.7	SUTRNP	Small acreage inside fenced barrier to refresh. Grazing this at wrong time of year may have provided opportunity for prairie dog expansion into the barrier. OK to graze but monitor time and response, and adapt.
166-1	Medora	0.0		0.0	1.6	SUTRNP	Only treated under Alt 4
166-2	Medora	21.5	All	21.5	21.5	SUTRNP	Isolated
172-1	Medora	3.6	All	3.6	3.6	SUTRNP	Little expansion opportunity on FS
180-1	Medora	40.9	All	40.9	40.9	MISC	Large and Isolated, little expansion opportunities except to private
186-1	Medora	4.2	All	4.2	4.2	SUTRNP	Previously treated on isolated FS
186-2	Medora	11.7	All	11.7	11.7	SUTRNP	3 colonies on an isolated section and qtr. Without control, this colony it will just continually recolonize 186-3.
186-3	Medora	18.3	All	18.3	18.3	SUTRNP	All
194-1	Medora	0.0		0.0	21.6	SUTRNP	Only treated under Alt 4
206-1	Medora	0.6	All	0.6	0.6	MISC	Bock DU Dam; Previously treated – prairie dogs have returned
231-1	Medora	11.8	Partial	11.8	28.3	SUTRNP	Eliminate this colony. Burrowing owls exists elsewhere in high densities.
242-1	Medora	0.0		0.0	18.3	SUTRNP	Only treated under Alt 4
250-1	Medora	0.0		0.0	32.6	SUTRNP	Only treated under Alt 4
270-1	Medora	0.0		0.0	45.7	SUTRNP	Only treated under Alt 4
270-2	Medora	22.2	All	22.2	22.2	SUTRNP	Along admin boundary
270-3	Medora	0.2	Partial	0.2	19.6	SUTRNP	Freshen up existing vegetative barrier by slight incursion into veg barrier by prairie dogs

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
291-1	Medora	21.7	All	21.7	21.7	MISC	Primary expansion opportunities to private
303-1	Medora	1.0	All	1.0	1.0	SUTRNP	Slow expanding colony; adjacent landowner is State; Colony isolated from others
306-1	Medora	0.0		0.0	20.7	MISC	Only treated under Alt 4
306-2	Medora	2.3	All	2.3	2.3	MISC	State colony to south. Not encroaching but close enough that considered imminent encroachment; but colony on state land (sec 16) would just recolonize this. Check with State on what they will do with their colony
332-1	McKenzie	1.0	All	1.0	1.0	NWMcK	Small, Isolated, in corner
333-2	McKenzie	4.0	Partial	4.0	34.3	NWMcK	Western lobe off large colony and southern extensions that cross into Allotment #339
336-1	McKenzie	0.0		0.0	1.3	NWMcK	Only treated under Alt 4
339-10	McKenzie	8.4	All	8.4	8.4	NWMcK	339-c or -d portion - eastern side
339-12	McKenzie	7.0	Partial	3.0	18.8	NWMcK	Two separate lobes can be pulled back from boundary; 5< acres
339-13	McKenzie	3.0	All	3.0	8.2	NWMcK	339-13a Only - western portion
339-16	McKenzie	0.0		0.0	3.3	NWMcK	Only treated under Alt 4
342-1	McKenzie	0.0		0.0	27.6	NWMcK	Only treated under Alt 4
344-1	McKenzie	0.0		0.0	15.5	NWMcK	Only treated under Alt 4
346-1	McKenzie	21.4	Partial	7.0	37.1	SWMcK	Partial poison and fence
346-2	McKenzie	0.0		0.0	12.7	SWMcK	Only treated under Alt 4
346-3	McKenzie	0.0		0.0	2.4	SWMcK	Only treated under Alt 4

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
351-1	McKenzie	0.0		0.0	3.7	SWMcK	Only treated under Alt 4
351-2	McKenzie	22.7	Partial	3.7	22.7	SWMcK	Colony in isthmus between private/State. Expansion opportunity to west. Consider eliminating or heavy partial treatment on east side. Could use Alkali Creek and tributary as a potential barriers and tease colony to west.
351-3	McKenzie	12.1	Partial	5.0	32.4	NWMcK	Partial poison and fence for barrier
358-1	McKenzie	2.0	All	2.0	2.0	NWMcK	Small, Isolated, in corner
358-2	McKenzie	0.0		0.0	12.7	NWMcK	Only treated under Alt 4
365-1	McKenzie	4.3	All	4.3	4.3	MISC	Small and isolated from other colonies
369-2	McKenzie	50.0	Partial	50.0	50.0	SWMcK	Shooting concern. Treat south half of 87 acre colony (south of woody stringer) with the objective to eliminate and alleviate potential shooting interest toward residence. Close area to shooting or, if safety remains issue, eliminate colony.
384-1	McKenzie	1.5	All	1.5	1.5	SWMcK	Only treat western portion; approximately 1.5 acres
387-1	McKenzie	7.0	Partial	2.0	7.0	SWMcK	Treat with veg barrier
398-1	McKenzie	21.3	All	0.0	21.3	SWMcK	Shooting is raising Safety concerns to nearby residence. Close area to shooting; monitor; or treat entire colony once and monitor to see if shooting interest abates. May need to retreat occasionally if shooting interest becomes a safety issue again.
398-2	McKenzie	1.5	All	1.5	1.5	SWMcK	Only very southern Portion
399-4	McKenzie	18.2	All	18.2	18.2	SWMcK	Debatable; relatively small but isolated from other colonies
408-1	McKenzie	3.4	All	3.4	3.4	SWMcK	small and isolated
412-2	McKenzie	31.3	All	31.3	31.3	NUTRNP	May be damaging a sealed pit from an O&G reclaim; Public Health/Safety

Colony ID	Ranger District	Gross Acres Alt 2/3	Treatment	Net Acres Alt 2/3	Gross and Net Acres Alt 4	Focal Area	Remarks, Comments
430-1	McKenzie	11.6	Partial	11.6	33.6	MISC	Isolated colony. Likely to continue as encroachment risk with nearby livestock attractant (water) facilities.
437-1	McKenzie	1.7	All	1.7	1.7	NUTRNP	Small and isolated from other colonies
456-3	McKenzie	0.0		0.0	3.3	NUTRNP	Only treated under Alt 4
456-4	McKenzie	0.0		0.0	0.7	NUTRNP	Only treated under Alt 4
459-1	McKenzie	30.8	All	30.8	30.8	NUTRNP	Isolated from other colonies, and little federal expansion opportunity
462-1	McKenzie	0.0		0.0	26.1	NUTRNP	Only treated under Alt 4
465-1	McKenzie	0.0		0.0	2.6	NUTRNP	Only treated under Alt 4
501-1	McKenzie	31.0	All	31.0	31.0	MISC	Very isolated from other colonies; half-mile from residence. This one raised in scoping. Consider shooting closure in combination with treatment.
512-2	McKenzie	30.5	Partial	11.0	50.4	SWMcK	Partial w/veg barrier
512-3	McKenzie	0.0		0.0	14.0	SWMcK	Only treated under Alt 4
516-1	McKenzie	0.0		0.0	4.4	SWMcK	Only treated under Alt 4
	Totals	**954.4**		**814.0**	**1,828.0**		

Project Design Features and Mitigation Measures

- Rodenticide application will be in full compliance of the product label and LRMP direction:
  - Only zinc phosphide treated grain bait will be used;
  - Pre-baiting is required per label instructions;
  - Rodenticide will not be placed on the ground until September 15 and use completed by January 31 (mitigates a risk to migratory birds);
  - Treated grain will remain on the ground no more than 2 days, after which it shall be pushed into the burrow (unless demonstrably neutralized);
  - Any above ground carcasses will be placed in nearest burrow or removed in accordance with product label requirements.
- An agreement will be necessary where both parties (FS and adjacent landowner) control their respective portion of the colony at an appropriate time to achieve maximum efficiency.
- The whooping crane migration will be monitored by the FS to ensure no cranes will consume treated bait.

  - If threat to cranes could potentially occur, alert the contractor of the potential to shut down poison operations due to whooping crane migration pattern;
  - If the FS determines, in coordination with the FWS, that crane migration will pass over the project area/analysis area, poison operations will be shut down and any poison grain on the surface will be disposed of immediately or permanently neutralized until it is determined the crane migration potential has passed.
- If an adaptive management tool may result in an adverse effects to a threatened or endangered species, the action will not be taken.

Required Monitoring

- Required implementation monitoring will include monitoring the whooping crane migration (see above and Monitoring Appendix);
- Implementation monitoring will ensure contractor compliance with design criteria, product label requirements, and other factors designed to improve safety and minimize impacts to resources;
- Inventory of known existing prairie dog colonies will continue every 3 years.

Direct and Indirect Effects - Alternative 2

Resource Indicator and Measure 1 – Acres of Prairie Dog Habitat

With the implementation of this alternative, there would be a relatively short term decrease of approximately 954 acres with 66 affected prairie dog colonies across the LMNG. This would affect approximately 17% of the 5,559 acres of prairie dog colony acreage on the LMNG. If NPS prairie dog colony acreage is considered (Total acres: FS + NPS = 6,983 acres), then approximately 14% of the prairie dog ecosystem on federal lands would be affected. After the implementation of the proposed action, the overall colony acreage would be approximately 4,605 acres. In 2021 that would be projected to be 5,243, and 8,540 in 2028 (10 years after control).

Resource Indicator and Measure 2 – Number of Complexes

Total prairie dog habitat would remain above the 1,000 acre level within the SUTRNP and Boyce Creek/Indian Creek focal areas, hence, there would be no impact to the "long-term viability without plague" under Knowles (2001) criteria. The NW McKenzie complex would take one year or less to recover.

Resource Indicator and Measure -Acres of Prairie Dog Habitat in MA 3.63 - Under the proposed action, there would be no control activities in the Management Area. Assuming a 5% expansion rate, it is projected that prairie dog habitat in MA 3.63 will increase from 567 acres to approximately 760 acres by 2021. In 2028 it is projected to be 1,000 acres under passive management at an assumed 5% expansion rate.

Table 40. Table summarizing the direct and indirect effects to Focal Areas and complexes from Alternative 2

	FOCAL AREAs/**Complexes**							
	So. Unit TRNP	NE Slope	**Boyce Ck./Indian Ck.**	**Southwest McKenzie**	**Northwest McKenzie**	No. Unit TRNP	Misc.	MA 3.63
Prairie Dog Colony **Acres** (NFS lands)	988	174	1,522	959	1,069	90	757	567
Number of Colonies	37	8	20	17	34	6	20	18

	FOCAL AREAs/**Complexes**							
	So. Unit TRNP	NE Slope	**Boyce Ck./Indian Ck.**	**Southwest McKenzie**	**Northwest McKenzie**	No. Unit TRNP	Misc.	MA 3.63
TRNP Focal Area (2012 TRNP prairie dog colony **acres** included)	2,412	--	--	--	--	200	--	--
Colony Acres AFTER Control	2,199	138	1,427	883	992	167	368	567
Number of Colonies AFTER Control actions	24	4	12	12	29	4	8	18
3 years AFTER control (2021) assumed 5% expansion rate)	2,546	160	1,662	1,022	1,148	193	426	656

Resource Indicator and Measure 3 – Number of Encroachments Treated

This alternative assumes all encroachments are undesired by the adjacent landowner with the exception of Theodore Roosevelt National Park, so this alternative will control approximately 63 encroachments. The remaining three colonies to be controlled are public safety concerns.

- Use of an integrated approach to address the issue of unwanted encroachments by:
    - Retreating with zinc phosphide 20 previously treated colonies to move toward meeting the objectives from previous decisions (2007 and 2008);
    - Implementing control measures on 47 colonies (746 acres; includes the previous 20) with zinc phosphide;
    - Partial treatment (with/without veg barrier) on 16 colonies (284 acres) to move them into a Category 2 situation;

Cumulative Effects – Alternative 2

Analysis Area

The Cumulative Effects boundary is the administrative boundary of the LMNG.

The temporal boundary for analysis is 10 years (2028) with analysis of a midpoint at three years (2021). This time frame is used to capture at least three inventory periods to validate or invalidate modeling and to develop a timeframe for potential achievement of four complexes. During this time monitoring will test passive management and ascertain a potential range of active prairie dog habitat management within MA 3.63, if needed.

General

Table 41 summarizes past, present, and reasonable foreseeable activities on the LMNG.

Table 41. Past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis for the proposed action.

Project/Activity	Location	Description
Past and Concurrent Actions		
Agriculture	LMNG Administrative Boundary	Intensive agriculture has converted some areas into crops or perhaps enrolled into the Conservation Reserve Program (CRP). Cropland conversion removes the habitat for prairie dogs. CRP may create a vegetative habitat type not preferred by prairie dog occupation (USDI FWS 2000).
Livestock Grazing Management Practices	LMNG	Livestock grazing has taken place since the late 1800s and continues to the present. Federal management of the LMNG began in the late 1930s with livestock grazing management changing as a result. The current LRMP provides grazing management direction for long-term sustainability of rangeland resources for multiple uses. The intensity and location of grazing may have habitat implications for prairie dog expansion or contraction.
Rodenticide Use	Black-tailed Prairie dog colonies that are encroaching onto or from adjacent landowners	Bishop and Culbertson (1976) outline the prairie dog population decline within the MRD administrative boundary from 1939 to 1972 - at least some, if not the primary cause of the decline, was attributed to rodenticide use, perhaps strychnine. Control of prairie dogs from 1988-1992 on the LMNG averaged 160 acres annually (pg. 3-167 NGP FEIS) with no poisoning again until 2006. In 2006, three colonies were partially treated on the MRD with zinc phosphide. There may be minor effects to non-target species and these are generally short-term and temporary (Apa et al. 1991). Secondary poisoning is not considered to be an issue for predators and scavengers (APHIS FEIS 1994).
Fencing to manage prairie dog populations	LMNG	Fencing can be used to control livestock grazing in specific areas with the purpose of allowing the development of a vegetative barrier that will minimize, or slow, prairie dog expansion. Terrall (2006; Gray 2009) demonstrated that vegetative barriers can be effective in minimizing expansion. The three colonies partially poisoned in 2006 on the MRD had fenced vegetative barriers established at the boundary between NFSL and adjacent private lands. An additional three fenced barriers have been established on the MRD.
Range allotment planning	LMNG	The LMNG is currently engaged in Vegetation Management Planning analysis. Livestock and prairie dogs may compete for forage resources. Livestock grazing intensity and timing can also be an important influence on prairie dog habitat conditions with higher intensity grazing patterns creating favorable habitat for prairie dog occupation.
Oil and Gas exploration	LMNG	Oil and gas exploration on the MRD is an on-going activity that started in the mid-1950s. Approximately 75-80% of the LMNG is leased. Associated road building, pipelines, reclamation, and seismic may influence prairie dog habitat or dispersal patterns. It may also influence recreational shooting patterns.

Project/Activity	Location	Description
Recreational prairie dog shooting	All black-tailed prairie dog colonies	In addition to impacts to prairie dog populations and behavior, there is potential for collateral damage to other species from recreational prairie dog shooting. These species include burrowing owls, coyotes, badgers, and raptors, consuming lead via shot carcasses (Pauli et al. 2007), etc. Current amount of recreational shooting on the LMNG is unknown. Scoping for this project also brought to light the concern for safety among residences from the recreational shooting of prairie dogs.
Reasonably Foreseeable Future Actions		
Rodenticide Use	All ownerships within the LMNG Administrative area.	Rodenticide use will likely continue on adjacent, non-federal ownerships, especially during drought conditions. The LMNG proposes to initiate control activities where unwanted prairie dog encroachment is occurring. However, future control activities are expected to be reduced after the implementation of this proposed action. There may be some effects to non-target species but these are generally short-term and temporary (Apa et al. 1991). Secondary poisoning is not considered to be an issue (App. P, APHIS FEIS 1994).
Livestock Grazing Management, Range Allotment Management Plans	LMNG	Not all range allotment planning areas contain prairie dogs colonies. However, where prairie dogs are present, actions implemented to meet LRMP goals and objectives may influence prairie dog colonies. Prairie dog management will likely be an issue in VMP analyses areas where they coincide.
Fencing to control livestock grazing on treated prairie dog colonies	LMNG	Fencing can be used to control livestock grazing in specific areas with the purpose of allowing the development of a vegetative barrier that will minimize, or slow, prairie dog expansion. There are six colonies on the MRD with vegetative barriers established by fencing out livestock usage. This is a tool for the manager but has potential effects to vegetation and livestock use.
Oil and Gas exploration	LMNG	Oil and gas exploration is an on-going activity that started in the mid-1950s. Approximately 75-80% of the LMNG is leased. Associated road building, pipelines, reclamation, and seismic may influence prairie dog habitat or dispersal patterns.
Travel Management	LMNG	Travel management is planned in the near future for the LMNG. Changes in motorized access may alter opportunities for recreational prairie dog shooters.
Recreational prairie dog shooting	All black-tailed prairie dog colonies	In addition to impacts to prairie dog populations and behavior, there is potential for collateral damage to other species from recreational prairie dog shooting. These species include burrowing owls, coyotes, badgers, and raptors that may ingest lead via shot carcasses (Pauli et al. 2007), etc. Current amount of recreational shooting is unknown.

Past and Current Activities

Part of the Cumulative Effects analysis includes a look at past and current activities. The principle factors can be lumped into two categories:

- Anthropogenic: perhaps the most notable activities here that affect prairie dogs include livestock grazing, past control efforts, and recreational shooting;
- Natural: weather patterns being the biggest factor here, presence or absence of predation, and specifically on the LMNG, the current lack of an operative plague presence.

Anthropogenic factors:

- Livestock grazing – included as a past and current activity because it differs appreciably from the herbivory patterns before European settlement. Previous herbivory patterns likely had a large

variance around a disturbance regime that may be best described using large scale temporal and spatial parameters. Traditional livestock grazing has a much tighter spatial and temporal disturbance regime due to fencing, water developments, grazing systems, and an introduced grazing animal (USDA FS 2000);

- Figure 8: Comparison of the extent (spatial and temporal) of historic and current primary ecological drivers (fire and grazing) for the mixed prairie on the Northern Great Plains. Taken from USDA Forest Service 2000.

Recreational shooting – an on-going activity that may have colony specific effects. It would be expected that larger colonies with good access near more populated areas would be preferred sites for recreational shooters. Hence, colonies near Belfield and Williston-Sydney and Watford City are likely preferred by shooters. This may help explain why prairie dog habitat in MA 3.63, which is in close proximity to Watford City and Williston, has remained relatively steady. Shooting also may provide a conduit for lead to enter the ecosystem (Langner et al. 2015);

- Past Control actions (by the FS): There have been two recent control actions taken by the FS on the Medora RD and one on McKenzie RD. On the Medora RD, the first of the two efforts involved only three colonies where a fenced vegetative strip was tested at each of the three sites. The second effort, implemented in 2009, controlled approximately 750 acres where there was unwanted prairie dog colony encroachment. That same year, the McKenzie RD employed rodenticide on approximately 300 acres where unwanted encroachment was occurring.

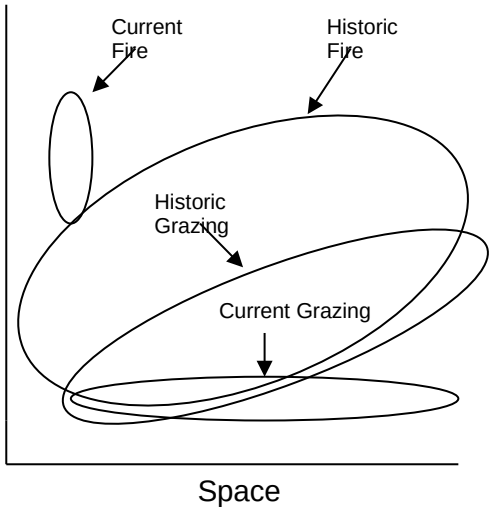

Figure 8. Comparison of the extent (spatial and temporal) of historic and current primary ecological drivers (fire and grazing) for the mixed prairie on the Northern Great Plains.

Natural factors:

- The history of plague in southwestern North Dakota includes two recorded occurrences of the plague on National Park Service prairie dog colonies with one event in 1987 spilling over onto the McKenzie RD. The other event occurred in the mid-1990's. At this time, however, sylvatic plague is not present and therefore not a concern for the LMNG prairie dog ecosystem;
- Predation is a factor in all natural ecosystems. Many species prey upon the prairie dog including golden eagles, ferruginous hawks, coyotes, and badgers. However, prairie dog colony expansion continues at a 5% rate with existing levels of predation;
- Weather patterns: perhaps a strong player in the role of the dynamics of prairie dog colony expansion and contraction. Recent history, as documented in the surveys done by the FS, partially reflect the role of climate in the prairie dog ecosystem. In the first decade of the new millennium, the climate pattern was generally dry. The acreage trend in the prairie dog population demonstrated a higher annual rate of increase (7-9%) than the last two surveys indicate (approximately 4%) when weather patterns were generally wetter and the winters harsher (Table 37).

Reasonably Foreseeable

The same list as in the above table, plus some additional factors apply to the reasonably foreseeable picture of cumulative effects.

Anthropogenic factors:

- Livestock grazing – The LMNG is currently doing vegetation management planning which predominantly deals with the management of livestock grazing. To move much of the vegetation towards desired conditions may require changes in livestock management in an adaptive management model as well. Initial efforts are focusing on distribution and using fences and water developments within current or altered grazing systems in an effort to move vegetation toward desired conditions. If vegetation management planning is successful in moving toward desired conditions, expansion of prairie dog colonies may be slower due to increases in mid to high structure vegetation, which prairie dogs tend to avoid (Gray 2009). In contrast, many prairie dog colonies start and expand near water developments due to the higher disturbed and lower structure nature of the vegetation surrounding these structures;
- Recreational shooting can impact the populations of a prairie dog community (Vosburgh and Irby 1998). In addition, lead may enter the food chain via shooting (Pauli and Buskirk 2007; Langner et. al 2015). The proposed project will reduce the number of colonies and the populations of prairie dogs in specific areas. Since recreational shooting also impacts the population level of prairie dog occupied habitat, when the proposed action is added to recreational shooting, there may be a depression in the rate of recolonization and expansion. This is not expected to affect the eventual achievement of LRMP objectives and will not result in longer-term effects to prairie dog viability. If monitoring indicates desired objectives are not being achieved, adaptive management options will be considered such as shooting restrictions or attempt to expand existing colonies to mitigate the effect of shooting. Secondly, adding the proposed project to recreational shooting may temporarily concentrate shooters into a "tighter shooting universe" and increase the potential for the lead fragments embedded in the carcasses to enter the food chain via predators and scavengers. Mitigating this is the fact that most colonies under the proposed action are small and would generally not be favored sites for recreational shooters who typically prefer larger colonies;
- Control actions would include the proposed project on NFS lands as well as those associated portions of the colonies on lands of other ownerships. This area is not calculated and would be an

unknown. There could be other sites on adjacent landowners that may be treated at the same time, thus adding to the overall reduction in prairie dog habitat on the landscape.

Natural Factors:

- Plague is not a reasonably foreseeable event on the LMNG at this time because it is not currently present and will not be considered for cumulative effects;
- Predation will continue to occur within the prairie dog ecosystem. The initial reduction in colony acreage and numbers will temporarily reduce the opportunities for predators of the prairie dog ecosystem;
- Perhaps the synergistic impact of weather and livestock grazing have the largest potential impact on prairie dog expansion/contraction dynamics. Climate and weather patterns influence vegetation growth and expression. Therefore, it influences prairie dog habitat and livestock grazing patterns. In general, if there is a drought, expansion of prairie dog colonies may occur at a faster rate than the 5 percent annual long-term rate. However, if weather patterns are moister than average, then recovery from the proposed action will be slower. Past monitoring indicates these weather fluctuations result in the average rate of colony expansion of 5%.

Table 42. Table summarizing the Cumulative Effects on the Resource Indicators and Measures for all alternatives.

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Cumulative Effects Alternative 1	Cumulative Effects Alternative 2	Cumulative Effects Alternative 3	Cumulative Effects Alternative 4
MA 3.63	Prairie dog habitat	Acres of active Prairie dog habitat in the year 2028	1,069	1,069	1,063	1,063
Prairie Dog	Complex	Number of Complexes (In 2028)	4 (projected)	4 (projected)	4 (projected)	4 (projected)
Prairie dog	Encroachments	Number of Uncontrolled Encroachments	63	0	0	0

Alternative 3 – No Rodenticide Use

Similar to the Proposed Action, Alternative 3 proposes to use an integrated approach to prairie dog management. However, in contrast, the rodenticide management tool will not be used. All other management tools, lethal and non-lethal, will be available to further the goals and objectives found in the LRMP, and the Purpose and Need of this project.

Alternative 3 proposes to:

- Use an integrated approach to address the issue of unwanted encroachments by (Refer to the Table 39 for those colonies that are encroaching). In summary:
    - Remove prairie dogs from 20 previously treated colonies using traps or other non-poisonous methods to move toward meeting the objectives from previous decisions, the manner of which will be determined by an IDT;
    - Removing 47 colonies (746 acres; includes the previous 20);
    - Partial treatment (with/without a fenced vegetation barrier) on 16 colonies (284 acres) to move them into a Category 2 situation;
    - The specific tool to be used for each colony will need to be assessed and determined by an IDT;

  - If translocation is selected, this will require further analysis and work to prepare a site for incoming residents and disclosure is not possible at this time.

- Control (through trapping) colonies that present a threat to nearby residences. While working to control these colonies, place signs near select colonies to remind shooters that a residence is nearby. In addition, inform local law enforcement (e.g. County and State NDGF) of the potential danger to nearby residence.
- Within MA 3.63:
  - This alternative may be more aggressive in translocating and establishing prairie dogs in other locations on the unit, most likely and appropriately MA 3.63;
  - Coordinate with NDGF, USFWS, and other stakeholders to work out a strategy for prairie dog translocation in the event that this alternative is selected;
  - Consider range management practices such as strategically placing water developments to create extensive areas of low structure habitat, in suitable soils and terrain that will favor prairie dog occupation if passive management does not result in a minimum of 5% rate of growth over ten years (2021 midpoint check, and 2028);
  - Consider a stronger emphasis on translocation techniques if passive management does not result in a minimum of 5% rate of growth in MA 3.63 over ten years (2028).

Initial specific colony prescriptions for this Alternative and the Proposed Action are summarized in Table 40. If monitoring determines that desired conditions are not being achieved, certain colony prescriptions may change using tools in the adaptive management toolbox. For Alternative 3, zinc phosphide is not part of the available toolbox.

Direct and Indirect Effect Summary – Alternative 3

The direct and indirect effects of implementing Alternative 3 would be similar to Alternative 2. The most appreciable difference is the mode of control. In Alternative 3, no rodenticide will be used. Assuming lethal trapping is more efficient and cost effective than live trapping and translocation, and given the lack of suitable relocation sites, lethal trapping will be the predominant tool used in this alternative.

Cumulative Effects – Alternative 3

General

The cumulative effects of Alternative 3 is expected to be the same as Alternative 2.

Alternative 4 – ¼ mile Control Zone from non-NFS lands

Alternative 4 proposes to initially control all prairie dog colonies out to ¼ mile from non-NFS lands where prairie dogs are not wanted and where the adjacent land owner will treat prairie dogs on their own lands. An integrated approach to management of prairie dogs within Category 2 would then commence. All management tools will be available, over time, to utilize towards furthering the goals and objectives found in the LRMP. This alternative is in response to public concern that vegetative buffers may not be effective at preventing encroachment and that a more aggressive method was needed.

The Alternative 4 proposes to:

- Use rodenticide to control prairie dog colonies out to ¼ mile from non-NFS lands where prairie dogs are unwanted and where the adjacent land owner will treat prairie dogs on their lands;
- Follow an integrated approach to address the issue of unwanted encroachments, including all of Category 2;

- Control colonies presenting a shooting hazard to nearby homes. Until control is completed, place signs near colonies to remind shooters when a residence is nearby. In addition, inform law enforcement (e.g. County and State NDGF) of the potential risks to nearby residences.
- Inform local residences within one mile of a colony to be controlled with poison when the activity occurs.

Initial specific colony prescriptions for this proposed action are summarized in Table 42 above. If monitoring determines that desired conditions are not being achieved, certain colony prescriptions may change using tools in the adaptive management toolbox.

Project Design Features and Mitigation Measures – Alternative 4

- Project design criteria are the same as Alternative 2

Required Monitoring

Same as Alternative 2.

Direct and Indirect Effects - Alternative 4

Resource Indicator and Measure 1 – Acres of Prairie Dog Habitat

With the implementation of this alternative, there would be a relatively short term decrease of approximately 1,984 acres (Table 47) with 104 affected prairie dog colonies across the LMNG. This would affect approximately 36% of the 5,559 acres of prairie dog colony acreage on the LMNG. If NPS prairie dog colony acreage is considered (Total acres: FS + NPS = 6,983 acres), then approximately 28% of the prairie dog ecosystem on federal lands would be affected. After the implementation of the proposed action, the overall colony acreage on NFS lands would be approximately 3,575 acres. In 2021, projected expansion would be approximately 4,139 acres and in 2028 approximate 5,823 acres (10 years after control and 5% annual expansion).

This alternative and the project as a whole allows for persistent adaptive management of prairie dog encroachment to nonfederal lands. Given the management proposed and the tools to be used, it is likely that the project will allow for sustained management of plan direction for prairie dogs while meeting the spirit and intent of the good neighbor policy.

Resource Indicator and Measure 2 – Number of Complexes

Total prairie dog habitat would remain above the 1,000 acre complex level within the SUTRNP and Boyce Creek/Indian Creek focal areas, hence, there would be no impact to the “long-term viability without plague” under Knowles (2001) criteria. The NW McKenzie complex would take five to six years to return to the complex objectives.

Resource Indicator and Measure 1a -Acres of Prairie Dog Habitat in MA 3.63 - Under the proposed action, there would be no control activities implemented in this area. Assuming a minimum 5% expansion rate, it is projected that prairie dog habitat in MA 3.63 will increase from 567 acres to approximately 656 acres by 2021. In 2028 it is projected to be 924 acres under passive management at an assumed 5% expansion rate.

Table 43. Table summarizing the direct and indirect effects to Focal Areas and complexes from Alternative 4

	FOCAL AREA/**Complex acres**							
	So. Unit TRNP	NE Slope	**Boyce Ck./Indian Ck.**	**Southwest McKenzie**	**Northwest McKenzie**	No. Unit TRNP	Misc.	MA 3.63
Prairie Dog Colony Acres (NFS lands)	988	174	1,522	959	1,069	90	757	567
Number of Colonies	37	8	20	17	34	6	20	18
TRNP Focal Area (2012 TRNP prairie dog colony **acres** included)	2,412	--	--	--	--	200	--	--
Colony Acres AFTER Control	2,039	50	1,142	658	804	53	275	567
Number of Colonies AFTER Control actions	27 (NFS)	3	12	13	30	3	11	18
Colony acres 3 years AFTER control (2021) assumed 5% expansion rate)	2,360	58	1,322	762	931	61	218	656

Resource Indicator and Measure 3 – Number of Encroachments Treated

This alternative considers treating all prairie dog colonies within ¼ mile of non-NFS lands as encroaching or are imminently so. This alternative was developed in response to prairie dog dispersal of up to 5 miles and members of the public are concerned that vegetation buffers would not be enough to eliminate unwanted encroachment. Therefore, all colonies within ¼ mile would be controlled where they are undesired by the adjacent landowner as long as that landowner controlled prairie dogs on their own land. This alternative will control approximately 103 encroachments. The remaining one colony proposed for control (#412-2) is outside the quarter mile distance but is a public health and safety concern due to the risk to an oil and gas reclaim buried reserve pit liner situated adjacent to a creek.

Cumulative Effects – Alternative 4

Analysis Area

The cumulative effects boundary will include lands within the administrative boundary of the LMNG.

The temporal boundary is set at 10 years (2028) with a midpoint analysis at three years (2021). This timeframe allows at least three inventory periods to validate or invalidate assumptions and to develop a timeframe for potential achievement of four complexes, to test passive management assumptions, and to ascertain a potential range of active prairie dog habitat management within MA 3.63, if needed.

General

See Table 41, Past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis for the proposed action.

Summary

The end result of Alternative 4 is comparable to Alternative 2, the Proposed Action. The initial objective of this alternative is to address the Purpose and Need. The major difference is that this alternative initially

controls much more acreage of prairie dog colonies in response to public comment on the proposed action.

It is suspected that a lethal action, or actions, would be more feasible to implement and more economically feasible than live trapping and translocating. Hence, lethal actions will be the predominant tool used initially.

Therefore, with the implementation of Alternative 4 there would be a decrease of approximately 1,984 acres and 104 affected prairie dog colonies across the LMNG (see Table 47). This would affect approximately 36% of the 5,559 acres of prairie dog colony acreage on the LMNG. If NPS prairie dog colony acreage is considered (Total acres: FS + NPS = 6,983 acres), then approximately 28% of the prairie dog ecosystem on federal lands would be affected. After the implementation of this alternative, the overall colony acreage on NFS lands would be approximately 3,575 acres. In 2021 that acreage would expand to approximate 4,139 acres. In 2028, the expected acreage would increase to 5,823 acres (10 years after control and 5% annual expansion).

Degree to Which the Purpose and Need for Action is Met

Table 44. Summary comparison of how the alternatives address the purpose and need

Purpose and Need	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
Responsiveness to the Good Neighbor Policy	Number of Unwanted Encroachments Treated	0	63	63	103
	Prevention of future encroachments	No	Yes	Yes	Yes
LRMP: Prairie Dog Complexes	Number of Prairie Dog Complexes after initial control	3	2	2	2
	Number of Complexes within 3 years (2021)	4	4	4	4

Degree to Which the Alternatives Address the Issues

External and internal comments revealed issues that drove the development of alternatives including:

Issue 1: The FS should consider the use of non-lethal management tools.

Issue 2: Use of rodenticides and other poisons as control measures may negatively affect non-target wildlife and domestic animals.

Issue 3: The proposed action, which only controls prairie dogs presently encroaching or likely to encroach within two years, may not be effective at reducing encroachment on to private lands especially during drought years.

Issue 4: Prairie dogs should be controlled regardless of whether or not they are encroaching on private lands.

Table 45. Summary comparison of how the alternatives address the key issues

Issue	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
The FS should consider the use of non-lethal management tools	Are non-lethal tools used?	No	Yes	Yes	Yes
Use of rodenticides and other poisons as control measures may negatively affect non-target wildlife and domestic animals	Are poisons used?	No	Yes	No	Yes

Issue	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
The proposed action, which only controls prairie dogs presently encroaching or likely to encroach within two years, may not be effective at reducing encroachment on to private lands especially during drought years.	Is the alternative effective at controlling encroaching prairie dog colonies?	No	Yes	Yes	Yes

Summary of Environmental Effects

Alternative 1, the No Action Alternative, does not fully address the Purpose and Need of the project. It does not address the unwanted encroachments of prairie dogs between ownerships or respond to good neighbor policy direction. In addition, it would not meet the need to inhibit future encroachments. Using passive management, Alternative 1 would be the quickest of the four alternatives to address an objective of the LRMP in meeting four prairie dog complexes on the LMNG. There could be direct effects to other wildlife species such as positive effects to species associated with prairie dogs (burrowing owl, golden eagles, etc.). Potentially negative effects could occur for species associated with late seral grasslands. But given the low percentage of the landscape occupied by prairie dogs, both effects would be minimal. Cost to implement is the lowest of the alternatives.

Alternative 2, the Proposed Action, fully meets the Purpose and Need of the project. It uses zinc phosphide to control an estimated 954 acres of prairie dog habitat. All known unwanted immediate encroachments (63) will be controlled. In addition to eradication of 47 colonies, 16 sites are proposed for a partial treatment back to where a Category 2 situation (within a ¼ mile of non-NFS lands but not encroaching) and where non-lethal tools will be used to inhibit these colonies from returning to Category 3 situation (encroaching or imminently encroaching) where zinc phosphide may be needed again. It would take approximately 3-5 years before all four complexes develop into meeting the definition of a complex. Potential effects to other wildlife species include temporary reductions of resources found in colonies (e.g. food and shelter) and risks to non-target species from primary or secondary poisoning from the use of rodenticide. Similarly, initial effects to habitat negatively affect some species and positively affect others. The situation is expected to reverse itself soon thereafter with the expansion of prairie dog colonies. The relative cost to implement is probably the second lowest of the alternatives.

Alternative 3, the No Rodenticide Alternative, would use lethal trapping as the predominant control method because it is a more cost effective tool than live trapping, which requires suitable release sites and may have a high mortality rate. However, the majority of the direct and indirect effects would be the same as Alternative 2. One difference would be the lack of risk of non-target species poisoning via secondary or primary pathways. This would or could be off-set by the non-discriminatory nature of lethal traps as non-target species could become victims as well, albeit, a different set of species that could be affected. Potential effects to other species of wildlife include temporary reductions of resources found in colonies (e.g. food and shelter) and risks to non-target species from the non-discriminating nature of lethal trapping. The relative cost to implement is the highest of the alternatives, and may even be cost prohibitive.

Alternative 4 proposes to extend control out to ¼ mile from adjacent ownerships. This was developed in response to stakeholders opinions that the current vegetation barriers are not effective at preventing encroachment. This alternative would initially control all prairie dogs within ¼ mile of adjacent ownerships. After initial actions are taken, colonies will be evaluated on a course of action that will minimize future encroachments through the use of various tools from the toolbox. Because of the amount of rodenticide used, there is a proportional increased risk of poisoning to non-target wildlife species. Though riskier, this is still not significant because of design criteria associated with rodenticide use on NFS lands and further mitigations to eliminate the potential effects to federally listed species. This alternative is perhaps the second most costly of the alternatives to implement. Acres treated is higher than

Alternative 2 and the cost of trapping in Alternative 3 is appreciably higher per acre than application of zinc phosphide, despite the fewer acres controlled in Alternative 3.

Table 46. Cost estimates by Alternative.

INITIAL TREATMENT COST ESTIMATE	Poison cost: $16-$40/acre	Trapping Cost: $275-$3,100/acre
Alternative 1	N/A	N/A
Alternative 2 (1,100 acres)	$17,700 - $44,400	
Alternative 3 (1,100 acres)		$305,250 - $3,441,000
Alternative 4 (1,984 acres)	$31,744 - $79,360	

Table 47. Consolidated summary table of the comparison of environmental effects to Wildlife Resources

Resource Element	Indicator/Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Threatened and Endangered Species	Effect Determination	No Effect; See Table 32 for determinations	No Effect; See Table 32 for determinations	No Effect; See Table 32 for determinations	No Effect; See Table 32 for determinations
Region 1 Sensitive Species	Impact Determination	See Table 32 for determinations	See Table 32 for determinations	See Table 32 for determinations	See Table 32 for determinations
Direct and Indirect Effects to Black-tailed Prairie Dogs	Initial Treatment Acres	0	954	954	1,828
Direct and Indirect Effects to Black-tailed Prairie Dogs	Control of Unwanted Encroachments: (number of colonies)	0	63	63	103 (a more broadly defined use of the word “encroachment” is used)
Rodenticide Usage	Acres Rodenticide used initially	0	954	0	1,828

Resource Element	Indicator/Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Direct and Indirect Effects to Black-tailed Prairie Dogs	Potential colony expansion: projected acres at 3 and 10 years (2015 survey base; 5% growth rate)	3 years: -6,435 ac 10 years – 9,055	3 years – 5,243 10 years – 7,377	3 years – 5,243 10 years – 7,377	3 years – 4,139 10 years – 5,823
Direct and Indirect Effects to Black-tailed Prairie Dogs	Number of Complexes at year 0 and year 10	0 years – 3 10 years - 4	0 years – 2 (post implementation) 10 years – 4 (assumes no control after initial effort)	0 years – 2 (post implementation) 10 years – 4 (assumes no control after initial effort).	0 years – 2 (post implementation) 10 years – 4 (assumes no control after initial effort
Direct and Indirect Effects to Black-footed Ferret Reintroduction Habitat (no control proposed)	Projected acres at 10 years (2028)	924	924	924	924
Economics	Relative cost of tools	Low – no management	Moderate: Estimate cost – $16 to $55 per acre for rodenticide application only; Fencing associated with veg barriers will increase cost	High: Contractor provided estimate was $3,000 per acre for lethal trapping. Another source quoted translocation costs at $210 to $375 per acre with NGO assistance. Higher cost per acre overall.	Moderate-High – will cost more than Alternative 2 because significantly more acreage

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Alternative 1:

- Complies with NEPA and portions of the LRMP: reaches the number of complexes faster than the action alternatives; but does not address LRMP direction concerning unwanted encroachments;
- Meets ESA and direction on Regional Forester sensitive species;
    - No Effects on all Threatened and Endangered species;
    - Does not negatively impact the viability of any Regional Forester Sensitive species;
- Meets Migratory Bird Treaty Act and Executive Order 13186.
        - In compliance with EO 13186: Alternative 1 poses no direct risks to migratory birds;

Alternatives 2; 3; and 4:

- Complies with all LRMP direction such as addressing unwanted encroachments; proposes to use rodenticides on an expanded timeline of only between the period of September 15 to January 31, though still meets the intent of the timeframe dictated in the LRMP (10/1-12/31) as described in Chapter 2:
    - This extension would allow rodenticide control of prairie dogs to occur both during drought conditions should they occur in fall, and during open winters when snowfall does not preclude rodenticide application. Effectiveness of control would be improved by taking advantage of seasonal conditions during which prairie dogs would be seeking food and thus likely to consume bait, while still avoiding application the remainder of the year to minimize impacts to migratory birds. Zinc phosphide product labels allow for application from July through January.
    - This extension is proposed for the first three years of the project and will only extend beyond those three years (2021) if monitoring of rodenticide application shows acceptable levels of effects to migratory birds.
- Continues to monitor colony acres to ensure prairie dog ecosystem is meeting or moving toward objectives such as for complexes, viability, and habitat for associated species; etc.
- Meets Migratory Bird Treaty Act and Executive Order 13186:
    - In compliance with EO 13186:
        - The project will minimize risk to migratory birds by timing the control activities between September 15 to January 31;
        - The project will have short-term effects but will result in long-term gain in prairie dog habitat for associated species such as burrowing owls and raptors;
        - In a longer-term perspective, restores structure and composition by allowing or encouraging prairie dog expansion in certain areas.

Other Relevant Mandatory Disclosures

Intensity Factors for Significance (FONSI) (40 CFR 1508.27(b))

Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

    - **Beneficial/Adverse Impacts –** may result from this project.

Table 48. Negative vs. beneficial impacts for each alternative.

Alternative	Negative Impacts	Beneficial Impacts
1	Increasing numbers of unwanted encroachments; potential increased threats to infrastructure and public health and safety; lowest cost economically	Increased acreage of prairie dog habitat on NFS with increased potential habitat for associated species
2	Risk of primary and secondary poisoning; reduced numbers and extent of occupied prairie dog habitat; moderate cost economically.	Retains a strong presence of the LMNG prairie ecosystem intact. Control response focused on addressing needs in the good neighbor policy.

Alternative	Negative Impacts	Beneficial Impacts
3	Lethal trapping may snare or capture non-target species; probably multiple prairie dogs per burrow; highest cost to implement.	Retains a strong presence of the LMNG prairie ecosystem intact
4	Greater risk of non-target species poisoning; greater reduction in numbers and extent of occupied prairie dog habitat; more expensive than Alternative 2 though less than Alternative 3.	Greater control response to unwanted prairie dog colonies; focused on encroaching colonies or those that may encroach in the future; beneficial to those concerned about prairie dog encroachment.

2. The degree to which the proposed action affects public health or safety.

    - The action alternatives will control 63 (Alt's 2/3) or 103 (Alt 4) unwanted encroachments of which several are near residences where shooting may also be a safety issue. Fewer colonies are within approximately ¼ mile with some direct risk of contact between prairie dogs and humans and/or domestic animals. All three action alternatives propose control of colony 412-2 which presents a public health and safety risk because of shooting near structures.

3. The degree to which the effects on the quality of the human environment are likely to be highly controversial. Prairie dogs are among the most controversial animals in the project area. Opinions vary from those who advocate for total eradication to those advocating for total preservation. The proposed project alleviates the unwanted encroachments and, through adaptive management, continues to manage a viable prairie dog population. All alternatives will initially utilize passive management to increase prairie dog habitat in the interior area (Category 1). If monitoring shows that there hasn't been a minimum of a 5 percent growth in prairie dog colony habitat within MA 3.63 after ten years (ending 2028), the issue will be brought before an IDT and District Ranger(s) by grassland biologists to consider active measures to facilitate colony expansion, including shooting limitations (considered under separate site-specific NEPA) and/or habitat enhancement.

4. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks. There are no highly uncertain effects nor unique or unknown risks to the human environment.

5. The three action alternatives propose to use adaptive management to determine potential courses of action in the future based on monitoring. For example, a non-fenced vegetative barrier is proposed based on the premise that a change in livestock grazing patterns will permit high herbaceous structure to persist in the zone of concern and slow or inhibit unwanted encroachment. However, if monitoring finds that the changes in livestock management is not working, and an assessment determines that a fenced barrier is needed to help inhibit unwanted encroachment, then the fenced barrier may be implemented.

    - A new prairie dog colony may also appear within Category 2 in a situation needing an assessment by an IDT to determine if or how it needs to be managed. Based on learning from other situations, the IDT would make a recommendation to the ranger in how to manage this colony.

8. With Design criteria noted above, there will be no effects to federally-listed TE species.

9. Under the proposed action, the use of rodenticide will adhere to the EPA product label.

Table 49: Consolidated summary table of the comparison of environmental effects to Wildlife Resources

Resource Element	Indicator/Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Threatened and Endangered Species	Effect Determination	No Effect; See Table 48 for determinations	No Effect; See Table 48 for determinations	No Effect; See Table 48 for determinations	No Effect; See Table 48 for determinations
Region 1 Sensitive Species	Impact Determination	See Table 48 for determinations	See Table 48 for determinations	See Table 48 for determinations	See Table 48 for determinations
Likely Direct and Indirect Effects to Black-tailed Prairie Dogs	Proposed Action Acres	0	954	954	1,828
Likely Direct and Indirect Effects to Black-tailed Prairie Dogs	Proposed Control of Unwanted Encroachments: (number of colonies)	0	63	63	103
Rodenticide Usage	Acres Rodenticide used	0	954	0	1,828
Likely Direct and Indirect Effects to Black-tailed Prairie Dogs	Potential colony expansion: projected acres at 3 and 10 years (2015 survey base; 5% growth rate)	3 years: -6,435 ac 10 years – 9,055	3 years – 5,243 10 years – 7,377	3 years – 5,243 10 years – 7,377	3 years – 4,139 10 years – 5,823
Likely Direct and Indirect Effects to Black-tailed Prairie Dogs	Number of Complexes at year 0 and year 10	0 years – 3 10 years - 4	0 years – 2 (post implementation) 10 years – 4 (assumes no control after initial effort)	0 years – 2 (post implementation) 10 years – 4 (assumes no control after initial effort).	0 years – 2 (post implementation) 10 years – 4 (assumes no control after initial effort).
Likely Direct and Indirect Effects to Black-footed Ferret Reintroduction Habitat (w/o control)	Projected acres	~900	~900	~900	~900
Economics	Relative cost of tools	Low – no management	Moderate: Estimate cost – $16 to $55 per acre for rodenticide application only	High: Estimate provided was $3,000 per acre for lethal trapping. But another source quoted translocation costs at $210 to $375 per acre with NGO assistance	Moderate-High – will cost more than Alternative 2 because significantly more acreage

3.7 Human Health and Safety

The intent of this section in the EA is to analyze and disclose the effects of the different treatment tools on human health. In particular, the use of zinc phosphide rodenticide and potential human health effects will be disclosed.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

The Dakota Prairie Grassland Land and Resource Management Plan (LRMP) provides standards and guidelines for the use of rodenticides for prairie dog control as follows:

1. Require mitigation measures to protect the national grassland resources when animal damage control activities are conducted by other governmental entities. Emphasize public safety; threatened, endangered, and sensitive species conservation; water quality protection, or other resource values. **Standard** (LRMP page 1-18)
2. Limit the use of rodenticides (grain baits) for reducing prairie dog populations to the following situations:
    - Public health and safety risks occur in the immediate area.
    - Damage to private and public infrastructure or facilities, such as cemeteries and residences.
    - To respond to unwanted prairie dog colonization on land adjoining the national grasslands when consistent with U.S. Fish and Wildlife Service approved, state-wide prairie dog conservation strategies. **Standard** (LRMP page 1-18)
3. Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program. **Guideline** (LRMP page 1-18)
4. Restrict the use of rodenticides (above-ground grain baits) for reducing prairie dog populations outside the period October 1 to December 31 to reduce risks to migratory birds. **Guideline** (LRMP page 1-19) (See modification discussion in Chapter 2.)
5. Do not use burrow fumigants in prairie dog colonies. **Standard** (LRMP page 1-19)
6. In MA 3.63, Black-footed Ferret Reintroduction Habitat: Use rodenticides to reduce prairie dog populations only in response to public health and safety risks. Mutual concurrence by the Forest Service and US Fish and Wildlife Service is required on a colony-by-colony basis before authorizing any poisoning. **Standard** (LRMP page 3-28).

Federal Law

Federal Insecticide, Fungicide, and Rodenticide Act

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), (7 U.S.C. s/s 136 et seq.): Describes pesticide regulations and requirements related to hazardous material use and worker protection standards for employees in the planning and application of pesticides.

EPA Worker Protection Standard 40 CFR 170 is applicable. This regulation is designed to protect workers from potential adverse effects of pesticides.

State and Local Law

North Dakota law includes Chapter 60-03-03 Worker Protection Standard which adopts Federal worker protection standards as specified in 40 CFR 170 excluding certain sections. Pesticides in North Dakota are regulated by the North Dakota Department of Agriculture under the authority created by three different chapters of the North Dakota Century Code (NDCC). NDCC Chapter 4-35 provides authority for the

Department to regulate the distribution, storage, transportation, and application, along with the disposal of pesticide containers. NDCC 19-18 is the state's pesticide registration law, which requires all pesticides to be registered with the Department prior to their sale, offering for sale, distribution, and transport within the state.

Forest Service Manual and Handbook Direction

Safety standards for pesticide use are set by the Environmental Protection Agency (EPA), Occupational Health and Safety Administration, Code of Federal Regulations (40 CFR part 170), and individual states. In addition, several sections of the Forest Service Manual (FSM 1994) provide guidance to the safe handling and application of pesticides.

Pesticide Use Management and Coordination Policy (FSM 2150): Provides agency policy and guidance on the use of pesticides as part of an integrated pest management approach. Additional guidance provided in the Pesticide Use Management Handbook (FSH 2109). Specifics include:

- Preparation of a safety plan for all pesticide use projects (FSM 2150);
- Consultation of pesticide handling requirements set forth in the Forest Service Health and Safety Code Handbook (FSM 6709.11) and (FSM 2156);
- Pesticide-Use Management and Coordination Handbook that requires the DPG to review pesticide use proposals in terms of human health (FSM 2109.13.2);
- Recommendation to complete risk assessments prior to pesticide use to ensure public safety (FSM 2109.14);
- Completion of project work plans prior to implementation, including a description of personal protective clothing and equipment required (FSM 2109.14.3);
- Development of a safety plan to protect the public and employees from unsafe work conditions when pesticides are involved (FSM 2109.16, FSM 2153.3);
- Safety and Health Hazard Analysis that requires completion of a Job Hazard Analysis (Form FS-6700-7) to determine hazards on the project and identify ways to eliminate them (FSM 2109.16.2, FSM 6700, FSH 6709.11).

FSM 2109.16.3 states the requirement for, and defines Pesticide Risk Assessment as "another method of helping to ensure safety in pesticide use". Risk analysis is used to quantitatively evaluate the probability that a given pesticide use might impose harm on humans or other species in the environment.

Desired Condition

The desired condition for pesticide use and human health is for prairie dog colonies to be managed such that human health and safety are protected and all control measures would be done in a manner that complies with law, regulation, policy, and label requirements. The desired condition also includes protection of human health and safety in proximity to prairie dog towns. Possible hazards in and around prairie dog towns potentially include exposure to sylvatic plague, fleas, poisoned bait, poisoned prairie dogs, hazards associated with being in proximity to prairie dog shooting, and possible rattlesnake bites.

Issues

The use of rodenticides was identified as a concern during scoping of the proposed action. Specifically, there is a concern about the impact of rodenticides on non-target wildlife species. Those effects are described in the wildlife section of this document. An analysis of potential effects on human health is recommended by the Forest Service Pesticide Use Management Handbook (FSH 2109). Some respondents to project scoping also mentioned concerns for human safety as a result of shooting in prairie dog towns especially when close to homes. Further comments were received about the possibility of disease transmission from prairie dogs to humans. Effectiveness of proposed controls was also raised as a concern. See the issues section in Chapter 2 for more information.

Resource Indicators and Measures

To evaluate and compare levels of effect to human health between alternatives the following measures are used:

- Potential for accidental human exposure to zinc phosphide (high, medium, low, none);
- Potential for transmission of diseases such as plague from prairie dogs to humans living nearby (high, medium, low, none);
- Potential for accidental shooting or near misses due to recreational shooting in proximity to residences or out-buildings (high, medium, low, none);
- Potential for rattle snake bites to applicators and/or those involved in prairie dog control measures (high, medium, low, none).

While these measures are qualitative rather than quantitative, they are still useful in comparing the relative risks and benefits of the alternatives under consideration.

Methodology

The methodologies used to assess human health risks are based on the 1998 EPA reregistration document for zinc phosphide.

The risks of adverse health effects from the use of pesticides depends on the toxic properties of the pesticide, the level of exposure to the pesticide, and the duration of exposure. This report analyzes the potential for adverse health effects to workers and members of the public from treatment of prairie dogs using zinc phosphide.

One of the primary uses of a risk assessment is to help identify risk management measures. Decision-makers can use the human health risk assessment to identify those pesticides, application methods, or exposure rates that pose the greatest risks to workers and the public. Specific design features can then be employed to avoid impacts or unnecessary risks. Reducing exposure can reduce risk. The use of personal protective equipment for applicators and posting of treated areas are all examples of ways to reduce exposure to workers and the public.

Because any risk assessment is based on a number of assumptions, readers and decision-makers should not conclude that the risk values are absolute. If the assumptions are changed, the risk values change. However, the risk of zinc phosphide use and application should remain the same unless new toxicity data becomes available.

The following primary reference literature were used to analyze potential human health risks associated with use of zinc phosphide:

- The 1998 EPA Reregistration Eligibility Decision (RED) for Zinc Phosphide (EPA 1998).
- 2017 zinc phosphide risk assessment by USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services (Human Health and Ecological Risk Assessment for the se of Wildlife Damage Management Methods by APHIS-Wildlife Services, Chapter X of The Use of Zinc Phosphide in Wildlife Damage Management, July 2017).

Three levels of analyses were used in the above risk assessment process: 1) a review of toxicity test data (i.e., acute, chronic, and sub-chronic) for pesticide proposed for use (in this case zinc phosphide) to determine dosage that could pose a risk to human health; 2) an estimate of exposure levels to which workers (applicators) and general public may be exposed during treatment operations; and 3) comparison of dose levels to toxicological thresholds developed by EPA to determine potential health risks.

Toxicity test data on laboratory animals is available for zinc phosphide. Most tests have been conducted under EPA's pesticide registration/re-registration requirements for use in the United States. The EPA uses test data to determine conditions for use of pesticides in the United States.

Label restrictions on pesticides are developed to mitigate, reduce, or eliminate potential risks to humans and the environment. Analysis of zinc phosphide use in this analysis assumes compliance with the product label during handling and application.

Direct/Indirect Effects Boundaries

The spatial boundaries for analyzing the direct and indirect effects to human health are the project area which is the LMNG.

The temporal boundaries for analyzing the direct and indirect effects are for the life of the project, which would continue until monitoring and/or new information determine that a change in management is necessary.

Cumulative Effects Boundaries

Because zinc phosphide does not bio-accumulate (EPA 1998), the spatial and temporal boundaries for analysis of cumulative effects is the same as for direct and indirect effects which is the LMNG.

Affected Environment

Existing Condition

Currently there is no use of rodenticides including zinc phosphide on the LMNG. Previous applications have been done on the LMNG as described in the cumulative effects activities section at the beginning of Chapter 3. Because no application is currently ongoing, no exposure to zinc phosphide is expected on the LMNG. Therefore there is currently no risk to human health from exposure to this rodenticide on NFS lands.

Environmental Consequences

Alternative 1 – No Action

The no action alternative includes no application of zinc phosphide on the LMNG. Therefore application of zinc phosphide would not present a risk to human health. There would be no possibility of accidental exposures to any human population, including applicators, agency staff, and the general public.

While prairie dogs can become infected with sylvatic plague, little evidence exists to show that increasing prairie dog populations on the LMNG would result in human health effects from the transmission of sylvatic plague to humans. The predominant information regarding plague in prairie dogs indicates that the disease very quickly kills off all prairie dogs in infected towns (USFWS 1993). Fleas infected with plague are a potential disease transmission vector from prairie dog towns to both humans and pets that come in contact and are bitten by infected fleas. Thus, while there is some potential that increases in prairie dog populations could result in human health effects, there is not an abundance of evidence to suggest that a transmission of plague from prairie dogs to humans is likely. In fact a 1993 Centers for Disease Control (CDC) report stated that only 3% of infections of humans with plague in the United States are acquired from prairie dogs or their fleas (Barnes 1993; *In* USFWS 1993). In addition, according to the CDC, there have been no reported cases of human plague in North Dakota from 1970-2012 (CDC Plague Incidence Map; https://www.cdc.gov/plague/maps/index.html).

Measures can be taken to reduce the likelihood of disease transmission further by avoiding close contact with prairie dogs and preventing transmission of fleas from prairie dogs onto pets either through the use of flea control on pets or through keeping pets from coming into contact with prairie dogs and their colonies, and thus, potentially infected fleas.

Several scoping comments were received indicating that some homes and occupied structures in close proximity to prairie dog colonies are threatened by recreational shooting. The occupants do not feel safe

with this activity taking place nearby. North Dakota Century Code prohibits hunting near occupied buildings without permission. The state regulation at 20.0-01-21 states "No person may hunt or pursue game upon the premises of another, within four hundred forty yards [402.34 meters] of any occupied building, without consent of the person occupying such building." Under the No Action alternative, prairie dog towns close to private property would not be controlled. Prairie dog colonies would continue to exist and encroach onto private lands. While shooting near occupied structures is prohibited, there may continue to be individuals who do not comply with this regulation or who still endanger those occupying structures further than 440 yards away. Some of the firearms used in recreational prairie dog shooting have a range of much more than 440 yards, and thus shooting may still threaten people and structures.

Alternative 2 – Proposed Action

Project Design Features and Mitigation Measures

All label requirements would be followed during application of zinc phosphide to protect applicators, agency personnel, permittees, and the general public from accidental poisoning. Only applicators certified in the state of North Dakota would apply zinc phosphide. In order to protect the public from zinc phosphide poisoning, notification signs will be placed around the perimeters and at entry points of prairie dog towns where poisoning will take place This notification will be placed on cards on-site in such a fashion as to be easily understood and noticed by people using the LMNG. These signs will notify of the presence of zinc phosphide poison, what the poison looks like, when it was applied, and that it is toxic to humans and pets. The poison control hotline number will also be included. Additionally all prairie dog towns planned for poisoning in a given year will be listed and available at the district office and supervisor's office for public inspection including phone call inquiries.

Required Monitoring

Monitor treatments for effectiveness of measures to protect human health, including applicators, agency staff, and the general public, from zinc phosphide exposure. If accidental exposures occur, determine what additional measures might have prevented that exposure and apply to future treatments.

Monitor, in cooperation with state health department agencies, for incidences of rodent-borne disease presence or transmission to humans or pets. Prioritize control, if necessary, for colonies with known disease that may be transmitted to humans or pets residing in close proximity. If the colony has been eliminated by disease, further control may not be necessary.

Monitor for incidences of shooting accidents or near misses as a result of shooting in prairie dog colonies in proximity to homes. Prioritize control for any colonies where these incidences take place or where home safety from shooting is a concern.

Where live trapping or fatal trapping of prairie dogs is used, monitor for incidents or near misses of rattlesnake bites to control personnel. If any such incidents occur, analyze for any lessons that may be learned and determine whether any corrective actions should be taken to prevent future incidents.

Direct and Indirect Effects - Alternative 2

The proposed action includes application of zinc phosphide to prairie dog towns that fall into the category of needing control (Category 3). There are potential direct and indirect effects of this action. These possible effects are addressed in detail below. In order to complete this effects analysis, the EPA Reregistration Eligibility Decision (RED), from July of 1998, was used as the primary reference (EPA 1998, located in the project record and on-line).

Zinc phosphide is approved for use in accordance with label restrictions by the EPA RED. The RED indicates that the primary use on the LMNG, in rangeland grasses, is considered a crop/food use. To protect against accidental ingestion in rangelands, label requirements include a prohibition against livestock feeding in treated areas.

The RED also notes that rodenticides that are used in and around the home are responsible for a high number of accidental human and pet exposures each year. The RED further states that EPA has determined that a single swallow of zinc phosphide bait may be fatal to a young child. To mitigate this potential risk, in 1998 EPA required that, for those rodenticides used near homes, an indicator dye, to help identify whether a child or pet has consumed the pesticide, and bittering agents be added to the formulations of baits. EPA directed that a task force be put together to come up with ways to make zinc phosphide bait safer for use. Possible measures were to include child resistant bait stations. EPA's concern highlights the toxicity of zinc phosphide and the need to take precautions to prevent non-target exposure including humans.

At the writing of this report, no zinc phosphide products are labeled for use for prairie dog control in residential areas. Because of the toxicity of zinc phosphide, only certified applicators may apply this product in accordance with label directions and within the applicators certification.

Factors that affect hazards associated with rodenticide use include the method of application, length of exposure, route of exposure, and the toxicity of the rodenticide.

Method of Application

Routes of exposure to a toxin are dependent on where the human or animal comes into contact with that toxin. In the case of zinc phosphide rodenticide approximately one teaspoonful of treated oats is applied around the burrows of prairie dogs. The product label indicates that exposure can occur through ingestion (swallowing the product), skin contact, and inhalation. The product causes moderate eye irritation, and persons retrieving carcasses or unused bait following application of the product must wear waterproof gloves. Personal protective equipment required for certified applicators include long sleeve shirt, long pants, shoes, socks, and waterproof gloves. Retrieval of carcasses or unused bait must be done wearing waterproof gloves. The product releases phosphine gas when it reacts to acidic conditions in the gut. Phosphine gas interferes with cell respiration and causes death. According to the DPG LRMP, zinc phosphide may only be applied from October 1 to December 31.

Two populations will be considered for exposure: the general public, and applicators.

Length and Route of Exposure; Toxicity

The magnitude of a dose that is hazardous to health depends on whether a single dose is given all at once (acute exposure), multiple doses are given over longer periods (chronic exposure), or regularly repeated doses or exposures over periods ranging from several days to months (sub-chronic). The EPA develops reference doses, which are an estimate of a daily does over a 70-year life span that a human can receive without an appreciable risk of deleterious effects.

Page vi of the reregistration document (EPA 1998) states "The Agency has determined that acute or chronic dietary exposure associated with the use of zinc phosphide is unlikely. Of those commodities designated as food uses for zinc phosphide, only three were found to have detectable residues after application (grasses, sugar beets, sugarcane). Since these three crops are not direct human food items, no acute or chronic dietary consumption of zinc phosphide is expected. Also, zinc phosphide will not concentrate during the processing of any commodity because the act of processing will not allow for unreacted zinc phosphide to remain in or on processed food items. No drinking water risk assessment was performed for zinc phosphide because no residues are expected in either ground or surface water. Exposure, other than accidental ingestion, is not expected."

Acute toxicity studies for zinc phosphide resulted in a Category 1 rating. Category 1 pesticides are highly toxic and severely irritating. Subchronic toxicity studies established a no observed effect level (NOEL) of 0.1 mg/kg/day, and a lowest effect level (LEL) of 1.0 mg/kg/day (EPA 1998).

Although zinc phosphide is registered for use on food crops, it is not applied to food so much as in areas near food. No chronic toxicity or carcinogenicity studies were required because chronic exposure to zinc

phosphide or its byproducts is expected to be negligible (EPA 1998 page 6). Residues of this pesticide are expected to be negligible as the product decomposes in to zinc and phosphorus, which are natural components of soil (EPA 1998 pages 22-23) that can be utilized by plants.

While zinc phosphide is highly toxic, the reregistration of this product was approved because the benefits of the use of this pesticide outweighs the risks when used according with label instructions (EPA 1998, pages 34-35). Reading and following instructions on the label is the best way to insure personal safety.

In addition, with respect to residues of zinc phosphide, they were detected on grasses (EPA 1998 page 12). However since grass is not directly eaten by humans and is rather food for livestock, the EPA did not expect secondary residues in meat, milk, poultry, or eggs because "residues of zinc phosphide ingested by livestock would be immediately converted to phosphine and metabolized to naturally occurring phosphorous compounds" (EPA 1998 page 12).

Carcinogenicity, Mutagenicity: Zinc phosphide is not considered a carcinogen or mutagen (EPA 1998 page 10: "chronic exposure is expected to be negligible").

Dietary Exposure from Drinking Water: According to the EPA reregistration document, zinc phosphide degrades rapidly to phosphine and zinc ions, both of which sorb strongly to soil and are common nutrients in soil. Zinc phosphide and its degradation products appear to have a low potential for ground and surface water contamination. Therefore, dietary exposure is not expected from either ground or surface water-fed drinking water (EPA 1998 page 14).

Dietary Exposure in Food Crops: Grasses are considered to be a food crop by EPA since animals intended for food consume grasses. Quantifiable amounts of zinc phosphide residues have been detected in grasses. According to EPA, since grasses are not direct human foods, no acute dietary consumption is expected. There is also no likelihood of residues of zinc phosphide or phosphine being found through transfer of residues on grasses to meat and milk (EPA 1998 page 15).

Exposure during application: Essentially the EPA reregistration document and referenced testing indicate that the main hazard of this pesticide is from eating or handling the product directly and not from contamination of food or the environment with residues. Therefore this report will focus on human health risks of this direct exposure.

Several exposure scenarios were identified for occupational situations. The first is handler exposure, which includes those applying the pesticide. The second is post-applications exposure, including workers reentering the treated area as well as members of the public or grasslands permittees entering the treated area. Because the general public are welcome to recreate on the DPG, which are public lands, the residential exposure scenarios are also relevant.

Exposure to zinc phosphide may occur during the following scenarios:

- Mixing the dry concentrate into wet bait;
- Loading dry bait (granular/pellet) formulation to support ground equipment applications;
- Applying the wet and dry baits by hand (spoon) as spot treatments;
- Applying tracking powders by hand;
- Applying tracking powders using hand-bulb and bellows-type dusters;
- Applying dry baits by hand as broadcast treatments;
- Applying dry baits with hand-held mechanical baiting device;
- Applying dry baits with cyclone and end-gate seeders, tractor drawn granular spreaders, and other ground-driven bait dispensing devices;
- Applying dry baits with whirly-bird spreaders;
- Applying dry baits with push-type spreaders.

EPA is concerned about inhalation exposure of occupational workers to the particulate fines or dust that may be generated from the mixing and loading of the dust-concentrate or wettable-powder formulations and from applying the pellet and bait formulations. While the EPA is concerned with this exposure, following labeling restrictions should provide adequate protection during application.

Within the context of the proposed application of this pesticide on the LMNG, there is a possibility of post-application exposures if baits applied outdoors are not applied underground and deep enough to prevent children and pets from finding and eating the baits or if baits resemble food, are brightly colored, or are packaged in a way in which they could be appealing to children or mistaken by children for food or candy. In addition there is a potential for workers to be exposed when reentering an application area. On the LMNG, those workers could include applicators, employees working on contract administration, monitoring, data gathering, firefighting, or range permit compliance.

Zinc phosphide labels require that only protected handlers of the product can be in the area of the application and that no other people can be in the area including the area of drift. All personnel that handle the product, including loaders and applicators, must wear long sleeved shirts, long pants, shoes, socks, and waterproof gloves (APHIS 2017).

For non-occupational exposure, EPA notes that rodenticides were responsible for 87% of all poison exposures (14,900) to children younger than 6 years of age reported in 1995. While zinc phosphide was not identified as being responsible for these exposures (most of the reports occurred with anticoagulant rodenticides) this is likely due to the fact that zinc phosphide is not as widely used in homes. The pattern of children eating rodenticide bait is of concern. In 1996, 17,601 exposures occurred in humans with over 13,000 of these exposures occurring in children younger than six years of age (EPA 1998).

While this project does not propose to use rodenticide bait in a residential setting it is important to note the risk these baits pose to children in order to develop measures to protect this vulnerable population. Areas prioritized for treatment with rodenticide are mainly within ¼ mile of private lands and where prairie dog activity threatens structures. Therefore there is potential for exposure to the general public.

Environmental Fate

In moist soils, zinc phosphide rapidly degrades to phosphine, which sorbs to soil and oxidizes to phosphate ions and phosphorus (EPA 1998 page 22). On dried soil zinc phosphide appears to be moderately persistent (half-lives may be greater than one month)(Ibid.). Zinc phosphide is expected to have a low potential for remaining in soil and water environments, thus would not cause ground or surface water contamination or create bioaccumulation hazards (Ibid.). Under normal conditions bait formulations may be moderately persistent. Zinc phosphide degrades in to volatile phosphine and zinc ions. Zinc ions and dissolved phosphorus readily sorb onto soil, are common nutrients in soil, and are relatively immobile (EPA 1998 page 23).

Protection for Applicators

Use of personal protective equipment (PPE) is required by the product label and federal law. Use of certified applicators is required. No broadcast treatments of poisons is permitted. Use hand baiting only.

Protection for General Public

There are no zinc phosphide products labeled that permit the use of ZP to control prairie dogs in residential settings. Therefore all application sites for this project, while generally within a quarter mile of private lands, will typically occur in agricultural settings and not near homes. Use of ZP is not permitted to control prairie dogs in residential areas, on roads, or over water according to product labels. In addition, for rangelands, the label requires the following: “Do not apply in areas where plants are being grown for food or feed or areas inhabited by livestock;” “Do not graze animals in treated areas”; and “apply only to rangeland with <50% ground cover” (EPA 1998 page 51, 52).

The label also requires that only protected handlers be in the area during application and that all other persons be kept out of the treated area during application. To prevent accidental exposure of all non-applicators, the proposed action includes the following measures:

1. On-the-ground signage notifying that the area is closed to entry because of the danger of accidental poisoning in the application area; the date of application; and when safe re-entry may occur. Because ZP has potential to be persistent (EPA 1998 page 22) with half-lives potentially greater than one month, the minimum time for the application area to be closed to entry is two months unless all product and carcasses are removed.
2. For prairie dogs or other poisoned animals that are found on the surface of the ground the certified applicator will remove and properly dispose of carcasses in accordance with label requirements.
3. Additional courtesy contacts will be made to those living in close proximity (within one mile) to colonies to be treated to raise awareness of the potential for, and avoid, accidental exposure to zinc phosphide. This notification will occur prior to treatment.

The FIFRA states that it is unlawful for any person in any State to distribute or sell to any person to use any registered pesticide in a manner inconsistent with its labeling (7 USC 136j Section 12). Label requirements also include the following measures for disposing of bait and dead animal carcasses:

1. Spilled and Excess Bait: wearing waterproof gloves clean up any spilled bait immediately and collect excess bait from application equipment. If bait cannot be applied according to label directions, properly dispose of it according to the "Pesticide Disposal" test.
2. Carcasses: Wearing waterproof gloves, bury carcasses of ground squirrels (18 inches deep) in holes dug on site or in inactive burrows. Cover and pack with soil. Alternately, use other disposal methods that state and local authorities allow.

According to the APHIS 2017 risk assessment, "There have been no reports of human deaths in the United States from exposure to zinc phosphide, but non-severe poisonings include occupational exposures at four veterinary hospitals (two in Michigan, one in Iowa, and one in Washington) when veterinary staff breathed in phosphine gases emitted from zinc phosphide exposed dogs (Centers for Disease Control (CDC) 2012). The dogs were accidentally poisoned by consuming rodenticides containing zinc phosphide. Following exposure, staff members experienced acute adverse health effects (such as shortness of breath, difficulty breathing, headache, nausea, dizziness, and chest pain), but everyone recovered in the presence of fresh air. While no deaths have been reported in the U.S., Europe has reported at least 25 deaths from zinc phosphide exposure (HSDB 2017). Currently, only supportive and resuscitative measures are available for zinc phosphide because antidote or specific therapies do not exist. The amount of zinc phosphide toxic to humans varies. Ingestion of 4-5 g has produced death in human adults on at least two occasions, whereas two other victims have survived doses of 25 and 50 g (HSDB 2017). Phosphine gas, which forms when zinc phosphide reacts with gastric acid in the stomach, is toxic. Phosphine toxicity causes cardiac, respiratory, and metabolic damage leading to death (Proudfoot 2009, Marino et al. 2014)."

CDC information regarding accidental poisoning from 2006 to 2011 may be viewed here: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6116a3.htm and in the project record.

While the use of zinc phosphide to control rodents has risks to human health, EPA determined that reregistration of zinc phosphide was warranted because of the benefits of product use to reduce disease transmission from populations of rodents to humans. According to the zinc phosphide RED, diseases vectored by rodents include plague, Rickettsial diseases such as murine typhus, and many others. In the case of prairie dogs, the transmission of sylvatic plague to humans is a concern. The disease is spread by fleas that parasitize prairie dogs. However, these fleas are not prone to bite humans, hence there is a low risk of humans contracting sylvatic plague from prairie dog colonies. In addition, no records of

transmission of plague from prairie dogs to humans has been recorded in North Dakota (CDC website https://www.cdc.gov/plague/maps/index.html).

Table 50 displays the effects of each of the project alternatives to selected human health effects indicators.

Table 50. Comparison of Resource Indicators for All Alternatives, Direct and Indirect Effects

Resource Element	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No Poisons	Alternative 4 Control out to ¼ mile from non-NFS
Potential for accidental human exposure to zinc phosphide	No potential	Low potential	No potential	Low potential though highest potential of all alternatives
Potential for disease transmission from prairie dog towns to humans	Low potential	Low potential with less potential than Alternatives 1 and 3	Low potential	Least potential of all alternatives*
Potential for shooting accidents as a result of recreational shooting in prairie dog towns near homes	Low potential	Low potential with less potential than Alternatives 1 and 3	Low potential	Low potential with less potential than Alternatives 1 and 3
Potential for rattlesnake bites during prairie dog control activities	No potential	Low potential	Moderate potential	Low potential

* While Alternative 4 has the lowest potential for disease transmission to humans, there are no recorded cases of such transmission in the project area according to CDC information.

Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

On the LMNG there were no prairie dog control projects from 1999 through 2004 due to a moratorium on the practice (Furnish letter of direction, 2000). After the moratorium was lifted in 2004 (Thompson letter of direction 2004), analysis and treatments were completed in 2006, 2010, and 2014 for a total of 1,421 acres of prairie dog control. No poisonings of humans, whether applicators, agency employees, grazing permittees, or the general public, were recorded. Neither were there any reported pet poisonings from these control efforts.

Certified applicators completed these control applications using zinc phosphide. No accidental exposures to applicators were recorded. The current project does propose a larger number of zinc phosphide treatments over a longer period of time, therefore having potential for different effects than past projects. However given the lack of negative human health effects from past control efforts and the inclusion of design features and label requirements for the use of zinc phosphide, Alternative 2 is not expected to result in accidental human exposure. In addition, zinc phosphide does not accumulate in the environment or in tissues of target animals (EPA 1998). Therefore the proposed action and past actions will not result in cumulative human health effects from application of zinc phosphide.

Prairie dog towns are commonly infested with fleas and may harbor diseases such as plague. Fleas are a vector with potential to carry diseases to humans. Control of prairie dogs in close proximity to human habitation has the potential to benefit human health by reducing the likelihood of such disease transmission. A search of the Centers for Disease Control (CDC) web site displayed no known cases of plague in humans in North or South Dakota (see project file or https://www.cdc.gov/plague/maps/).

Resource Indicator and Measure 1

Number of potential accidental human exposures or likelihood of accidental human exposure to zinc phosphide: No known accidental human or pet exposures to zinc phosphide have occurred as a result of past applications of zinc phosphide on the DPG since 2006. Because of design features included in this project, including informational signage and contacts with nearby residents, this project is not expected to result in human or pet exposures to zinc phosphide. As a result, Alternative 2 is not expected to contribute to any cumulative effect to human or pet exposures.

It is probable that some level of zinc phosphide application for rodents is occurring on non-NFS lands within the project area. There is no database recording such applications and no real way to quantify them. An internet search for cases of accidental exposure to humans and pets from zinc phosphide within the project area did not find any incidents.

Resource Indicator and Measure 2

Potential for incidences of disease transmission from prairie dog colonies to humans on the DPG: The potential for disease transmittal from prairie dogs to humans is low with any alternative under consideration in this project. That potential may be even lower with selection of Alternative 2 due to the reduction in prairie dogs occupying NFS lands in close proximity to residences. No incidence of disease transmission from prairie dogs to humans has been reported in the project area or the state. In fact the Centers for Disease Control shows no incidences of plague in humans in North Dakota for the years 1970 to 2012 (CDC web information: https://www.cdc.gov/plague/maps/index.html and in the project file). Most incidences are located in the Four Corners region of the southwest. The nearest incident to the project area is located near the Montana/Wyoming border. Alternative 2 would not combine with effects of disease transmission from prairie dogs on lands of any ownership to create a cumulative effect to human health.

Resource Indicator and Measure 3

Potential for accidental shooting as a result of recreational shooting in prairie dog colonies near human habitation: Control of prairie dog towns in proximity to residences is likely to reduce the potential for shooting accidents as a result of recreational shooting in prairie dog towns. While no accidental shootings or near misses are known to have occurred as a result of recreation shooting on NFS lands, the actual potential for such an incident may be low under the no action alternative. However scoping responses indicated that such near misses are possible or may have occurred. There are also anecdotal reports in project area newspapers indicating that unsafe shooting may occur in the vicinity of prairie dog towns on lands of all ownerships in the project area. That potential would be somewhat lower with selection of Alternative 2 due to the reduction of prairie dogs in proximity to homes.

Resource Indicator and Measure 4

Potential for rattlesnake bites to prairie dog control applicators during control operations: Because Alternative 2 would primarily use zinc phosphide control of prairie dogs rather than trapping, there is little potential for rattlesnake bites to applicators. While applicators would still be placing bait in areas where rattlesnakes occur, bait is placed on the surface rather than in the burrow, reducing the risk of snake encounters and bites. There are no known incidences of rattlesnake bites during previous control efforts, however a contractor that performs prairie dog control using both traps and poison bait indicated that having employees bitten during prairie dog trapping was a concern. The contractor indicated that there was much less risk of snake bite to employees using zinc phosphide bait application. Alternative 2 would not combine with previous incidents or incidents on lands of other ownerships to create a cumulative effect on human health from snake bites.

Alternative 3

Direct and Indirect Effects

Alternative 3 would implement prairie dog control using only methods that do not include rodenticides. Methods used would include live trapping and translocating prairie dogs to suitable areas, lethal trapping of prairie dogs, etc. Control measures would likely happen more slowly due to increased costs of non-lethal methods (see project file). One contractor estimated the cost per acre for treatment using zinc phosphide bait at $16 per acre whereas the estimated cost per acre for lethal trapping of prairie dogs was $3,133.44 per acre. In other words, for the cost to lethally trap prairie dogs on one acre of land, zinc phosphide treatment could have treated almost 196 acres.

In addition, communication from a contractor involved in prairie dog control indicated that there is a risk of rattlesnake bites to those involved in setting and removing traps for prairie dogs.

Because prairie dog control would take place at a reduced rate, due to limited funds available, as compared to the proposed action, and would not include any zinc phosphide treatment, risks and benefits of this alternative would be different than Alternative 2. Since no zinc phosphide treatments would take place, there would be no potential for accidental human exposure to zinc phosphide on NFS lands within the LMNG.

Due to the reduced rate of implementation, Alternative 3 would control prairie dog colonies in close proximity to human habitation at a slower rate. Therefore effects would be more similar to the no action alternative in terms of the risk of disease transmission, though small, and the risk of accidental shooting in prairie dog colonies in proximity to homes and out-buildings.

Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Because Alternative 3 would not include application of zinc phosphide, there would be no possibility of human exposure to zinc phosphide, and no cumulative effect from application of zinc phosphide to human health. Prairie dog colonies would continue to exist in proximity to human habitation due to a slower rate of control. Therefore some possibility of disease transmission from these colonies to humans is possible, though unlikely since there is no recorded evidence of such transmission on the LMNG.

The potential for shooting accidents to humans on adjacent private lands is similar, though slightly reduced from, the no action alternative; in other words, because of reduced rate of control of prairie dog colonies adjacent to private lands as compared to Alternative 2, Alternative 3 maintains some level of risk of impacting human health through maintained potential for accidents and near misses as a result of recreational shooting near human habitation. There is increased potential for human health effects as a result of rattlesnake bites during trapping operations with Alternative 3 as compared to the no action and proposed action alternatives.

It is not known how much trapping of prairie dogs is occurring on non-NFS lands. Alternative 3 will not contribute to any cumulative effects on human health as a result of implementing lethal or live trapping of prairie dogs.

Resource Indicator and Measure 1

Number of potential accidental human exposures or likelihood of accidental human exposure to zinc phosphide: Alternative 3 proposes no use of zinc phosphide and would therefore have no potential at all for human health effects from accidental poisoning. Alternative 3 would also not have any cumulative effect with rodenticide applications on lands of other ownerships.

Resource Indicator and Measure 2

Potential for incidences of disease transmission from prairie dog colonies to humans from colonies on the DPG: Alternative 3 would do the least to address the potential for disease transmission from prairie dog colonies to humans. However there does not appear to be a risk of such disease transmission within the project area based on available records.

Resource Indicator and Measure 3

Potential for accidental shooting as a result of recreational shooting in prairie dog colonies near human habitation: Alternative 3 would control prairie dog colonies in proximity to private lands but at a much slower pace than Alternative 2 due to the high cost of control. Therefore the potential for accidental shooting near private property and homes, while low, would likely remain. The actual occurrence of such incidents on non-NFS lands is unknown. Based on available records, it does not appear that Alternative 3 would result in a cumulative health risk based on incidents on lands of all ownerships.

Resource Indicator and Measure 4

Potential for rattlesnake bites to prairie dog control applicators during control operations: Because Alternative 3 involves placing traps within prairie dog burrows where rattlesnakes are found, there is an elevated, though still low, risk of rattlesnake bites to control personnel. There are no available records regarding similar exposure on lands of other ownerships. Alternative 3 is not expected to create a cumulative effect to applicators of rattlesnake bites.

Alternative 4

Alternative 4 was added late in the process of analysis in order to address public concern that control proposed in Alternative 2 was not aggressive enough. Please see Chapter 2 for a complete description of the alternatives.

Direct and Indirect Effects

Generally in terms of human health effects, Alternative 4 is similar to Alternative 2. The main difference is that more area would receive application of zinc phosphide poison. With greater treatment area comes increased risk of accidental human and pet exposure to poison.

Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects to human health from Alternative 4 are expected to be similar to those described for Alternative 2. Because of design features and product label restrictions, Alternative 4 is not expected to contribute to cumulative effects to human health.

Resource Indicator and Measure 1

Number of potential accidental human exposures or likelihood of accidental human exposure to zinc phosphide: Same as described for Alternative 2 with the exception that Alternative 4 would apply poison over a larger area and therefore have an increased potential for accidental exposure to humans and/or pets.

Resource Indicator and Measure 2

Potential for incidences of disease transmission from prairie dog colonies to humans on the DPG: Same as Alternative 2.

Resource Indicator and Measure 3

Potential for accidental shooting as a result of recreational shooting in prairie dog colonies near human habitation: Same as Alternative 2.

Resource Indicator and Measure 4

Potential for rattlesnake bites to prairie dog control applicators during control operations: Same as Alternative 2.

Table 51: Summary comparison of how the alternatives address the key issues

Issue	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
Use of rodenticides and other poisons as control measures may negatively affect non-target wildlife and domestic animals	Potential (high, medium, low, none) for accidental poisoning of domestic animals	None	Low due to inclusion of design features	None	Low due to inclusion of design features; Highest potential of all alternatives due to higher number of acres treated with ZP.

Summary of Environmental Effects

Risks to human health as a result of prairie dog control fall into four distinct possibilities:

- accidental poisoning with zinc phosphide bait;
- disease transmission from prairie dogs to humans;
- accidental shooting due to recreational prairie dog shooting near residences; and
- rattlesnake bite during trapping efforts.

Alternatives 2 and 4 are the only alternatives that presents a risk of accidental poisoning with zinc phosphide through exposure during application or due to consumption of grain baits. This potential is reduced through design features including signing of control areas and making contacts with those living within one mile of prairie dog towns where poison baits are applied prior to application.

The potential for disease transmission from prairie dog towns to humans, while possible, seems unlikely in North Dakota as evidenced by a lack of documented incidences. While Alternatives 2 and 4 do the most to reduce prairie dog occupancy in close proximity to homes at a faster rate, there is no available evidence to show that disease transmission from prairie dogs to humans in the project area is a real risk.

While there are no recorded episodes of accidental shooting as a result of recreational shooting of prairie dogs close to homes, there are anecdotal accounts of near misses. Concerns about accidental shooting as a result of prairie dog towns on NFS lands adjacent to private homes were received during the scoping period for this project. Alternatives 2 and 4 do the most to address this concern.

While there are no known incidences of rattlesnake bites during prairie dog control trapping, this concern was expressed by those involved in prairie dog control. Alternatives 2 and 4 would have the least potential of the action alternatives to result in rattlesnake bites for control specialists.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

All alternatives comply with the DPG LRMP. Use of only certified applicators to conduct zinc phosphide bait applications meets the requirements of FIFRA, EPA worker protection standards, and North Dakota state law regarding pesticide use. Use of design features notifying the public of the hazards of prairie dog control and closing control areas to entry by people and livestock will also help meet federal laws related

to the use of zinc phosphide. Completion of this report along with project design features and product label requirements causes this project to comply with requirements in FSH 2150 and 2109.

Intensity Factors for Significance (FONSI) (40 CFR 1508.27(b))

- **Beneficial/Adverse Impacts**: Actual impacts to human health are expected to be negligible. There is a slight potential for both positive and negative human health effects from this project. However due to an absence of known previous health effects from either zinc phosphide poisoning, shooting in prairie dog towns, disease transmission from prairie dogs to humans, or rattlesnake bites during control operations, the likelihood of any of these effects is small.
- **Public Health and Safety**: There is a slight potential for this project to have an effect to human health and safety, either from choosing to implement prairie dog control, and if so, how; or from choosing not to implement prairie dog control. Action and inaction both carry potential risks and benefits to human health. However given a lack of existing human health effects, and a lack of human health effects from past rodenticide treatments, none are expected with implementation of this project.
- **Cumulatively Significant Impacts**: None expected.

Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

2. The degree to which the proposed action affects public health or safety: Alternative 2 has the potential to beneficially and/or adversely impact human health and safety both by applying pesticides to prairie dog towns, which has the potential for adverse human health effects, and by reducing prairie dog numbers adjacent to homes, which may protect human safety by eliminating recreational shooting in the vicinity of homes. Potential disease transmission from prairie dogs to humans may be reduced through prairie dog control, but given a lack of incidences of such disease transmission in the project area, it is doubtful whether any real effect on disease transmission would occur with any alternative.
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial: While prairie dog control is somewhat controversial in the project area, whether implemented or not, the level of controversy does not appear to raise to the level of significance.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks: Prairie dog control using a variety of methods is well understood in the project area and does not involve unique or unknown risks.
10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment: A review of label requirements and relevant laws indicates that the project is in compliance with all applicable laws.

3.8 Heritage Resources

Introduction

Cultural and heritage resources include both archaeological sites and historic structures that reflect past human interactions as well as human use of the landscape and its resources. These cultural heritage resources have value for their association with important events or people in our history, their distinctive historical style, or their potential to provide information about our past. Cultural resources that are determined to be eligible to the National Register of Historic Places (NRHP) are considered "historic properties" that are managed to avoid or mitigate impacts to their integrity.

The Dakota Prairie Grasslands (DPG) proposes to manage prairie dog colonies that occur within the McKenzie and Medora Ranger Districts. Heritage program analysis will focus on the effect that may occur to heritage resources as a result of managing prairie dog colonies. Foreseeable impacts to heritage resources generally occur as the result of earth disturbing activities in or around known or unknown cultural heritage sites.

In consultation with the North Dakota State Historic Preservation Office (SHPO), the area of potential effect (APE) for cultural heritage resources has been identified as the prairie dog treatment area plus a 200 foot buffer. Approximately 28%, 524 acres, of the 1,876 acres of APE have been previously surveyed for cultural heritage resources. Analysis of previously identified archaeological sites utilized a 200 foot buffer to ensure consideration of potential heritage affects from unpredictably evolving prairie dog activity. Thirteen previously identified archaeological sites and five previously identified site leads are located within the prairie dog activity, the proposed treatment area, and or the 200 foot buffer. Details are outlined below under "Spatial and Temporal Context for Effects Analysis."

Cultural heritage resources are not directly related to the purpose and need of the proposed prairie dog management (FSH.1909.15, 11.21) nor are there any anticipated heritage related issues (FSH 1909.15, 12.4) that have been identified through scoping.

Relevant Laws, Regulations, and Policy

Regulatory Framework

The Forest Service and other Federal Agencies are required to manage historic properties in the United States under several statutes, most notably the National Historic Preservation Act of 1966 (NHPA). These requirements are regulated through 36 CFR 800 and are carried forward in the Grasslands Plan standards (USDA FS 2001:1-5, 1-24-25).

Historic properties are identified by a cultural resource inventory and are determined as eligible to the National Register of Historic Places based on their ability to yield information about the past or their relation to important events, persons or historical styles. Cultural resource inventories must be completed prior to road construction, installation of buried pipelines, or any other ground-disturbing activities that may have the potential to impact historic properties. Historic properties are managed to either protect them in-place or to mitigate adverse project effects. The SHPO reviews eligibility and management provisions and provides comments about project effects on cultural resources. The process of consultation with SHPO must take place prior to impacts on the ground unless the inventory results fall within a scope of a memorandum of understanding between the DPG and SHPO that streamlines consultation.

Land and Resource Management Plan

The Dakota Prairie Grasslands Land and Resource Management Plan (LRMP) provides standards and guidelines (pp. 1-24 to 1-25) for proposed projects that may affect heritage resources.

- Standard N – 1. Consult with designated representatives of federally recognized American Indian tribes during design of projects with potential to affect cultural rights and practices to help ensure protection, preservation, and use of areas that are culturally important to them. (LRMP page 1-24)
- Guideline N – 2. Consider American Indian traditional cultural plant use when designing vegetative management activities. (LRMP page 1-24)
- Standard N – 3. Leave human remains undisturbed. In case of accidental disturbance take steps outlined in Appendix M. (LRMP page 1-24)
- Standard N – 4. Prohibit disturbance of heritage resources by management activities or vandalism through project design, specified protection measures, monitoring, and coordination. (LRMP page 1-24)
- Guideline N – 6. Limit non-research oriented ground-disturbing activities on heritage districts and sites eligible for the National Register of Historic Places (NRHP) that creates adverse impacts to the district or site. (LRMP page 1-25)

Federal Law

The Antiquities Act of 1906

The Antiquities Act of 1906 protects historic or prehistoric remains or any object of antiquity on federal lands and applies to both heritage and paleontological resources. Ruled unconstitutionally vague in 1977, the statutory intent was to impose criminal penalties for unauthorized destruction or appropriation of antiquities without a valid permit. Now the Archaeological Resources Protection Act serves this purpose (see below).

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, as amended - This act protects historic and archaeological values during the planning and implementation of federal projects (CFR 36 800 and CFR 36 60). The law outlines the section 106 compliance process and requires the location and identification of heritage resources during the planning phase of a project, a determination of "significance" (based on scientific archaeological values) for potentially affected resources, and provisions for mitigation of any significant sites that may be affected.

The Federal Land Policy and Management Act

The Federal Land Policy and Management Act of 1976 Section 102(8) - This act requires that "public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition..."

The American Indian Religious Freedom Act

The American Indian Religious Freedom Act (AIRFA) of 1978 protects American Indian rights to exercise traditional religious practices, including access and freedom to worship sites through ceremonial and traditional rites.

The Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) of 1979 imposes civil and criminal penalties for the unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources on federal lands.

The Native American Grave Protection and Repatriation Act

The Native American Grave Protection and Repatriation Act (NAGPRA) of 1990 protects American Indian burials and sacred items.

Executive Orders

Executive Order 13007 of May 24, 1996

Executive Order 13007 mandates consideration of historic and traditional landscapes, increased awareness and consultation for traditional cultural properties, and avoidance of adversely affecting the physical integrity of such sites. It also allows Native Americans to worship at sacred sites located on federal property. New 2013 guidance has been offered for increased awareness of this throughout federal land management.

Other Guidance or Recommendations

Programmatic Agreement (PA) among the USDA Forest Service, Northern Region (North Dakota) North Dakota State (USDA FS PA).

Topics and Issues Addressed in This Analysis

Purpose and Need

See Chapter 2 for a description of the Purpose and Need. Cultural heritage resources are not driving all or part of the project's Purpose and Need for Action.

Resource Indicators and Measures

Any federal undertaking, such as ground disturbing activities, that has the potential to affect heritage resources must be evaluated for impact to cultural resources (42 USC 4332 § 102(c); 42 USC 4331 §101(b)). Forest Service archaeologist compliance with best management practice (BMP), programmatic agreement (PA) between the Forest Service and SHPO, which includes the Site Identification Strategy (SIS), and the Forest Service Handbook and Manual will ensure adequate analysis and evaluation of impacts to heritage resources. Provided compliance measures are met and heritage resources are avoided, there will be no effect to heritage resources.

Table 52. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: P/N, or key issue?	Source (LRMP S/G; law or policy, BMPs, etc.)?
Archaeological site integrity	Intact	Stratigraphic disturbance	No	LRMP Standard N – 4, NHPA Section 106, FSH 2309.12, FSM 2360

Methodology

Defining an area of potential effects (APE) provides both the agency and consulting parties with a basis for understanding the geographic extent of anticipated impacts of the proposed project, which is necessary in order to determine whether the project may adversely affect historic properties. In relation to compliance with NHPA, the APE helps the agency determine where to look for cultural resources based on what areas may be affected. In consultation with the SHPO, the APE for cultural heritage resources has been identified as the prairie dog treatment area plus a 200 foot buffer.

Prairie Dog Management Heritage Site Identification Strategy Site Identification Strategy (SIS) (see North Dakota Programmatic Agreement for SIS) includes:

- Class I Inventory (Literature Search)
- Minimum 10% survey coverage

All 18 cultural heritage resources that were previously inventoried have been reviewed and their site conditions at that time noted. With avoidance of cultural heritage resources when earth disturbing prairie dog burrow collapsing occurs, there will be no management activity affecting these known sites. Approximately 28%, 524 acres, of the 1,876 acres of APE have been previously surveyed for cultural heritage resources. Analysis of previously identified archaeological sites utilized a 200 foot buffer to ensure consideration of potential heritage affects from unpredictably evolving prairie dog activity. Thirteen previously identified archaeological sites and five previously identified site leads are located within the prairie dog activity, the proposed treatment area, and or the 200 foot buffer. Details are outlined below under "Spatial and Temporal Context for Effects Analysis" and Table 1.

Class III Inventory (SIS) for new ground disturbing activities

Upon identification of need for on-the ground earth disturbance, the Little Missouri National Grassland will contact the district or grasslands archaeologist with locational information. The archaeologist will review the GIS data and cultural resource atlas to determine whether a previous heritage survey has been conducted in the project area. If no previous heritage resource survey has been conducted, an archaeologist will conduct a heritage survey. Depending on the size and nature of the earth disturbance, a proportionate survey, centered on the disturbance, will be conducted. The archaeologist will record any heritage resources within the survey area.

If a heritage survey has been previously conducted, the archaeologist will ascertain whether the survey was adequate. Provided survey is adequate, the archaeologist will assess whether heritage resources have been identified in the previously surveyed area. The archaeologist will identify effects of the earth disturbance from the federal undertaking to the identified heritage resources, if any, and will ascertain mitigation and avoidance measures. The archaeologist will consult with SHPO, complying with Section 106 of the National Historic Preservation Act and North Dakota SHPO Programmatic Agreement.

The project record and effects to heritage resources will have been reviewed and analyzed. Provided Forest Service archaeologist complies with the BMP, DPG LRMP, PAs between the North Dakota and South Dakota SHPOs and the Forest Service, no adverse direct, indirect, or cumulative effects to heritage resources are anticipated.

Information Sources

USFS Grasslands Archaeologist reviews laws, policy, direction and plans, including the DPG LRMP (2001) and Programmatic Agreement (PA) with North Dakota SHPO, for consistency; conducts file searches and GIS research, including consulting the Cultural Resource Atlas and related files in the Supervisor's Office in Bismarck, North Dakota, as well as the DPG District Office records in addition to the project records for previous earth disturbing federal undertakings. All GIS, inventory and site file information is kept independently at the USFS as well as at the North Dakota SHPO. The USFS acquires a copy of the North Dakota SHPO data via a memorandum of agreement to provide their most current heritage data.

Spatial and Temporal Context for Effects Analysis

The spatial context is the Little Missouri National Grasslands. Heritage resources concerns within this spatial context are identified cultural resources that are either eligible for inclusion or as of yet unevaluated for inclusion to the NRHP that may be affected by any management activity. Eight previously identified archaeological sites and one previously identified site lead are within proposed treatment areas; one previously identified archaeological site and one previously identified site lead are within 200 feet of the proposed treatment area, though requires ground truthing to determine whether they have been affected by the prairie dog activity and therefore may not be within the proposed treatment area; four previously identified archaeological sites and three previously identified site leads are within 200 feet of the proposed treatment area, though are not likely to be affected by the prairie dogs and therefore not within the proposed treatment area.

Specifically, sites 32GV00015, 32SL00082, 32BI00398, 32MZ00018, 32MZ00506, 32MZ00508, 32MZ00510, 32MZ00840, and site lead 32SLX0250, are previously identified cultural heritage resources and have been affected by prairie dog activity and are therefore within the proposed treatment area. Site 32BI00089 and site lead 32MZX1309 are within 200 feet of the proposed treatment area but require ground truthing to determine if they are affected by prairie dog activity and within the treatment area. Sites 32MZ00462, 32MZ00507, 32MZ00509, 32MZ01918, and site leads 32MZX0001, 32MZX0437, and 32MZX0660, are within 200 feet of the proposed treatment areas.

Direct/Indirect and Cumulative Effects Boundaries

The spatial boundaries for analyzing the direct and indirect effects to heritage resources are those treatment areas that encompass or intersect with an identified archaeological site because there is a potential to affect heritage resources as a result of any proposed earth disturbance from the collapsing of prairie dog colonies.

The temporal boundaries for analyzing the direct and indirect effects are limited to implementing any earth disturbing work, such as collapsing prairie dog colonies, for the life of the project, because that is the only potential earth disturbing federal undertaking proposed that has the potential to affect heritage resources.

Affected Environment

Existing Condition

The LMNG contains sites covering the entire prehistoric time range of North Dakota. Evidence of early peopling of the Great Plains, collectively called Paleoindians, first appeared in the Late Pleistocene/Early Holocene (11,500-7,500 BP). While a large number of sites are known on the grassland, only a small percentage has actually been test excavated or produced diagnostic artifacts. Any archaeological sites that remain undisturbed by federal undertakings that include earth disturbance are subject to naturally occurring erosion and disturbances. When there is a new federal undertaking that occurs on an identified site that is eligible or unevaluated for eligibility for the National Register of Historic Places, an archaeological site update is generally conducted to capture the current condition so as to maintain an understanding of the existing condition of cultural heritage resources.

Eight previously identified archaeological sites and one previously identified site lead are within proposed treatment areas. All eight of these identified archaeological sites are unevaluated for significance for the NRHP. Therefore they must be avoided or evaluated to determine eligibility for inclusion to the NRHP. Those sites that are eligible for inclusion will be avoided. One previously identified archaeological site and one previously identified site lead are within 200 feet of the proposed treatment area, though may not have been affected by the prairie dog activity (burrowing) and therefore may not be within the proposed treatment area. Four previously identified archaeological sites and three previously identified site leads are within 200 feet of the proposed treatment area, though are not likely to be affected by the prairie dog activity and therefore not within the proposed treatment area.

The integrity of those sites that are within the prairie dog colonies has suffered extensive damage. Those sites that are abutting the prairie dog colonies may have been damaged by the prairie dog activity, but these sites require a field visit to determine the extent of damage. Those sites that are not within the colonies but fall within the 200 feet buffer have not, to date, yet suffered extensive natural stratigraphic disturbance and damage.

Table 53. Heritage Sites within Proposed Project Area

Archaeological Site	NRHP Eligibility	Within Proposed Treatment?	Inventory Report
32BI00089 (historic)	Not eligible	Maybe, ground truth required	D711021
32BI00398 (historic)	Unevaluated, Avoid	Yes	D784013

32GV00015 (prehistoric)	Unevaluated, Avoid	Yes	D783129
32MZ00018 (historic)	Unevaluated, Avoid	Yes	D879165, D886046, D881046
32MZ00462 (prehistoric/historic)	Unevaluated, Avoid	No, but within 200 foot buffer	D881114
32MZ00506 (prehistoric)	Unevaluated, Avoid	Yes	D881221
32MZ00507 (prehistoric)	Unevaluated, Avoid	No, but within 200 foot buffer	D881221
32MZ00508 (prehistoric)	Unevaluated, Avoid	Yes	D881221
32MZ00509 (prehistoric)	Unevaluated, Avoid	No, but within 200 foot buffer	D881221
32MZ00510 (prehistoric)	Unevaluated, Avoid	Yes	D881221
32MZ00840 (historic)	Unevaluated, Avoid	Yes	D887018
32MZ01918 (prehistoric/historic)	Unevaluated, Avoid	No, but within 200 foot buffer	D808028
32MZX0001	Not eligible	No, but within 200 foot buffer	n/a
32MZX0437	Not eligible	No, but within 200 foot buffer	n/a
32MZX0660	Not eligible	No, but within 200 foot buffer	n/a
32MZX1309	Not eligible	Maybe, ground truth required	n/a
32SL00082 (historic)	Unevaluated, Avoid	Yes	D790080
32SLX0250	Not eligible	Yes	n/a

Table 54. Heritage Indicators and Measures for the Existing Condition Heritage Element

Heritage indicators and measures for the existing condition for Heritage	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Existing Condition
Archaeological site integrity	Intact	Stratigraphic disturbance	Extensive stratigraphic disturbance within colonies; No stratigraphic disturbance outside of colonies

Resource Indicator and Measure 1

Archaeological site integrity is a determining factor in which a site is eligible for inclusion in the NRHP. Therefore it is an important indicator to measure. Prairie dog activity disturbs and destroys the integrity of prehistoric and historic properties, therefore effecting their eligibility for inclusion in the NRHP. Those sites that fall within the prairie dog colonies have suffered extensive stratigraphic disturbance and their current existing condition is extensively disturbed.

Environmental Consequences

Alternative 1 – No Action

Historic properties will be subject to natural deterioration, decay and stratigraphic disturbance as a result of prairie dog activity. Prairie dog activity disturbs and destroys prehistoric and historic properties by moving artifacts within the soil, creating false patterns of artifact occurrence that no longer lends to interpreting what occurred in the past or how people were living. This disturbance could in fact cause misinterpretation of the archaeological record (Bocek 1986:589). There will be no extensive stratigraphic disturbance as a result of management actions.

Table 55. Heritage Indicators and Measures, all alternatives

Heritage Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 1	Action Alternatives
Archaeological site integrity	Condition	Stratigraphic disturbance	Natural disturbance may occur but will not be affected by management actions	Design features avoid extensive stratigraphic disturbance

All Action Alternatives

The action alternatives include killing or removing prairie dogs using a variety of methods including live or lethal trapping and poisoning. Vegetation barriers may also be created to deter expansion onto non-NFS lands. These actions and the other tools in the adaptive management toolbox do not include soil disturbing activities or other actions that would potentially impact heritage resources.

The only proposed federal action that may affect cultural heritage resources is collapsing prairie dog burrows because it is earth disturbing and could directly affect identified heritage resources. Therefore any colony collapsing will avoid all cultural heritage resources that are eligible for inclusion in the NRHP or those that have yet to be evaluated and will not be evaluated prior to implementation. Cultural resource surveys are required during the interdisciplinary team review completed for site-specific actions prior to implementation. Collapsing burrows is not proposed for current implementation during this treatment, but may be proposed in the future.

Project Design Features and Mitigation Measures

All proposed earth disturbing activity for burrow collapse will include reviewing records for previous cultural heritage surveys. If there is no previous survey, a cultural heritage survey will be conducted prior to implementation. All identified heritage resources that are eligible for inclusion in the NRHP will be flagged and avoided during project implementation. All previously recorded heritage resources that are unevaluated must be either evaluated for eligibility or treated as eligible.

Upon earth disturbing activities, if an inadvertent discovery occurs, project work in the area shall stop and the Grasslands Archaeologist will be notified immediately. If human remains are uncovered, suspend activities immediately and notify the Grasslands Archaeologist and local law enforcement. Project work in the area of the inadvertent discovery can resume once the discovery has been secured and evaluated (USDA FS 2012).

If previously unidentified cultural sites are encountered in the course of further inventory or project implementation, the Grasslands Archaeologist or Heritage Specialists will consult with the SHPO, as required by law, to determine the significance of the discovery and the effects of the project upon them. As required by Section 106 of the NHPA, the SHPO will also be consulted about any adverse effects to known cultural sites prior to project implementation. The Tribal Historic Preservation Officers (THPO) from consulting tribal governments will be included in discussions concerning prehistoric and historic Native American properties. Mitigation measures that may be required in consultation with the SHPO may include avoidance of sites, protection, or scientific investigation.

Direct and Indirect Effects – Action Alternatives

All cultural heritage sites will be avoided during colony collapsing implementation, therefore there will be no direct or indirect effects to cultural heritage resources. Earth disturbance from collapsing prairie dog burrows may affect historic properties. Specifically, historic properties would be subject to stratigraphic disturbance which destroys prehistoric and historic properties. This destruction occurs from moving artifacts within the soil, creating false patterns of artifact occurrence that no longer lends to interpreting

what occurred in the past or how people were living. This disturbance would both destroy and deteriorate the archaeological record. Therefore archaeological sites eligible for inclusion in the NRHP will be avoided. Unevaluated archaeological sites will also be avoided in the event evaluation will not occur prior to implementation.

Table 56. Heritage Indicators and Measures for Alternative 2, 3, and 4 Direct/Indirect Effects

Heritage Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Action Alternatives Direct/Indirect Effects
Archaeological site integrity	Condition	Stratigraphic disturbance	Design features avoid extensive stratigraphic disturbance

Cumulative Effects – Action Alternatives

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

The cumulative effect of extensive stratigraphic disturbance from collapsing prairie dog colonies on cultural heritage resources would exacerbate the deteriorating integrity of the sites that already undergo other natural environmental deterioration from rodents, plants, and water erosion from rain and snow fall. Once erosional processes are initiated, they become increasingly more severe and destructive with each rainfall.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

This proposed project complies with the LRMP, policies, and applicable regulations and laws regarding historic properties. All areas of potential effect (APE) will be surveyed for cultural heritage resources prior to implementing any earth disturbing activities and all identified eligible and unevaluated cultural heritage sites will be avoided during earth disturbing activities. Any previous surveys of the APE will be consulted and relied upon, provided surveys were adequate. The laws and policies that govern cultural resource management on Federal lands are coordinated with the SHPO who serves in an advisory capacity. The policies of the USDA FS and the SHPOs are consistent. All alternatives are consistent with the Grasslands Plan and applicable regulations and laws regarding historic properties.

Chapter 4. Consultation and Coordination

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

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Liv Fetterman - Heritage
Jack Dahl - Botany
Kyle Dalzell – Range
Leslie Ferguson – Human Health Risk Assessment
Jennie Jennings - Hydrology
Troy Price – Heritage
Sabry Hanna - Paleo
Arden Warm - Wildlife

FEDERAL, STATE, AND LOCAL AGENCIES:

North Dakota State Historic Preservation Office

Cristi Painter – Wildlife Biologist, Thunder Basin National Grassland

TRIBES:

Standing Rock Sioux Tribe Tribal Historic Preservation Office

Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Tribal Historic Preservation Office

Spirit Lake Sioux Tribe Tribal Historic Preservation Office

Turtle Mountain Band of Chippewa Tribal Historic Preservation Office

OTHERS:

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LITERATURE CITED

General References

USDA Forest Service. 2001. Final Environmental Impact Statement for the Northern Great Plains Management Plans Revision. May 2001. 669 pages.

USDA Forest Service. 2001. Appendixes for the Northern Great Plains Management Plans Revision. May 2001. 1,015 pages.

USDA Forest Service. 2002. Addendum to the Northern Great Plains Management Plans Revision FEIS and Land and Resource Management Plans 2001 Revisions. 324 pages.

USDA Forest Service. 2002. Record of Decision for Dakota Prairie Grasslands Final Environmental Impact Statement and Land and Resource Management Plan. 45 pages.

USDA Forest Service and Bureau of Land Management Montana State Office. 2003. Oil and Gas Leasing Record of Decision. 47 pages.

USDA Forest Service. 2006. Livestock Grazing Record of Decision for Dakota Prairie Grasslands Final Environmental Impact Statement and Land and Resource Management Plan. 26 pages.

Botany

Brakie, M. 2007. Alkali sacaton (*Sporobolus airoides*): Plant Fact Sheet. United States Department of Agriculture Natural Resources Conservation Service East Texas Plant Materials Center, Nacogdoches, Texas.

Dickinson C. E. and J. L. Dodd. 1983. Phonological Pattern in the Shortgrass Prairie. The American Midland Naturalist, Vol. 96, No. 2 (Oct., 1976) pp. 367-378. Available online http://www.jstor.org/stable/2424076 .

Flora of North America (FNA). *Coryphantha missouriensis.* Flora of North America. Vol. 4 Page 222, 223, 227, 228. Available online at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415329 (accessed June 21, 2013).

Hamel, C. and E. Reimer. 2004. The ST. Lazare Area of Manitoba: A biodiversity Hotspot. In Blue Jay 62 (December 2004): pp. 203-210. Available online. http://www.gov.mb.ca/sd/cdc/pdf/stlazare.pdf

Heidel, B. 1990. Inventory of rare plant species in Theodore Roosevelt National Park, Billings and McKenzie Counties, ND. North Dakota Parks and Recreation Department. Bismarck, ND. In: USDA Forest Service. 2000. Final Environmental Impact Statement for the Northern Great Plains Management Revision

Johnson, K. A. 2000. USDA Forest Service Fire Effects Information System. Alkali sacaton (*Sporobolus airoides*). Located online here: https://www.fs.fed.us/database/feis/plants/graminoid/spoair/all.html

Johnson, Kathleen A. 2001. *Sporobolus airoides*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available online http://www.fs.fed.us/database/feis/ .

Kaul R. P. and K. H. Keeler. 1983. Effects of grazing and juniper-canopy closure on the prairie flora in Nebraska High-Plains canyons. In: Kucera CL (ed) Proceedings of the seventh North American Prairie Conference. Southwest Missouri State University, Springfield, pp 95–105. Available online. http://images.library.wisc.edu/EcoNatRes/EFacs/NAPC/NAPC07/reference/econatres.napc07.rkaul.pdf .

Ladyman, J. A. R. 2006. *Eriogonum visheri* A. Nelson (Visher's buckwheat): A Technical Conservation Assessment. USDA Forest Service. Rocky Mountain Region. Available online: http://www.fs.fed.us/r2/projects/scp/assessments/eriogonumvisheri.pdf

Lenz, D. 1993. 1991-1992 Inventory of rare plant species in the Little Missouri Grasslands. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. Bismarck, ND. In: USDA Forest Service. 2000. Final Environmental Impact Statement for the Northern Great Plains Management Revision.

Milne, S. 2004. Population ecology and expansion dynamics of black-tailed prairie dogs in western North Dakota. M.S. thesis, University of North Dakota, Grand Forks.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (accessed: December 30, 2016).

North Dakota Natural Heritage Program, Department of Parks and Recreation. Bismarck, North Dakota.

North Dakota Natural Heritage Program. 2013. North Dakota's 100 Species of Conservation Priority. North Dakota Natural Heritage Program, Bismarck, ND. 361 pp.

Reveal, J. L. 1970. A revision of the Utah species of *Townsendia* (*Compositae*). The Great Basin Naturalist. Bol. 30. No 1 (March 30, 1970), pp. 23-52. Available online http://www.jstor.org/stable/41711246 .

Lenz, D. 1993. 1991-1992 Inventory of rare plant species in the Little Missouri Grasslands. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. Bismarck, ND.

Heidel, B. 1990. Inventory of rare plant species in Theodore Roosevelt National Park, Billings and McKenzie Counties, ND. North Dakota Parks and Recreation Department. Bismarck, ND.

USDA Forest Service. 2001. *Land and Resource Management Plan*. Dakota Prairie Grasslands. Bismarck, North Dakota.

USDA Forest Service. 2007. *Decision Notice and Finding of No Significant Impact for Black-Tailed Prairie Dog Control*. Dakota Prairie Grasslands. Dickinson, North Dakota.

USDA Forest Service. 2011. Threatened, Endangered, and Sensitive Plant species list by District. Northern Region Office, Missoula Montana.

USDA Natural Resources Conservation Service (NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. United States

Department of Agriculture Handbook 296. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624 .

United States Department of Agriculture. 2016. The PLANTS Database (http://plants.usda.gov). Natural Resource Conservation Service (NRCS). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

United States Fish and Wildlife Service (USFWS). 2014. Environmental Conservation Online System. Species Profile. Western Prairie Fringed Orchid (*Platanthera praeclara*). Available online at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2YD .

USGS. 2016. Northern Prairie Wildlife Research Center (NPWRC) Herbarium. *Townsendia exscapa*; Easter daisy. 2 pages.

United States Geological Survey (USGS). 2016. *Coryphantha missouriensis.* Northern Prairie Wildlife Research Center Herbarium. Available online at www.npwrc.usgs.gov/herbarium/node/32688 .

United States Geological Survey (USGS). 2016. *Townsendia exscapa.* Northern Prairie Wildlife Research Center Herbarium. Available online at www.npwrc.usgs.gov/herbarium/node/32759 .

Stevens, O. A. 1920. The Geographical Distribution of North Dakota Plants. American Journal of Botany. Vol. 7, No. 6 (Jun., 1920), pp. 231-242. Botanical Society of America, Inc. Available online at Http://www.jstor.org/stable/2435172 .

Svingen D. 2006. Black-Tailed Prairie Dog Conservation Assessment and Strategy for the Medora Ranger District. USDA Forest Service. http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/102335_FSPLT3_2571924.pdf .

Svingen D. 2006. Black-Tailed Prairie Dog Conservation Assessment and Strategy for the McKenzie Ranger District. USDA Forest Service. http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/102335_FSPLT3_2571923.pdf .

Heritage Resources

Bocek, B. 1986. Rodent Ecology and Burrowing Behavior: Predicted Effects on Archaeological Site Formation. *American Antiquity, 51*(3), 589-603.

USDA Forest Service. 2001. Land and Resource Management Plan, Dakota Prairie Grasslands, Northern Region.

USDA Forest Service, Northern Region. 2012. Unanticipated Discovery Plan and Discovery of Human Remains Protocols Northern Region, USDA Forest Service.

USDA Forest Service. 1999. Programmatic Agreement Among The United States Department of Agriculture, Forest Service, Northern Region (North Dakota), The Advisory Council on Historic Preservation, and the North Dakota State Historic Preservation Officers Regarding Cultural Resources Management on National Forests in the State of North Dakota.

Human Health

Centers for Disease Control. 2012. Occupational Phosphine Gas Poisoning at Veterinary Hospitals from Dogs that Ingested Zinc Phosphide — Michigan, Iowa, and Washington, 2006–2011. Available on-line at https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6116a3.htm

Furnish, J. R. 2000. Black-tailed Prairie Dog Management. To Regional Foresters, R-1, R-2, R-3.

Thompson, T. L. 2004. Black-tailed Prairie Dog management. Memo To Regional Foresters: R-1, R-2, R-3 to rescind 2000 Policy.

USDA Animal Plant and Health Inspection Service (APHIS). 2017. The Use of Zinc Phosphide in Wildlife Damage Management Draft Zinc Phosphide Risk Assessment. July 2017. 32 pages.

USDI Fish and Wildlife Service. 1993. Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-footed Ferret. Biological Report 13, July 1993. 102 pages.

US Environmental Protection Agency. 1998. Reregistration Eligibility Decision (RED); Zinc Phosphide; EPA 738-R-98-006, July 1998. 226 pages.

Hydrology and Soils

Carlson, D. C., and E. M. White. 1987. Effects of prairie dogs on mound soils. Soil Sci. Soc. Am. J. 51:389-393.

Clark, T. W. 1970. Revegetation patterns on White-tail Prairie dog burrow mounds. Wyoming Range Management Issue; 280 p. 8-12.

Clippinger, N. W. 1989. Habitat Suitability Index Models: Black-tailed Prairie Dog. USDI USFWS. Englewood, Colorado. 32 pages.

Knowles, C. J. 1986. Population recovery of black-tailed prairie dogs following control with zinc phosphide. J. of Range Management. 39(3): 249-250.

Licht, D. S. and K. D. Sanchez (1993) Association of Black-tailed Prairie dog colonies with cattle point attractants in the Northern Great Plains. Great Basin Naturalist 53(4):385-389.

Martinez-Estevez, L., P. Balvanera, J. Pacheco, G. Ceballos. 2013. Prairie Dog Decline Reduces the Supply of Ecosystem Services and Leads to Desertification of Semiarid Grasslands. http://dx.doi.org/10.1371/journal.pone.0075229 .

Munn, L. C. 1993. Effects of Prairie Dogs on Physical and Chemical Properties of Soils. In Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-footed Ferret. U.S. Department of the Interior, Fish and Wildlife Service.

National Park Service. 2006a. Black-footed ferret reintroduction plan, draft environmental assessment. National Park Service, Wind Cave National Park. Hot Springs, South Dakota.

Reading, Richard, and Randy Matchett. 1997. Attributes of Black-tailed Prairie Dog Colonies in Northcentral Montana.

Reid, N. J. 1954. The distribution of the black-tailed prairie dog in the badlands of southwestern North Dakota. M.S. Thesis, Iowa State Univ., Ames. 30 pp.

USDA Forest Service. 2001. Dakota Prairie Grasslands Land Resource Management Plan.

USDA Forest Service. 2005c. Black-tailed prairie dog conservation and management on the Nebraska National Forest and associated units-final environmental impact statement. Rocky Mountain Region Nebraska National Forest. Chadron NE.

USDA Forest Service. 2011. Watershed Condition Framework: A framework for assessing and tracking changes to watershed condition. FS-977.

Range Resources

Agnew, W., D. W. Uresk, and R. M. Hansen. 1986. Flora and fauna associated with prairie dog colonies and adjacent ungrazed mixed-grass prairie in western South Dakota. Journal of Range Management, 135-139.

Archer, S., M. G. Garrett, and J. K. Detling. 1987. Rates of vegetation change associated with prairie dog (*Cynomys ludovicianus*) grazing in North American mixed-grass prairie. Plant Ecology, 72(3), 159-166.

Gray, M. B. 2009. Evaluation of barriers to black-tailed prairie dog (*Cynomys ludovicianus*) colony expansion, Bad River Ranches, South Dakota (Doctoral dissertation, South Dakota State University).

Guenther, D. A., and J. K. Detling. 2003. Observations of cattle use of prairie dog towns. Journal of Range Management, 410-417.

Hansen, R. M., and I. K. Gold. 1977. Blacktail prairie dogs, desert cottontails and cattle trophic relations on shortgrass range. Journal of Range Management, 210-214.

Hendrickson, J. R., P. S. Johnson, M. A. Liebig, K. K. Sedivec, and G. A. Halvorson. 2016. Use of ecological sites in managing wildlife and livestock: An example with prairie dogs. Rangelands, 38(1), 23-28.

Hygnstrom, S. E., and D. R. Virchow. 1994. Prairie dogs. The Handbook: Prevention and Control of Wildlife Damage, 20 pages.

Johnson, W. C., and S. K. Collinge. 2004. Landscape effects on black-tailed prairie dog colonies. Biological Conservation, 115(3), 487-497.

Knowles, C. 1986. Some Relationships of Black-tailed Prairie Dogs to Livestock Grazing. The Great Basin Naturalist, 46(2), 198-203. Retrieved from http://www.jstor.org/stable/41712211

Koford, C. B. 1958. Prairie dogs, whitefaces, and blue grama. Wildlife Monographs, (3), 3-78.

Licht, D. S., and K. D. Sanchez. 1993. Association of black-tailed prairie dog colonies with cattle point attractants in the northern Great Plains. The Great Basin Naturalist, 385-389.

May, Holly L. January 2003. Wildlife Habitat Council. Drafts reviewed by Bruce Baker, USGS Midcontinent Ecological Science Center; Bob Luce, Black-tailed Prairie Dog Conservation Team;

Craig Knowles, FaunaWest Wildlife Consultants. Edited by Charlie Rewa, NRCS Wildlife Habitat Management Institute. Black-tailed Prairie Dog (*Cynomys ludovicianus*) Fish and Wildlife Habitat Management Leaflet, Number 23.

Merriam, C. H. 1902. The prairie dog of the Great Plains. US Department of Agriculture Yearbook 1901, 257-270.

North Dakota Department of Trust Lands. 2017 County Rents and Values North Dakota. Retrieved April 10, 2017, from https://land.nd.gov/docs/surface/ctyrent17.pdf

Sedivec, Kevin K, and Jeffrey L. Printz. 2012. Ecological Sites of North Dakota. R-1556. North Dakota State University, Fargo, ND and USDA Natural Resources Conservation Service. Bismarck, North Dakota. 27 p.

Stoltenberg, M. B., P. S. Johnson, A. J. Smart, and L. Xu. 2004. Effects of prairie dogs and cattle on vegetation disappearance on prairie dog towns in mixed-grass prairie.

Terrall, D. F. 2006. Use of natural vegetative barriers to limit black-tailed prairie dog town expansion in western South Dakota.

USDA Forest Service. 2001. Land and resource management plan for the Dakota Prairie Grasslands. Missoula, MT: USDA Forest Service.

USDA Forest Service. 2007. Final environmental impact statement, noxious weed management project, Dakota Prairie Grasslands. Bismarck, ND: USDA Forest Service, McKenzie Ranger District.

United States Department of Agriculture, Natural Resources Conservation Service (NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. United States Department of Agriculture Handbook 296. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624.

United States Department of Agriculture, Natural Resources Conservation Service. 2012. Ecological Site Descriptions. Available online at https://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD . Accessed 7/13/2016

United States Department of Agriculture, Natural Resources Conservation Service (NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. United States Department of Agriculture Handbook 296. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624.

United States Department of Agriculture, National Agricultural Statistics Service. January 2017. Grazing Fees: Animal Unit Fee, 17 States. Retrieved April 10, 2017, from https://www.nass.usda.gov/Charts_and_Maps/Grazing_Fees/gf_am.php

Uresk, D. W. (1984). Black-tailed prairie dog food habits and forage relationships in western South Dakota. Journal of Range Management, 325-329.

Uresk, D. W. (1987). Relation of black-tailed prairie dogs and control programs to vegetation, livestock, and wildlife.

Uresk, D. W., and D. D. Paulson. (1988). Estimated carrying capacity for cattle competing with prairie dogs and forage utilization in western South Dakota.

Winter, S. L., Cully Jr, J. F., and J. S. Pontius. (2002). Vegetation of prairie dog colonies and non-colonized shortgrass prairie. Journal of Range Management, 502-508.

Wildlife

Abegglen, J. 2018. Personal communication.

Apa, A. D. and D. W. Uresk. 1991. Impacts of Black-tailed Prairie Dog Rodenticides on Non-Target Passerines. Great Basin Naturalist.

Ashton, D. E. and E. M. Dowd. 1991. Fragile Legacy, Endangered, Threatened and Rare Animals of South Dakota. SD Department of Game, Fish, and Parks.

Bechard, M. J., and J. K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*). *In* The Birds of North America, No. 172 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Bishop, Norman G., and J. L. Culbertson. 1976. Decline of Prairie Dog Towns in Southwestern North Dakota. J. of Range Management.

Bodenchuk, M., T. D. Halstead, and M. A. Yeary. 2013. Prairie Dog management and Conservation Benefits. Wildlife Damage Management Conference Proceedings.

Canadian Wildlife service and US Fish and Wildlife Service. 2007. International recovery plan for the whooping crane. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), and US Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp.

Carlson McCain. 2013. Black-tailed Prairie Dog Colony Mapping; Dakota Prairie Grasslands. Final Report.

Carlson McCain. 2015. Black-tailed Prairie Dog Colony Mapping; Dakota Prairie Grasslands. Final Report.

Collins, C. P. and T. D. Reynolds (2005, September 2). Ferruginous Hawk (*Buteo regalis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Collins, A. R., J. P. Workman, and D. W. Uresk. 1984. An Economic Analysis of Black-tailed Prairie Dog Control. Journal of Range Management.

Connelly, J. W., M. W. Gratson, and K. P. Reese. 1998. Sharp-tailed Grouse (*Tympanuchus phasianellus*). *In* The Birds of North America, No. 354 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. 1998 (revised 2002). Effects of management practices on grassland birds: Baird's Sparrow. Northern Prairie Wildlife Research Center, Jamestown, ND. 19 pages.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, P. A. Rabie, and B. R. Euliss. 1999 (revised 2002). Effects of management practices on grassland birds: Long-billed Curlew. Northern Prairie Wildlife Research Center, Jamestown, ND. 19 pages.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. 1998 (revised 2001). Effects of management practices on grassland birds: Sprague's Pipit. Northern Prairie Wildlife Research Center, Jamestown, ND. 15 pages.

Deisch, Michele S., Daniel W. Uresk, Raymond L. Linder. 1990. Effects of prairie dog rodenticides on deer mice in western South Dakota. Great Basin Naturalist. 50(4): 347-353.

Dryer, M. and A. Sandvol. 1993. Recovery Plan for the Pallid Sturgeon. USFWS.

Dugger, B. D., and K. M. Dugger. 2002. Long-billed Curlew (*Numenius americanus*). In The Birds of North America, No. 628 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Fischer, J, and D.B. Lindenmayer. 2000. An assessment of the published results of animal relocations Biological Conservation. 96: 1-11.

Furnish, J. R. 2000. Black-tailed Prairie Dog Management. To Regional Foresters, R-1, R-2, R-3.

Johnson, K. D. 1999. Return of the Wolf? North Dakota Outdoors 61(8):14-16.

Gray, M. B. 2009. Evaluation of Barriers to Black-tailed Prairie Dog Expansion, Bad River Ranches, South Dakota. Masters Thesis. South Dakota State University.

Green, M. T., P. E. Lowther, S. L. Jones, S. K. Davis, and B. C. Dale. 2002. Baird's Sparrow (*Ammodramus bairdii*). *In* The Birds of North America, No. 638 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Hagen, Sandra K, Patrick T. Isakson, and Steve R. Dyke. 2005. North Dakota Comprehensive Wildlife Conservation Strategy. North Dakota Game and Fish Department. Bismarck, ND. 454 pp

Hoogland, J. L. 2006. Conservation of the Black-Tailed prairie Dog. Island Press. P. 350.

Hyngstrom, S. E. and D. R. Virchow. 1994. Prairie Dogs. The Handbook: Prevention and Control of Wildlife Damage.

Knowles, Craig and Pamela Knowles. 1994. A Review of Black-Tailed Prairie Dog Literature in Relation to Rangelands Administered by the Custer National Forest. Prepared for the Custer National Forest, Billings, MT. 71 pages.

Knowles, Craig. 2001. Black-tailed Prairie Dog Population Viability Assessment for North Dakota. Report to the State of North Dakota.

Knowles, Craig. 2003. Prairie Dog Colony Numbers, Area, and Distribution on the Little Missouri and Grand River National Grasslands. Report to the Dakota Prairie Grasslands.

Kochert, M. N., K. Steenhof, C. L. McIntyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). *In* The Birds of North America, No. 684 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Langner, Heiko, Robert Domenech, Vincent Slabe, Sean Sullivan. 2015. Lead and Mercury in Fall Migrant Golden Eagles from Western North America. Archives of Environmental Contamination and Toxicology (2015) 69: 54-61.

Licht, D. S. and S. Fritts. 1994. Gray Wolf (*Canis lupus*) Occurrences in the Dakotas. American Midland Naturalist.

Licht, D.S., and Steven H. Fritz. 1994. Gray Wolf (*Canis lupus*) Occurrences in the Dakotas. American Midland Naturalist 132:74-81.

Littrell, E.E. 1990. Effects of Field Vertebrate Pest Control on Non-Target Wildlife. Proceedings of the Fourth Vertebrae Pest Conference.

McCain and Associates. 2008. Black-tailed Prairie Dog Colony Mapping; Dakota Prairie Grasslands. Final Report.

Milne, S. and R. Sweitzer. 2004. Relative Abundance and Aspects of the Distribution of Black-tailed Prairie Dogs in the Little Missouri National Grassland, North Dakota. Univ. North Dakota, Grand Forks, North Dakota.

Nebraska National Forest. 2008, Black-tailed Prairie Dog Management on the Nebraska National Forest and Associated Units. Final Environmental Impact Statement. USDA FS.

Pauli, J. N. and S. W. Buskirk. 2007. Recreational Shooting of Prairie Dogs: A portal for Lead Entering Wildlife Food Chains. Journal of Wildlife Management.

Rey, M. 2007. Dakota Prairie Grasslands Livestock Grazing Decision Appeal. Memorandum for the Chief of the Forest Service.

Robbins, M. B., and B. C. Dale. 1999. Sprague's Pipit (*Anthus spragueii*). *In* The Birds of North America, No. 439 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA; Retrieved from The Birds of North American Online database:

Rosenfield, R. N., J. Bielefeldt, L. J. Rosenfield, R. K. Murphy, M. A.Bozek, and D. A. Grosheusch. 2002. The Status of Merlin and Cooper's Hawk Populations on the Little Missouri National grassland in Southwestern North Dakota. Final report to DPG.

Royer, R. A. 2002. On the Status of Five sensitive Butterfly Species in McKenzie District Pastures 12, 13, and 14. McKenzie County, North Dakota. Final report to DPG.

Royer, R. A. 2003. Butterflies of North Dakota: An Atlas and Guide. Minot State University. Science Monograph Number Two.

Royer, R. A. 2004. On the Status of Five sensitive Butterfly Species within Medora District Pastures in the vicinity of Whitetail Picnic Area, Square Butte, and Moody Plateau in the Little Missouri National grassland, North Dakota. Final report to DPG.

Schroeder, M. A., J. R. Young, and C. E. Braun. 1999. Sage Grouse (*Centrocercus urophasianus*). *In* The Birds of North America, No. 425 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.; Retrieved from The Birds of North American Online database:

Selby, Gerald. 2016. USDA Forest Service, Dakota Prairie Grassland (Little Missouri National Grassland), McKenzie Ranger District, 2016 Dakota Skipper Survey. Report – Final. 36 pp.

Shaughnessy, M. 2014. Survey and Faunal Inventory of Black-tailed Prairie Dog Colonies in Southwestern North Dakota.

Shier, D. 2006. Effect of Family Support on the Success of Translocated Black-Tailed Prairie Dogs. Conservation Biology Vol 20, No. 6, 1780-1790.

Sidle, John, Mark Ball, Timothy Byer, James Chynoweth, Gary Foli, Robert Hodorff, Glen Moravek, Richard Peterson, Dan Svingen. 2001. Occurrence of Burrowing Owls IN Black-tailed Prairie Dog Colonies on Great Plains National Grasslands. Journal of Raptor Research 35(4):316-321.

Snell G. P. and B. D. Hlavachick. 1980. Control of Prairie Dogs the Easy Way. Rangelands 2(6).

Steenhof, K. 1998. Prairie Falcon (*Falco mexicanus*). *In* The Birds of North America, No. 346 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Svingen, D. 2006. Black-tailed prairie dog conservation assessment and strategy: Medora Ranger District. Dakota Prairie Grasslands, internal report. May 5, 2006. 82 pp.

Svingen, D. 2006. Black-tailed prairie dog conservation assessment and strategy: McKenzie Ranger District. Dakota Prairie Grasslands, internal report. 2006. 97 pp. + appendices.

SWCA Environmental Consultants. 2017. McKenzie Ranger District Dakota Skipper 2017 Survey Report, McKenzie County, North Dakota. October 2017. 14 pp. + Appendices.

Swisher, K. 2007. Email: Adding the bald eagle to FS Sensitive Species List

Tenny, D. P. 2004. Discretionary Review of Appeals decisions for the Land Resource Management Plan Revisions under the Northern Great Plains final Environmental Impact Statement.

Terrall, D. F. 2006. Use of natural Vegetative Barriers to Limit Black-tailed Prairie Dog Town Expansion in Western South Dakota. Master's Thesis. South Dakota State University.

Thompson, T. L. 2004. Black-tailed Prairie Dog management. Memo To Regional Foresters: R-1, R-2, R-3 to rescind 2000 Policy.

Uresk, D. 1987. Relation of Black-Tailed Prairie Dogs and Control Programs to Vegetation, Livestock, and Wildlife. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Rapid City, South Dakota. 12 pages.

Uresk, D. W., R. M. King, A. D. Apa, M. S. Deisch, and R.L. Linder. 1988. Rodenticidal effects of zinc phosphide and strychnine on non-target species. In: Uresk, D. W.; Schenbeck, G. L.; Cefkin, R., tech. coords. Eighth Great Plains wildlife damage control workshop proceedings; 1987 April 28.30; Rapid City, SD. Gen. Tech. Rep. RM -154. Fort Collins, CO: U.S. Department of Agriculture, Rocky Mountain Forest and Range Experiment Station. 57-63.

US Environmental Protection Agency. 1998. Reregistration Eligibility Decision (RED); Zinc Phosphide; EPA 738-R-98-006, July 1998. 226 pages.

USDA Animal and Plant Health Inspection Service. 1994. Animal Damage Control Program FEIS. Washington D.C.

USDA Forest Service. 1999. Endangered, Threatened, and Sensitive Species Occurring on Land Administered by NFS - Northern Region. Dale Bosworth, March, 1999.

USDA Forest Service. 1991. Final Environmental Impact Statement: Oil and Gas Leasing – Northern Little Missouri National Grassland. Billings. MT.

USDA Forest Service. 2000. Terrestrial Assessment: A broad-scale look at species viability on the Northern Great Plains. Final Report. 127 pp.

USDA Forest Service. 2001. Final Environmental Impact Statement and Appendices for the Northern Great Plains Management Plans Revisions. Chadron, NE.

USDA Forest Service. 2001. Land and Resource Management Plan for the Dakota Prairie Grasslands.

USDA Forest Service. 2008. Nebraska National Forest. Final Environmental Impact Statement for Nebraska and South Dakota Black-tailed Prairie Dog Management on the Nebraska National Forest and Associated Units. Page 3-80.

USDA Forest Service. 2011. Weldon: Region One Sensitive Species List.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain Recovery Plan. U.S. Fish and Wildlife Service, Denver, Colorado 119 pp.

U.S. Fish and Wildlife Service. 2000. 12 Month Administrative Finding, Black-tailed Prairie Dog.

U.S. Fish and Wildlife Service. 2002. Fed Register: Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Great Plains Breeding Population of the Piping Plover; Final Rule Vol. 67, No. 176

U.S. Fish and Wildlife Service. 2004. Black-tailed prairie dog removed from candidate species list. News Release. http://news.fw.gov/NewsReleases/R6. Accessed Aug. 12, 2004.

U.S. Fish and Wildlife Service. 2014a. Interior Least Tern: 5 Year review – Summary and Evaluation

U.S. Fish and Wildlife Service. 2014. Revised Recovery Plan for the Pallid Sturgeon.

U.S. Fish and Wildlife Service. 2015. Fed Register: Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of Black-footed Ferrets in Wyoming. Final Rule. Vol 80, No. 210.

U.S. Fish and Wildlife Service. Information for Planning and Conservation (IPaC). Last accessed 01/06/2017. Bismarck, ND.

Vosburgh, T. and L. Irby. 1998. Effects of Recreational Shooting on Prairie Dog Colonies. Journal of Wildlife Management 62(1):363-372.

Warkentin, I. G., N. S. Sodhi, R. H. M. Espie, A. F. Poole, L. W. Oliphant, P. C. James, and I. G. Warkentin (2005). Merlin (*Falco columbarius*). The Birds of North America Online. (A. Poole, Ed.) Ithaca: Cornell Laboratory of Ornithology; Retrieved from The Birds of North American Online.

White, C. M., N. J. Clum, T. J. Cade, and W. G. Hunt. (2002). Peregrine Falcon (*Falco peregrinus*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Laboratory of Ornithology; White, C. M., N. J. Clum, T. J. Cade, and W. G. Hunt. (2002). Peregrine Falcon (*Falco peregrinus*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Laboratory of Ornithology; Retrieved from The Birds of North American Online database.

Witmer, G. W., and K. A. Fagerstone. 2003. The use of Toxicants in black-tailed Prairie Dog Management: An Overview. Proceedings of the 10th Wildlife Damage Management Conference.

Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). *In* The Birds of North America, No. 231 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C; Retrieved from The Birds of North American Online database

Appendices