



# United States Department of the Interior

## Fish and Wildlife Service

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### In Reply Refer To:

File: M19 Beaverhead-Deerlodge National Forest  
06E11000-2021-F-0310 BDNF 2009 Forest Plan, Lynx occupied

April 5, 2021

Cheri A. Ford, Forest Supervisor  
Beaverhead-Deerlodge National Forest  
420 Barrett Street  
Dillon, Montana 59725

Dear Ms. Ford:

The U.S. Fish and Wildlife Service (Service) has reviewed your January 4, 2021 biological assessment on effects to Canada lynx (*Lynx canadensis*) from implementing the 2009 Revised Forest Plan and the Northern Rockies Lynx Management Direction (NRLMD) on the Beaverhead-Deerlodge National Forest (Forest). The Forest made a determination of may affect, likely to adversely affect for Canada lynx. Additional information was received through March 12, 2021.

The attached biological opinion addresses the effects of implementing the 2009 Revised Forest Plan and the NRLMD on Canada lynx and is based on information provided in the biological assessment and additional information received during the consultation process. The biological opinion was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Thank you for your continued assistance in the conservation of endangered, threatened, and proposed species. A complete project file of this consultation is on file at the Service's Montana Field Office. If you have questions or comments related to this consultation, please contact Katrina Dixon at (406) 430-9005.

Sincerely,

Jodi L. Bush  
Office Supervisor

# **ENDANGERED SPECIES ACT SECTION 7 CONSULTATION**

## **BIOLOGICAL OPINION**

**on the**

### **Effects of the Implementing the 2009 Revised Forest Plan, Incorporating the Northern Rockies Lynx Management Direction, on Canada Lynx**

Agency: U.S. Department of Agriculture  
Forest Service  
Beaverhead-Deerlodge National Forest  
Dillon, Montana

Consultation Conducted by: U.S. Fish and Wildlife Service  
Montana Field Office  
Helena, Montana

Date Issued: April 5, 2021

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## I. INTRODUCTION

This biological opinion was prepared by the U.S. Fish and Wildlife Service (Service) and analyzes the effects of implementing the 2009 Revised Forest Plan for the Beaverhead-Deerlodge National Forest (Forest), which incorporates the Northern Rockies Lynx Management Direction (NRLMD), on Canada lynx (*Lynx Canadensis*; also referred to as lynx throughout this opinion). This assessment responds to a change in lynx occupancy status from “unoccupied” to “occupied” on the Forest, which was determined in September 2020. Formal consultation was initiated on January 5, 2021; the date the Service received the biological assessment (U.S. Forest Service 2021a). We continued to receive information regarding this consultation through March 12, 2021.

Section 7(b)(3)(A) of the Endangered Species Act of 1973, as amended (Act) requires that the Secretary of Interior issue biological opinions on federal agency actions that may adversely affect listed species or critical habitat. Biological opinions determine if the action proposed by the action agency is likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Section 7(b)(3)(A) of the Act also requires the Secretary to suggest reasonable and prudent alternatives to any action that is found likely to result in jeopardy or adverse modification of critical habitat, if any has been designated. If the Secretary determines “no jeopardy”, then regulations implementing the Act (50 C.F.R. § 402.14) further require the Director to specify “reasonable and prudent measures” and “terms and conditions” necessary or appropriate to minimize the impact of any incidental take resulting from the action(s). This biological opinion addresses only impacts to federally listed species and does not address the overall environmental acceptability of the proposed action.

This consultation represents the first tier of a tiered consultation framework, with each subsequent project that may affect lynx analyzed within this programmatic biological opinion, as implemented under the 2009 Revised Forest Plan, being the second tier of consultation. When applicable, some second tier consultations would reference back to this programmatic biological opinion to ensure that the effects of specific projects under consultation are commensurate with the effects anticipated in this biological opinion and incidental take statement.

### Consultation History

In 2007, the Northern Region of the Forest Service formally consulted on the effects of the NRLMD on lynx (U.S. Fish and Wildlife Service 2007). The NRLMD was amended to Land and Resource Management Plans, including the Forest. The Service concluded that the continued implementation of Forest Plans that incorporated the NRLMD may result in some adverse effects to lynx, although would not likely jeopardize the continued existence of lynx within the contiguous United States (Ibid.). For unoccupied Forests (as the previous status of the Beaverhead-Deerlodge), forest plans would be amended but the provisions of the NRLMD would not be implemented until these areas become occupied (Ibid.). As a result, the NRLMD was incorporated into the 2009 Revised Forest Plan as Wildlife Standard 7. In 2017, the Service issued an amended incidental take statement for the 2007 biological opinion on the NRLMD for the occupied National Forests based on updated information submitted in March of that year (U.S. Fish and Wildlife Service 2017b).

The Forest revised their Forest Plan in 2009. However, effects to lynx were not consulted on at that time as lynx were not considered as may be present on the Forest. In 2013, the Service determined lynx may be present on the Forest and updated the species list for the Forest to include lynx as a transient within secondary/peripheral lynx habitat. In 2013, the Service assumed the 2007 consultation on the NRLMD to be sufficient to analyze effects to lynx on the Forest as the 2007 consultation included all National Forests in the action area, both occupied and unoccupied.

In 2019, the Forest informally consulted on the effects of implementing the 2009 Revised Forest Plan on Canada lynx as a result of a Montana District Court order. The Service issued a letter of concurrence for a “may affect, not likely to adversely affect Canada lynx” determination (U.S. Fish and Wildlife 2019). The 2019 assessment and concurrence determined effects to lynx from Forest management actions would be minimal and would not significantly affect how transient lynx would use habitat (Ibid.).

In September of 2020, based on recent lynx detections on the Forest, the Western Lynx Biology Team (WLBT) determined that the Forest met the provisions of “occupied” for lynx as defined in the 2006 Amended Conservation Agreement (WLBT 2020). The WLBT recommended that all mapped lynx habitat on the Forest be considered “occupied” (Ibid.). This includes all mountain ranges except for the Tendoy and eastern portion of the Beaverhead mountain ranges south of Highway 324 and south of Interstate 15. As such, to be consistent with Wildlife Habitat Standard 7 and the Record of Decision for the NRLMD, the Forest is now required to apply the NRLMD rather than only consider it. This new information has triggered a reassessment of the *Biological Assessment for Canada Lynx, Effects of the 2009 Revised Forest Plan* (U.S. Forest Service 2021a). The Forest initiated the current consultation via email on November 12, 2020 at which point informal consultation began.

We received a new biological assessment and request for formal consultation regarding the effects to lynx from implementation of the 2009 Revised Forest Plan, which incorporates the NRLMD, on January 5, 2021 (U.S. Forest Service 2021a). Further consultation continued through email, meetings, and phone conversations with Forest staff. The biological assessment, information in our files, as well as additional information and discussions throughout the informal and formal consultation process were used in the preparation of this biological opinion. A complete project file of this consultation is on file at our office.

## **II. DESCRIPTION OF THE PROPOSED ACTION**

The proposed action is the continued implementation of the Forest’s 2009 land management plan (2009 Revised Forest Plan), which incorporates the NRLMD. The 2009 Revised Forest Plan is the land use planning level guidance document for the Forest, providing direction for project and activity decision making. The NRLMD provides direction on occupied National Forest’s for forest management activities that could affect lynx and their habitat in order to further the recovery and conservation of Canada lynx. Habitat on the Forest may support long and/or short term lynx residential use if and when structural conditions provide high horizontal cover suitable for supporting high densities of snowshoe hares (WLBT 2020). The classification of the Forest as secondary/peripheral habitat does not change as part of this action.

The 2009 Revised Forest Plan established direction for all resource management activities on the Forest and identified forest-wide desired future conditions, goals, objectives, and standards for a variety of social values and environmental factors. These values and factors include air quality, American Indian rights and interests, aquatic resources, economics and social values, fire management, heritage resources, infrastructure, lands, livestock grazing, minerals (including oil and gas), recreation and travel management, scenic resources, soils, special designations (e.g., wilderness, national scenic trails, historic sites, scenic byways, and research natural areas), timber management, vegetation, and wildlife habitat.

The 2009 Revised Forest Plan is considered a framework programmatic action. It does not authorize, fund, or carry out an action but provides direction for future actions that may be authorized, funded, or carried out by the Forest. Therefore, any action subsequently authorized, funded, or carried out under the 2009 Revised Forest Plan, will be addressed in subsequent section 7 consultations, as appropriate. Types of activities subsequently authorized, funded, or carried out under the 2009 Revised Forest Plan that may affect lynx are described in the biological assessment prepared for this consultation, which is hereby incorporated by reference (U.S. Forest Service 2021a). The life of the 2009 Revised Forest Plan serves as the temporal bounds for this analysis. Because timeframes for amendment or revision of the Plan is uncertain, this analysis uses fifteen years from the date of consultation (2036) to disclose anticipated effects to Canada lynx and its habitat (Ibid.).

In general, the 2009 Revised Forest Plan (including the NRLMD) contains the following direction:

- Goals, which are general descriptions of desired results to be achieved sometime in the future with no specific date and are used to develop objectives (Forest Plan);
- Objectives form the basis for site-specific project planning by providing concise and measurable statements to achieve goals (NRLMD and Forest Plan);
- Standards, which are mandatory constraints applied to projects to meet or maintain the desired condition or conditions, avoid or mitigate undesirable effects, or meet legal requirements (NRLMD and Forest Plan); and
- Guidelines, which are management actions that should be used to meet objectives although deviations from guidelines is possible (NRLMD).

Incorporated into the 2009 Revised Forest Plan, the NRLMD provides standards and guidelines for vegetation management, over-the-snow winter recreation, developed recreation (primarily ski areas), minerals and energy development, forest roads, and linkage areas in order to avoid or reduce the potential for adverse effects on lynx. A site-specific forest plan amendment is required where standards are not met. It is expected guidelines would be followed as they provide basic design criteria to meet objectives and acknowledge risk factors for individual lynx; however, based on site-specific conditions, there may be a reason not to follow a guideline (U.S Forest Service 2007, U.S. Fish and Wildlife Service 2007). The assumption that guidelines are followed was also an important consideration for the biological assessment and resulting biological opinion for the NRLMD (Ibid.). If guidelines are not followed, rationale (and subsequent consultation, if necessary) should be documented within the project analysis but a Forest Plan amendment is not required.

The Record of Decision (ROD) for the NRLMD requires National Forests with mapped lynx habitat that are occupied by Canada lynx to apply the management direction within the NRLMD (U.S. Forest Service 2007). The ROD also suggests that National Forests containing unoccupied

lynx habitat should consider lynx management direction; however, the direction is not mandatory (Ibid). The Forest previously followed the NRLMD despite its unoccupied status and incorporated the NRLMD into the Forest Plan as Wildlife Standard 7 (U.S. Forest Service 2021a).

The NRLMD includes exemptions from Standards VEG S1, VEG S2, VEG S5, and VEG S6 to allow for fuel treatment projects within the WUI. In addition, exceptions listed in VEG S5 and VEG S6 would allow some activities for other resource benefit such as to protect structures, for research, and/or to promote the conservation of tree species such as whitebark pine and aspen. Previous consultation on the NRLMD listed allowable exemptions and exceptions for each Forest under the vegetation standards. Due to updates in mapped lynx habitat on the Forest, the Forest is including an increase in exception acres under Vegetation Standards 5 and 6 (VEG S5 and VEG S6) and a reduction in WUI exemption acres under VEG S5 and VEG S6 as part of this proposed action (see Table 1 below). Appendix D of the biological assessment documents rationale for these requests (U.S. Forest Service 2021a).

**Table 1. Exception and exemption acres requested for the Forest (U.S. Forest Service 2021a).**

Exception or Exemption Category	Requested exception or exemption acres
VEG S5 and VEG S6 exemptions for fuel treatment projects within the WUI – 6% of mapped lynx habitat within an administrative boundary <sup>1</sup>	88,910
VEG S5 exceptions for other resource benefit including precommercial thinning that reduces snowshoe hare habitat from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat	6,200
VEG S6 exceptions for other resource benefit including vegetation management projects that reduce snowshoe hare habitat in multi-store mature or late successional forests	390

<sup>1</sup>Exemption acres for WUI were assigned by grouping VEG S5 and VEG S6 categories, thus repeated numbers indicate a total across a category, not a sum (e.g., 88,910 acres is the total for both VEG S5 and VEG S6 WUI categories).

## STATUS OF THE SPECIES

On January 11, 2018, the U.S. Fish and Wildlife Service (Service) announced the completion of a Species Status Assessment (SSA) for the Canada lynx contiguous United States Distinct Population Segment (DPS). The SSA provides a scientific review of the Canada lynx and compiles the best available scientific information regarding the historical, current, and potential future conditions for lynx in the lower 48 states. It is an extensive review of the best available scientific information and almost 20 years of working in partnership with state, federal, tribal, industry and other land managers on the conservation of this species. Refer to the SSA for information on the status of Canada lynx, including but not limited to species description, life history, and status and distribution (U.S. Fish and Wildlife Service 2017a). The SSA evaluates the DPS's viability considering climate change, forest management and related regulations,

wildland fire management, and other potential sources of habitat loss and fragmentation. The SSA incorporates information from the Canada lynx expert elicitation workshop (Lynx SSA Team 2016), which addresses the current and future status of, potential threats to, and likely viability of resident lynx populations throughout the DPS. The Canada lynx conservation assessment and strategy (LCAS), 3<sup>rd</sup> edition (Interagency Lynx Biology Team 2013), is another source of best available scientific information that provides a thorough review of lynx and lynx management. In addition, the following listing documents also include information on the status of Canada lynx: the final rule listing lynx as a threatened species (65 FR 16052); the remanded determination in our clarifications of findings of our final rule (68 FR 40076); and the 2014 revised final rule designating lynx critical habitat (79 FR 54782). Finally, the 2007 biological opinion (U.S. Fish and Wildlife Service 2007) and associated 2017 amended incidental take statement (U.S. Fish and Wildlife Service 2017b) on the effects of the Northern Rockies Lynx Management Direction (NRLMD) on the Distinct Population Segment of Canada lynx (lynx) in the contiguous United States also includes detailed discussions on the status of lynx. These documents include the best available science regarding the status and distribution of lynx and are incorporated by reference.

### **Analysis of the Species Likely to be Affected**

The biological assessment determined that implementing the 2009 Revised Forest Plan would likely adversely affect individual Canada lynx. Therefore, formal consultation with the Service was initiated and this biological opinion has been written to determine whether or not activities associated with this action are likely to jeopardize the continued existence of Canada lynx. Lynx are listed as threatened under the Act. No designated lynx critical habitat occurs within the action area. Therefore, none will be affected.

### **ENVIRONMENTAL BASELINE**

Under the provisions of section 7(a)(2), when considering the “effects of the action” on listed species, the Service is required to consider the environmental baseline. Regulations implementing the Act (50 C.F.R. § 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in progress. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline.

The action area for the analysis of effects of implementing the 2009 Revised Forest Plan includes the approximately 3.39 million acres of Forest land within the administrative boundaries of the Forest, with the exception of the Elkhorn Landscape. Refer to the biological assessment, which is incorporated by reference, for a more detailed description on acres by county and a vicinity map (U.S. Forest Service 2021a). The Helena-Lewis and Clark National Forest jointly manages activities on the Elkhorns Landscape with the Beaverhead-Deerlodge National Forest. The

effects to lynx in the Elkhorn Landscape are analyzed within the consultation on the 2021 Forest Plan for the Helena-Lewis and Clark National Forest (U.S. Fish and Wildlife Service 2021). As such, effects within the Elkhorns Landscape will not be analyzed further in this biological opinion.

The Forest is further divided into 78 lynx analysis units (LAUs). LAUs will be used to analyze effects to lynx at the site-specific, project scale. LAUs are typically large enough to represent the average home range size of a female lynx and contain adequate habitat and landscapes to support lynx year-round, providing a sufficient landscape to assess the effects of site-specific projects on individual lynx but not so large as to dilute the potential effects of an action. In order to fully address effects of implementing the 2009 Revised Forest Plan, the Forest provided lynx habitat information. The information provided consists of a broad scale estimate of lynx habitat across the Forest intended to provide an overall picture of the current status of lynx habitat.

### **Status of the Species within the Action Area**

The Forest (i.e. action area) is considered secondary/Peripheral lynx habitat. Secondary Canada lynx habitat or a ‘secondary area’ and peripheral areas are defined in the Canada Lynx Recovery Outline (U.S. Fish and Wildlife Service 2005) and revised LCAS (Interagency Lynx Biology Team 2013). Both secondary and peripheral areas lack evidence of lynx reproduction. These areas have sporadic historical records of lynx, generally corresponding to cyclic population highs in Canada and might contribute to lynx persistence by supporting successful dispersal or exploratory movements. Habitat in these areas appears to be inherently patchier and less productive and likely only support lynx intermittently. The LCAS indicates that the focus of management in secondary areas is on “providing a mosaic of forest structure to support snowshoe hare prey resources for individual lynx that infrequently may move through or reside temporarily in the area” and that landscape connectivity should be maintained to allow for movement and dispersal. The LCAS further speculates that “the amount and quality of habitat required to support an independent adult or subadult disperser is less than is necessary to support reproduction and sustain a local population” (Ibid.).

Lynx have been documented in portions of the action area, some as transients and other recent occurrences may be resident but that has yet to be determined. While it is unknown as to the status of the recent occurrences (resident, disperser, transient), these verified occurrences do meet the definition of occupied. While lynx may be currently using portions of the action area, much of the action area is outside of the current known lynx distribution. Appendix B of the biological assessment (U.S. Forest Service 2021a) consists of a summary report of Canada lynx detections on the Forest. This report documents surveys and passive detections, locations, and years where detections occurred. In short, formal surveys on the Forest have occurred since 1999 using the National Lynx Detection Protocol (McKelvey et al. 1999), methods outlined in Halfpenny et al. (1995) and Squires et al. (2004a), or modifications of these protocols. Detections prior to 2018 are considered “unverified” as neither eDNA nor photographs exist. However, detections were recorded in the Anaconda, Flint Creek, and Pioneer Mountain ranges, with verified sightings occurring within the Anaconda range in 2018-2020 (U.S. Forest Service 2021a). In 2020, a male lynx was detected at Storm Lake in the Anaconda Range (the same male from previous detections) and a new female lynx was genetically confirmed in the Beaverhead Range (Ibid.).

The Forest updated their lynx habitat model and associated LAUs in 2020 based on improved vegetation and snow-depth datasets (see Appendix C of the biological assessment (U.S. Forest Service 2021a). This process resulted in 1,625,806 acres of modeled lynx habitat within 78 LAUs. Ninety-one percent (1,481,830 acres) of the modeled lynx habitat is within lands managed by the Forest with the other nine percent (143,975 acres) residing on land under other ownership (including inholdings).

Overall, the action area contains some degree of lynx habitat. Lynx habitat can be further categorized into specific types of habitat. Snowshoe hare habitat (lynx foraging habitat) is generally comprised of young forests in a stand initiation stage and older, multi-story forests. Early stand initiation stands are very young regenerating stands characterized by a gradient of no trees to a dense growth of young trees that provide abundant forage and hiding cover for snowshoe hare during the summer. In the winter, these stands are covered by snow and unavailable to snowshoe hares. As they age, these stands often transition into stand initiation phase, where trees have grown tall enough to protrude above the snow and provide forage and dense hiding cover for snowshoe hares in the winter and summer. Multi-story forests with dense horizontal cover (a dense understory of young trees and shrubs) provide both lynx and snowshoe hares with abundant forage and hiding cover during summer and winter. Summer habitat is not believed to limit snowshoe hare or lynx populations. However, winter habitat is believed to be a factor limiting snowshoe hare and lynx populations (Squires et al 2010, Interagency Lynx Biology Team 2013).

Stands of trees with a relatively closed overstory canopy and limited understory vegetation are characterized as stem exclusion or other habitat. These phases are forest successional stages that are part of the boreal forest landscape. Little light reaches the forest floor so understory vegetation (including trees) are shaded and grow slowly; shrubs become dormant and new trees are precluded by a lack of sunlight and/or moisture. Thus, these structural stages do not currently provide snowshoe hare habitat due to the lack of horizontal cover. In some stem exclusion stands, a limited amount of snowshoe hare forage may be available during the summer as a greater variety and quantity of deciduous forage and cover is available to hares due to the lack of snow cover and the growth of seasonal vegetation. This summer understory habitat is covered by snow during the winter and is unavailable to hares or lynx.

The Forest classified the updated lynx habitat polygons into vegetation structural stages to further evaluate snowshoe hare habitat across the Forest with the understanding that structural stages are dynamic. The acres displayed in Table 2 are broad scale estimates intended to provide an overall picture of the current status of lynx in the action area and do not represent the level of precision necessary for project level analyses. These are the estimated current conditions. However, the habitat is expected to change over time as a result of succession and forest growth as well as changes related to disturbances such as fire, harvest, pre-commercial thinning, and insect infestations.

The Forest provides some, although scattered, available year-round habitat for lynx and prey species. Under the current habitat model, 41 percent of lynx habitat on the Forest is considered snowshoe hare habitat or foraging habitat (multi-story, stand initiation, early stand initiation), 28 percent of which is estimated to provide snowshoe hare habitat year-round (multi-story (26 percent) and stand initiation (2 percent)). The remainder of lynx habitat (59 percent) managed by the Forest consists of “non-foraging” areas for lynx (stem exclusion and other). In these

categories, live tree crowns are generally too high to provide winter forage for hares, and contains limited dead and down material, although could provide small, isolated patches of hare habitat in the summer. The majority of lynx habitat on the Forest would not likely support foraging opportunities for lynx until altered by management activities or natural disturbances. Appendix E of the biological assessment (U.S. Forest Service 2021a) displays the current area and estimated percentages of structural stages within the updated lynx habitat model for each LAU.

**Table 2. Lynx habitat within structural stages across all LAUs (U.S. Forest Service 2021a).**

Structural Stage	Total Lynx Habitat (acres/percent)	Lynx Habitat in LAUs under Forest Management (acres/percent)	Lynx Habitat in LAUs under other Ownership (acres/percent) <sup>1</sup>
Early Stand Initiation	203,815 acres 13%	187,919 acres 92%	15,896 acres 8%
Stand Initiation	36,935 acres 2%	36,023 acres 98%	911 acres 2%
Multi-story	420,873 acres 26%	382,777 acres 91%	38,097 acres 9%
Stem Exclusion	266,856 acres 16%	254,317 acres 95%	12,539 acres 5%
Other	697,325 acres 43%	620,793 acres 89%	76,532 acres 11%
<b>TOTAL</b>	<b>1,625,805 acres 100%</b>	<b>1,481,830 acres 91%</b>	<b>143,975 acres 9%</b>

<sup>1</sup>This total includes inholdings within the BDNF and lands outside of the external Forest boundary managed by private, state, or other federal entities.

Lynx den sites are generally found in mature spruce-fir forests among downed logs or root wads in areas with abundant coarse woody debris and dense understories with high horizontal cover. Downed trees provide cover for den sites and kittens and are often associated with dense woody stem growth. The structural components of lynx den sites are common features in both managed and unmanaged stands. Because lynx have large home ranges and low den site fidelity, most lynx populations are not limited by a lack of immediate den sites (Squires et al. 2008). At the time of this writing, no known lynx dens occur on the Forest, although it is possible dens may be detected in the future.

Fire and other natural disturbance processes, both currently and historically, played an important role in maintaining a mosaic of forest successional stages that provides habitat for both snowshoe hare and lynx (Ruediger et al. 2000, Interagency Lynx Biology Team 2013). Fire regimes are variable, having both frequent (35-100 years) stand-replacing or mixed severity fires and infrequent (200+ years) stand replacement fires. Within the past 70 years, land management agencies began effective fire suppression with the advent of aircraft support. Fire exclusion has the potential to alter vegetation mosaics and species composition that may reduce the quality and/or quantity of lynx habitat. In western forests, fire exclusion in areas with a history of infrequent fire return intervals has probably not had much impact. But areas where the fire

regime was historically frequent or mixed has generally shifted to more intense fire regimes, resulting in forest compositions and structures that are more homogeneous, composed of more shade-tolerant species with more canopy layers, and are more susceptible to severe fires, insects, and diseases.

## **Factors Affecting Species Environment within the Action Area**

This section identifies and describes key areas of Forest management that affect the environment for lynx. These factors include vegetation management (including fire management), livestock management, human use, and linkage areas. Existing management related to these factors is summarized below. The biological assessment provides additional information on the existing condition related to the following factors and is incorporated by reference (U.S. Forest Service 2021a).

On March 23, 2007, the Service issued a biological opinion and incidental take statement on the effects of the NRLMD on the Distinct Population Segment of Canada lynx (lynx) in the contiguous United States (U.S. Fish and Wildlife Service 2007), in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The Service determined that the NRLMD was not likely to jeopardize lynx (Ibid.).

The NRLMD provides direction primarily for lynx habitat management to avoid or reduce the potential for projects proposed under Forest Plans to adversely affect lynx. The direction accomplishes this through a suite of standards and guidelines that reduce or avoid adverse effects on lynx from land management activities primarily by reducing or avoiding adverse effects on lynx habitat that provides snowshoe hare habitat (lynx foraging habitat). Thus, the NRLMD promotes and conserves the habitat conditions needed to produce snowshoe hare (lynx primary prey) densities that are adequate to sustain lynx within their home ranges, and thus sustain lynx populations and promote recovery of Canada lynx. Some exemptions and exceptions to avoiding adverse effects to lynx may occur within the wildland urban interface (WUI) to protect human safety and property or for activities for other resource benefits and are described below.

The NRLMD standards and guidelines are applicable and required for all management actions in occupied, mapped lynx habitat within the action area. The NRLMD standards and guidelines are to be considered in habitat identified as unoccupied but are not required. Until September 2020, the Forest has been considered to be unoccupied. Thus, the Forest considered the NRLMD but was not required to follow the NRLMD. Although the Forest was determined to be unoccupied at the time, the NRMLD was incorporated into the 2009 Revised Forest Plan as Wildlife Standard 7 and is the current lynx direction in that plan. Since the Forest was recently determined to be occupied by lynx, the NRLMD now applies to the occupied, mapped lynx habitat within LAUs on the Forest. In addition, the Forest is now using a newer habitat model to determine lynx habitat. The effects of such will be considered in the effects section below.

## **Vegetation Management**

Vegetation management includes activities that change the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire or timber harvest. Harvesting has been used within the action area as a tool to achieve a variety of resource objectives, including but not limited to lowering fuels and fire risk; establishing desired tree

species; improving tree growth; reducing impacts of insects or disease; contributing wood products to the local economy; improving wildlife habitat; and salvaging the economic value of trees killed by fire or other factors.

Five vegetation management categories may influence lynx and lynx habitat on the Forest. These include timber harvest, aspen restoration, conifer encroachment removal, special forest products, and other actions associated with vegetation management (e.g., temporary road construction). The Forest divides vegetation management areas into three categories: those that are suitable for timber production (the management of tree stands for industrial or consumer use), areas unsuitable for production, but where harvest is allowed for another reason (managing fire risk, aspen restoration, salvage, etc.), and areas that are unsuitable for production and no harvest is allowed (fragile soils, wetlands, areas withdrawn by an act of Congress, etc.). Overall, 65 percent of lynx habitat on the Forest is eligible for harvest. Of that amount, only 14 percent is considered suitable for timber production (224,836 acres) with 51 percent unsuitable for production but harvest is allowed for other objectives (828,758 acres).

In addition, the Forest Plan contains some components for treating specific tree species (e.g., Douglas-fir, lodgepole pine, aspen). Of suitable timber in lynx habitat, a majority is in the mixed conifer, “other” stage (28 percent) followed by lodgepole pine in the stem exclusion stage (18 percent). Similarly, where timber isn’t suitable for production, but harvest is still permitted, the majority of stands in modeled lynx habitat are mixed conifer in the “other” stage (32 percent) with mature, multi-storied mixed conifer stands in less, but similar frequencies (25 percent). Where harvest is not suitable or permitted, a majority of lynx habitat consists of mature, multi-storied mixed conifer stands (29 percent) and mixed conifer stands in the “other” category (23 percent). Lynx habitat outside of the Forest boundary maintains a similar pattern with “other” mixed conifer making up a majority (29 percent) followed closely by mature multi-storied mixed conifer stands (28 percent).

Timber management includes pre-commercial thinning, regeneration harvest, salvage harvest, commercial thin harvest, and conifer removal for research purposes and whitebark pine restoration. Since 2009, the Forest treated or signed decisions for approximately 60,574 acres of timber management projects, including those that utilized pre-commercial thinning. Of these, the Forest analyzed 28,649 acres as lynx habitat under the former habitat model. Harvest treatments occurred on 27,612 and 1,563 acres of non-foraging and foraging habitat, respectively. The Forest has commercially treated approximately 1,400 to 1,800 acres per year. Of these, 70 to 90 percent (980 to 1,710 acres) are considered suitable for timber production with 10 to 30 percent (140 to 540 acres) classified as not suitable, but harvest is permitted for other objectives.

Aspen restoration activities focus on felling conifer and/or using prescribed fire to increase the aspen component and improve aspen health by removing competing conifers. Since 2009, the Forest restored approximately 8,669 acres of aspen, which included 2,211 acres of lynx habitat under the former habitat model.

The Forest Plan contains a vegetation objective to reduce conifer encroachment in riparian areas, shrublands, and grasslands on 74,000 acres over the life of the plan. Douglas-fir or western junipers are typically the species removed to increase or maintain shrub-steppe and grassland habitats. Since 2009, the Forest reduced conifers on approximately 4,563 acres, of which 19

acres were considered lynx foraging habitat (snowshoe hare habitat) under the former habitat model.

The Forest also produces miscellaneous non-commercial forest products such as post and poles, Christmas trees, and firewood. These actions may be concentrated in one area if products are readily available, but activities are generally dispersed temporally. Since 2009, 33 acres of non-foraging (early stand initiation, stem exclusion, and other structural stages) lynx habitat has been treated for post and pole use.

Historically, fire suppression policies resulted in fire exclusion from most ecosystems on the Forest, which resulted in overstocked and similar-aged stands. The 2009 Revised Forest Plan addresses this condition by emphasizing hazardous fuels treatments in wildland-urban interface (WUI) areas and locations where existing stocking conditions exceed historical conditions.

Wildland fire use is also an available option to reduce hazardous fuels. Prescribed fire plans are developed on the Forest to best use fire management as a vegetation management tool.

Fire management activities that may affect lynx and lynx habitat on the Forest include fuels treatments (vegetation management in specific areas and planned ignitions, including prescribed fire) and wildland fire (unplanned ignitions). Recent treatments focus on hazardous fuels reduction, timber harvest and subsequent burning, prescribed fires for wildlife habitat improvements (such as in aspen), and mechanical fuel removal (U.S. Forest Service 2021a).

Generally, the focus for hazardous fuels treatments is within the WUI and within vegetation management projects to reduce fuel loading. Per the 2009 Revised Forest Plan, the WUI is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland fire or vegetative fuel. The NRMND defines WUI as the area adjacent to an at-risk community as identified in the Community Wildlife Protection Plan (CWPP). In the absence of a CWPP plan, the definition within the Healthy Forest Restoration Act (HFRA) applies. In this case, the WUI is an area 0.5 miles from the boundary of an at-risk community, or within 1.5 miles of the boundary of an at-risk community if the terrain is steep, or if there is a nearby road or ridgeline that could be incorporated into a fuel break, the land is in condition class three, or the area contains an emergency exit route needed for safe evacuations (condensed from HFRA § 101). The analysis on the 2009 Revised Forest Plan uses WUI boundaries as defined by CWPP plans although “WUI areas” generally refer to places where human development meets or intermingles with undeveloped wildland or fuels. Although the Forest participates in CWPP partnerships, WUI boundaries are identified and updated by counties with CWPPs and are not approved by the Forest Service.

Approximately 573,071 acres (39 percent) of lynx habitat on the Forest falls within the WUI boundary. Of this habitat, a majority is within the “other” structural stage (18 percent) followed by mature, multi-storied (9 percent). Since 2009, only 567 acres of lynx habitat were treated as parts of hazardous fuels projects (excluding projects with multiple objectives, such as aspen and conifer removal) under the previous habitat model. Of these, 49 acres of stand initiation and 317 acres of mature, multi-storied lynx habitat were included as part of the WUI exception acres for VEG S5 and VEG S6, respectively. The tracked exception acres consisted of less than one percent of the lynx habitat on the Forest under the previous lynx habitat model.

The 2009 Revised Forest Plan allows for modified containment strategies (e.g., monitor, confine, and point or zone protection) to manage unplanned ignitions for resource benefits. Some

considerations used for deciding to use a modified containment strategy include: fire fighter safety, values at risk (includes wildlife habitat and silvicultural concerns), functional and objective concerns, cost, seasonal severity or timing, current and projected fire weather forecasts, natural and artificial barriers to fire spread, fire history information, and the overall projected fire size, growth intervals, and spread potential. Fire regimes on the Forest are variable, with both frequent stand-replacing or mixed severity fires (0-100 plus years) and infrequent stand replacement (over 200 years) fires occurring. Since 1980, stand-regenerating wildfires burned a total of 151,886 acres on the Forest. Of this total, 126,271 acres fell within lynx habitat.

The Forest Plan recognizes the need for noxious weed control and associated activities, such as off-road motorized travel to treat infestations. In 2002, the Forest signed the decision for the Beaverhead-Deerlodge National Forest Noxious Weed Control Program that contained actions related to noxious weed control, including aerial and ground application of chemical herbicides, mechanical treatments (hand pulling), biological control methods, surveys for new infestations, and post-treatment monitoring. Annual direct control methods are permitted on 15,000-16,000 acres (including up to 9,000 acres with aerial application and up to 7,000 acres in ground treatments). Generally, between 1,000-2,000 acres of annual treatments are considered beneficial for wildlife as improvements to forage, biodiversity, or habitat restoration.

#### *Ongoing Vegetation Management Projects*

The Forest has several ongoing projects related to vegetation management. These projects were previously consulted on when the Forest was considered to be unoccupied by lynx. Therefore, we will reassess the ongoing effects of those portions of the projects that have yet to be implemented to determine if there are any additional effects not previously considered. The projects or portions of projects already completed are represented in the baseline conditions provided in the paragraphs above. Eight of these projects are located outside of lynx habitat and will have no effects to lynx. They will not be discussed further. Nine ongoing vegetation management projects occur within mapped lynx habitat, including Little Hogback Meyers Fire Salvage, Roadside 9 Hazardous Fuels Reduction, Red Rocks Vegetation Management, Fleecer, Birch-Willow-Lost Aspen, French Creek Aspen, Aspen Release 2011, East Deerlodge Valley, and Trapper Creek Vegetation Management (U.S. Forest Service 2021b). The effects of the ongoing actions that are not fully implemented will be considered in our effects section below.

#### **Livestock Management**

The Forest has approximately 240 allotments on 3,209,705 acres of Forest lands, including some that are not currently active. Of those, 915,197 acres or 56 percent of lynx habitat occur within grazing allotments. Livestock grazing generally occurs through the middle of June through September. As part of livestock management, range permittees maintain existing structures to properly manage permitted cattle, sheep, horses, and domestic bison. Examples of structures include water developments (e.g., spring developments, troughs, and buried pipelines), fences, shipping corrals, buildings for designated cow camps, and ponds. Activities may include off road travel with motorized equipment, tree removal (via chainsaw) for fallen trees on structures or pose substantial threats to a structure, sediment excavation from water sources, repair of broken pipe, and trough leveling. Existing range structures are generally replaced every 30 to 40 years due to deterioration from age (J. Bowey, pers. comm. in U.S. Forest Service 2021a). The number of utilized and functioning structures changes annually due to livestock location and

number, accessibility, and environmental or human-caused degradation of infrastructure. Effects from installation of new infrastructure are analyzed at the project-level and are not considered in this analysis.

## **Human Use**

### *Recreation Management*

For purposes of this analysis, developed recreation includes but is not limited to facilities and improvements managed by the Forest Service, including campgrounds, day use areas, marinas, rental cabins, roads and trails, and trailheads with facilities. Recreation on the Forest encompasses a large array of activities, from wilderness camping and hiking to alpine skiing, motorized trail riding, fishing, and more. Recreation is managed by making site-specific decisions about types of opportunity, facilities, or access. These are typically categorized by season, development level, and access type. Refer to tables 12 and 13 in the biological assessment (U.S. Forest Service 2021a) for available activities during summer and winter, respectively.

Special uses include both commercial and non-commercial recreation opportunities such as outfitting and guiding (e.g., guided hunts, guided climbing, educational tours, wilderness skill courses), non-commercial group use (e.g., family reunions, off-highway vehicle club gatherings), competitive events (one-time and reoccurring), organization camps, recreation residences, and downhill and Nordic ski areas. The Forest currently authorizes 14 different types of recreation special uses. A variety of permit types authorizes diverse activities and range in term from a few days up to 40 years. Some authorizations provide for reissuance upon expiration (e.g., organization camps, recreation residences, outfitting and guiding, resorts, and winter resorts) while others require a new application from the proponent upon expiration (e.g., recreation events, temporary outfitting and guiding, non-commercial group use).

Approximately 250 developed recreation sites occur on the Forest. Of the developed sites, approximately 159 are within LAUs. An average of 2 sites occur within an LAU with the maximum of 20 sites in an LAU. Winter motorized over-the-snow is described separately below. Winter non-motorized activities occurs within 33 percent (535,447 acres) of lynx habitat on the Forest, with use including cross country skiing, ski touring, winter hiking, dog sledding, trapping, hunting, and fishing, among others. In general, non-motorized activities are permitted in all winter recreation allocations on the Forest.

Permits issued for winter resorts (i.e., downhill ski areas) provide for reissuance upon expiration and are authorized for up to 40-year terms. Two downhill ski areas, Maverick Mountain and Discovery Ski Area, established in the 1960s and 1970s respectively, operate on the Forest. Discovery Ski Area operates on approximately 2,200 acres with over 80 percent on national forest system lands near the town of Philipsburg, Montana. Its operating season runs from late November to early April, depending on snow conditions. Discovery Ski Area contains eight lifts, twenty miles of cross-country trails, and supports a capacity of 2,150 daily visitors. During the 2018-2019 season (used as a proxy for current data as 2020 was a shortened season due to COVID-19 restrictions), a daily average of 616 people visited Discovery Ski Area with a peak day of 1,975 skiers. Maverick Mountain, located on the south end of the Pioneer Mountains, operates on 525 acres on national forest system lands. Maverick Mountain manages one ski lift,

supports a daily capacity of 333 visitors, and shares a similar operating season with Discovery Ski Area. During the 2018-2019 season (used as a proxy for current data as 2020 was a shortened season), an average of 151 people visited Maverick Mountain with a peak day of 329 skiers.

Up until recently, these ski areas focused their efforts and infrastructure on winter recreation opportunities. With the passage of the Ski Area Recreational Opportunity Enhancement Act of 2011, however, the Secretary of Agriculture may now permit other seasonal or year-round recreational activities in addition to skiing and other snow sports under ski area permits. The Act specifically identified what those non-snow sport activities could include, such as: zip lines, mountain bike terrain parks and trails, frisbee golf courses, and ropes courses. Discovery Ski Area currently has some summer operations, but those activities are not conducted on Forest lands. Both ski areas expressed interest in future summer operations on Forest lands.

One Nordic (cross-country) ski area, Homestake Lodge, also operates under a special use permit. Homestake Lodge represents the only permitted Nordic ski area on the Forest. Homestake Lodge is located on a private inholding but operates a system of groomed Nordic ski trails on adjacent Forest lands. Its permit authorizes night skiing, snow making, and recreation events and includes an operating season of November through April, depending on snow conditions. In addition, the Forest, in cooperation with partners and volunteers, manages several Nordic ski areas including Chief Joseph, Echo Lake, Elkhorn, Moulton, Birch Creek, and Thompson Park. These areas consist of designated (marked but not groomed) and groomed system trails, warming huts, outhouses, and parking areas. Thompson Park's system of winter trails also includes opportunities for fat tire bike users on some of its groomed routes. Although use in Nordic areas is considered non-motorized, grooming is accomplished via motorized means (snowcats, groomers pulled by snowmobiles, etc.). Approximately 350 miles are groomed on the Forest, authorized for grooming, or designated for Nordic, fat tire bike, or multi-use (e.g. snowmobiles, snowshoes, skiing, etc.).

Non-developed or dispersed recreation captures a variety of other activities that occur outside of developed sites, such as dispersed camping, boating (both motorized and non-motorized), horseback riding and pack stock use, hiking and backpacking, climbing, rock hounding, crystal mining, prospecting, geocaching, winter touring (snowshoeing, cross-country skiing, backcountry skiing, or dog sledding), hunting and fishing, drone use, photography, summer and winter off-highway vehicle use, driving for pleasure, and similar activities. Sometimes a combination of developed recreation (camping at a developed site) is paired with non-developed recreation activities (pack stock use) and vice versa (camping at a dispersed site but using system trails for a day hike).

While no infrastructure is associated with dispersed recreation, dispersed campsite inventories initiated on the Forest in 2012 catalogued over 1,500 campsites, with the largest number on the Madison Ranger District and the smallest number on the Dillon Ranger District. This inventory has potentially increased over time. Because these are not considered developed sites, and, given the unregulated nature of dispersed campsites, the Forest does not regularly update inventory or data. Information on capacity, frequency of use, and user groups associated with each site is not available. Beyond dispersed camping, it is not possible to quantify dispersed recreation.

Recreation on the Forest is also influenced by numerous area designations that define or limit types of activities occurring within them, including designated wilderness and recommended wilderness. The Forest manages two Wilderness areas; the Lee Metcalf Wilderness, which is divided into four separate units in the Madison Range on the east side of the Forest and the Anaconda Pintler Wilderness, which is in the Pintler Range on the west side of the Forest. Several areas of recommended Wilderness are dispersed throughout the Forest that range in size from approximately 1,900 to 89,000 acres. Lynx habitat in Wilderness and recommended Wilderness consist of 16 percent (241,716 acres) of the available lynx habitat on the Forest as detailed in Table 16 of the biological assessment (U.S. Forest Service 2021a).

### *Roads*

The Forest is categorized into motorized and non-motorized allocations, which describe access types within areas. Approximately 6,454 and 1,561 miles of motorized and non-motorized routes occur on the Forest, respectively, that are open for use during all or part of the year, including approximately 958 and 1,276 miles of motorized and non-motorized trails (these numbers exclude over-the-snow vehicles, which are described separately). Motorized allocations consist of 44 percent of lynx habitat in the summer and 58 percent in winter. New permanent road construction is rare, although temporary roads may be used for project implementation. Since 2009, the Forest has not constructed any new permanent roads. Approximately 0.7 mile and 27.45 miles of system roads and non-system (unauthorized) routes, respectively, have been decommissioned in the last 11 years.

Road maintenance and repair activities consist of grading, blading, ditch cleaning, culvert cleaning or replacement, graveling, among others. These occur throughout the summer as weather permits and are prioritized by Forest need, so the location or maintenance activities vary by year. Other road-related activities include but are not limited to temporary road construction and reclamation, vegetation brushing, off-road travel (including access via helicopter), and maintenance of administrative sites and infrastructure outside of special uses (e.g., signs, buildings).

Low-standard temporary roads are usually constructed for timber harvest and are typically reclaimed after harvest activities. Temporary roads are approximately ten feet wide and vary in length, but generally do not exceed 1 mile. Since 2009, 26.5 miles of temporary road have been constructed and another 21.4 miles of temporary roads are part of existing decisions but are not yet built. This trend of proposing, building, and decommissioning temporary roads will likely continue.

Vegetation brushing along roadsides is part of timber management, road maintenance, and special uses projects. Brushing can occur with mechanized or hand-tools, depending on the extent of the need for travel or human safety.

Off-road motorized travel can occur as part of a variety of activities, such as range infrastructure maintenance, special forest products, noxious weed removal, thinning treatments, winter surveys, and others. This activity is not generally permitted by public users, with the exception of permit holders, hired contractors, or researchers, but is associated with specific project objectives that are subject to analysis.

### *Snowmobile Use*

Winter motorized travel on the Forests is permitted on 58 percent (949,425 acres) of lynx habitat. A variety of motorized activities can occur within winter recreation allocations, including snowmobiles, ATV and motorcycle riding, four-wheeling, and scenic driving, among others. These activities may be limited to specific areas (e.g., outside of designated and recommended wilderness) and restricted by season of use. In addition to recreation over-snow use, over-snow travel is permitted as part of lands and recreation special uses for infrastructure and administrative maintenance.

### *Energy and Mineral Development*

Most Federal lands are open to locatable mineral mining under the Mining Law of 1872, as amended. These minerals are valuable deposits subject to exploration and development under this law. More than half of the Forest lands are considered favorable for one or more polymetallic locatable or precious mineral deposits although demand is tied to economics and international markets. Most current mining activities on the Forest include small-scale exploration, consisting of short-term (one year or less) mineral, energy, or geophysical investigations and their incidental support activities typically occurring on small claims or exploratory drilling. These mining and associated activities are submitted to the Forest under a mining Plan of Operations or Notice of Intent with the exception of some small-scale mining exploration activities (locatable minerals, e.g. gold panning, metal detecting, rock hounding, etc.). These activities occur but are not possible to quantify due to the lack of permitting requirements under the law.

There are currently 379 active mines within LAUs on the Forest, with a range between 0 and 32 in any given LAU. Forty-two LAUs contain one mine or less while 4 LAUs contain at least 20 mines. Due to a lack of footprint data, it is not possible to determine how many acres of active mines intersect with lynx habitat, although it is assumed most of them are small (less than ten acres).

The Forest does not have any active large-scale mines, although there are four existing footprints under the Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA; also known as superfund). Mines under remediation include Beal Mountain and Basin Creek, both on the Butte Ranger District. The two legacy superfund sites where cleanup is ongoing include Black Pine Mine on the Pintler Ranger District and Elkhorn Mine on the Dillon Ranger District.

Mining operations may require cross-country travel by vehicles and equipment, construction of less than one mile of low standard road, or use and minor repair of existing roads. Footprints for these projects vary from a few square feet to hundreds of acres, depending on the mining project scale. Small minerals exploration projects are short-term, with exploration and reclamation typically occurring within the same year. Large scale operations may occur over a long duration and reclamation requirements may also vary depending on site-specific analysis. Generally, mining operations do not occur in winter but can occur depending on the project and outcome of project-specific analysis. Large-scale mining may require year-round use and potentially snowplowing.

The Forest Service also permits removal of saleable or common variety minerals, including sand, gravel, stone, and clay, including decorative rock or landscaping stones. Due to changes in demand, the yearly number of permits and volumes for saleable material is challenging to predict. However, the Forest is the primary user of borrow pit material for construction and maintenance of forest roads and facilities. This material occurs in varying locations in differing amounts on-Forest.

Oil and gas exploration consist of drilling one or more holes through directional drilling on a single or multiple pad configuration. Because semi-trucks transport drill rigs to perspective sites, road reconstruction and road building may accompany oil and gas proposals. The Forest requires obliteration of pad sites after exploration, use, or leasing is completed. Currently, no ongoing oil and gas projects occur on the Forest.

In general, the potential for occurrence of oil and gas on the Forest is considered low or very low, although some areas have a moderate potential. Areas of interest for oil and gas leasing include a portion of the Lima-Tendoy Mountains and the Big Hole Valley. In 1995, a Reasonably Foreseeable Development (RFD) scenario predicted there would be low-level of drilling on the Forest and assumed there could be up to ten wildcat and four development wells drilled over a fifteen-year period. The RFD was reviewed in 2012 and still deemed sufficient. The majority of the wells would be dry holes (lasting only one year) unless the wells were productive. The RFD predicted foreseeable wells would require pads averaging 6.7 acres per well and changes to roads, although sites would be reclaimed after drilling.

### **Linkage Areas and Habitat Connectivity**

The Northern Rockies Lynx Planning Area map identifies potential linkage areas within and among the Northern Rockies planning area, including linkage areas on the Forest. The Forest contains approximately 22 linkage areas within or partially within the Forest boundary (see Figure 2 in the biological assessment). Lynx use of linkage areas is unknown, but it is assumed lynx may be dispersing into the Forest as verified detections are increasing and lynx are residing within the Forest boundary (U.S. Forest Service 2021a). Interstates 15 and 90, and Montana State Highways 1, 2, 38, 43, 278, and 287 are major public travel corridors that separate portions of the Forest, which may represent potential fragmentation at a broad scale. In addition, some mountain ranges on the Forest, such the Pioneers, Lima-Tendoys, and Tobacco Roots, are naturally separated by wide valleys, which could represent an impediment to lynx movement.

### **Climate Change**

The lynx is a cold-climate and snow-adapted habitat and prey specialist and there is general agreement that the species is vulnerable to climate warming, especially at the southern periphery of its range (U.S. Fish and Wildlife Service 2017a). Continued climate warming is expected to diminish boreal forest habitats and snow conditions at the southern edge of the range that are, in some places, already patchily-distributed and perhaps only marginally capable of supporting resident lynx (Ibid.). Although projected climate warming is expected to reduce the future distribution and number of lynx, substantial uncertainty about the timing, rate, magnitude, and extent of potential impacts that may affect lynx remains. Despite these uncertainties, specific effects of climate warming on lynx, snowshoe hares, and their habitats in the range of lynx can be reasonably anticipated include: (1) northward and upslope contraction of boreal spruce-fir

forest types, (2) northward and upslope contraction of snow conditions believed to favor lynx over other terrestrial hare predators, (3) reduced hare populations and densities, and (4) changes in the frequency, pattern, and intensity of forest disturbance events. Other potential effects of projected warming include: (5) reduced gene flow between Canadian and DPS lynx populations, (6) changes in the periodicity and amplitude of northern hare cycles, which could result in reduced lynx immigration to the DPS from Canada, and (7) increased or novel diseases and parasites. Each of these factors is discussed in detail in the Species Status Assessment for the Canada lynx (*Ibid.*). Despite concerns about the long-term persistence of lynx, experts projected that resident lynx populations are very likely to persist in all 5 geographic units that currently support them in the near-term (year 2025) and mid-term (2050), and uncertainty was greater regarding predictions beyond that time frame (*Ibid.*).

## **EFFECTS OF THE ACTION**

Under section 7(a)(2) of the Act, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 C.F.R. § 402.02). The effects discussed below are the result of implementing the 2009 Revised Forest Plan.

The 2009 Revised Forest Plan retains the objectives, goals, standards, guidelines, and monitoring requirements from the NRLMD in its entirety. The direction in the NRLMD will be applied to projects occurring in occupied lynx habitat. Our effects analysis is based on what the 2009 Revised Forest Plan (and NRLMD) permits or prohibits, as well as a quantitative assessment of the effects to lynx from actions that have the most potential to negatively affect lynx. The analysis includes an estimate of acres that may be treated in snowshoe hare habitat under future actions that may affect lynx using the exemptions from and/or exceptions to the NRLMD that are incorporated into the 2009 Revised Forest Plan. While we analyze what the 2009 Revised Forest Plan would allow, many activities that are allowed are never fully carried out for a variety of reasons, such as funding limitations and environmental or policy considerations. However, the following sections analyze the potential effects to lynx from full implementation of activities that may occur under the direction in the 2009 Revised Forest Plan. Since the action is implementation of the 2009 Revised Forest Plan and the baseline section displays the current conditions on-the-ground (also as implemented under the 2009 Revised Forest Plan), those conditions will not be repeated in the effects section and can be referenced above.

### **Vegetation Management**

Vegetation management includes activities that change the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire, timber harvest, aspen restoration, and conifer encroachment removal. For the purposes of this analysis, vegetation management does not include removing vegetation for permanent developments like mineral operations, ski runs, roads, and the like, and does not apply to fire suppression or wildland fire use. These actions are analyzed separately below. Vegetation management can have beneficial, neutral, insignificant, or adverse effects on lynx and snowshoe hare habitat. The vegetation

management standards and guidelines in the NRLMD work together to promote the vegetation management objectives. Collectively, application of the vegetation management standards and guidelines avoids most adverse effects to lynx.

As described in the biological assessment, 65 percent (1,053,594 acres) of lynx habitat within the forest boundary is eligible for timber harvest, with 14 percent (224,836 acres) considered suitable for timber production and 51 percent (828,758 acres) not suitable, but harvest is permitted for other objectives (U.S. Forest Service 2021a). The NRLMD components will be applied to timber harvest activities in occupied lynx habitat.

Over the next 15 years, the Forest will likely treat stands considered suitable for production and those that are unsuitable, although harvest is permitted, equally with an emphasis on suitable timber (meaning slightly more suitable timber may be harvested than unsuitable). Due to the increased pace and scale of timber harvest, the Forest could commercially treat a total of 60,000 acres by 2036. This would represent approximately 6 percent of the lynx habitat within areas where harvest is permitted and 4 percent of the total lynx habitat within the Forest boundary. This assumes all harvest would occur within lynx habitat and represents the maximum area that could be affected, although it is unlikely harvest would affect lynx habitat to this extent.

On the Forest, an average vegetation management project is approximately 80,000 acres, of which regeneration or intermediate harvest could be proposed on up to 10,000 acres treated over several years. Up to 10 to 15 percent of an analysis area could be treated (U.S. Forest Service 2021a), not all of which may contain lynx habitat. After completion, project areas would rarely be re-treated during the life of the 2009 Revised Forest Plan and would be eligible for pre-commercial thinning in approximately thirty years. When complete, these large vegetation projects contain a mosaic of treated and untreated areas that could support the life history needs of lynx. A variety of connected spatial arrangements, compositions, and recovery times following vegetation treatments is important to support lynx use (Holbrook et al. 2017), reproduction (Kosterman et al. 2018), and the growth of lynx habitat over time.

The NRLMD has identified four objectives related to vegetation management that would improve the quality of lynx habitat by improving conditions for prey: (1) manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx (Objective VEG O1); (2) provide a mosaic of habitat conditions through time that support dense horizontal cover and high densities of snowshoe hare, and provide winter snowshoe hare habitat in both the stand initiation structural stage and in the mature, multi-story conifer vegetation (Objective VEG O2); (3) conduct fire use activities to restore ecological processes and maintain or improve lynx habitat (Objective VEG O3); and (4) focus vegetation management in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover (Objective VEG O4).

Forest management activities can result in a conversion of vegetation types. The Objectives VEG O1, O2, O3, and O4 reduce the potential for adverse effects to lynx from such conversions of habitat. Attainment of the vegetation management objectives through projects designed using vegetation management standards and guidelines would support lynx survival and conservation. With the application of these measures, we do not anticipate that the proposed action would adversely affect lynx via habitat conversions within the action area.

The primary factors driving lynx populations, behavior, and distribution are the abundance and distribution of snowshoe hares. Vegetation management activities can result in a setback of vegetation succession to an early stand initiation structural stage, which may be used by snowshoe hares during the summer but is snow-covered and thus unavailable to hares during the winter. Eventually these stands may regenerate into a stand initiation structural stage, providing high stem densities and horizontal structure extending above the snowpack during winter, and become high quality snowshoe hare habitat (Squires et al. 2010, Kosterman 2014, Holbrook et al. 2017, Holbrook et al. 2018). Older forested stands also provide high quality habitat when they provide multi-story mature or late successional forests that provide high horizontal cover for both lynx and snowshoe hare (Murray et al. 1994, Squires et al. 2010, Kosterman 2014, Holbrook et al. 2017, Kosterman et al. 2018, Holbrook et al. 2019). In Montana, these stands within a study area were used consistently by both lynx and snowshoe hare during the winter (Squires et al. 2010). These stands, along with stands in a stand initiation structural stage (including early stand initiation), provide the landscape mosaic of habitat conditions needed for snowshoe hare production and lynx foraging habitat (Kosterman 2014, Kosterman et al. 2018).

Standards VEG S1, VEG S2, VEG S5, and VEG S6 would lead to attainment of the vegetation objectives described above by limiting the disturbance to snowshoe hare habitat and ensuring that enough habitat within each LAU would be available to provide lynx with sufficient snowshoe hare prey and lynx foraging habitat conditions. Under Standard VEG S1, if more than 30 percent of lynx habitat in an LAU is in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects. Additionally, Standard VEG S2 requires that timber management projects shall not regenerate (i.e., change to stand initiation structural stage) more than 15 percent of lynx habitat within an LAU in a 10-year period. While some treatment may result in regenerating lynx habitat to stand initiation structural stages, these young stands typically contain high stem densities and horizontal cover, which provides summer habitat and eventually grows into essential winter foraging habitat for snowshoe hares. Vegetation Standards VEG S1 and VEG S2 promote a balance, a mosaic, of young and older stands within each LAU.

Thinning stand initiation structural stages can reduce horizontal cover that is critical to maintain the snowshoe hare prey base. High horizontal cover is important to hares and lynx. Reducing dense horizontal structure through silvicultural thinning would likely reduce an area's carrying capacity for snowshoe hares (Ruggiero et al. 2000; Griffin and Mills 2004, 2007; Homyack et al 2007; Interagency Lynx Biology Team 2013). By deferring precommercial thinning activities that reduce snowshoe hare habitat until the stand no longer provides winter snowshoe hare habitat, Standard VEG S5 ensures that stand initiation snowshoe hare and lynx habitat is not degraded. This standard protects and maintains the high stem densities that provide high quality snowshoe hare forage during summer and/or winter seasons and maintains the inherent capacity of the habitat to produce snowshoe hares.

As previously mentioned, lynx preferentially forage in spruce-fir forests with high horizontal cover, abundant hares, deep snow, and large-diameter trees during the winter. The high horizontal cover found in multi-story conifer stands is a major factor affecting winter hare densities. During winter, snowshoe hares were consistently found in multi-story forest stands (Squires et al. 2010). These older, multi-story stands provide forage, hiding cover, and likely thermal cover for both snowshoe hares and lynx. Standard VEG S6 precludes vegetation

management projects that reduce snowshoe hare habitat in multi-story mature or late successional forests. This standard protects mature, multi-story habitat that provides a dense understory and high quality snowshoe hare habitat and also maintains the inherent capacity of the habitat to produce snowshoe hares.

Guideline VEG G1 directs that vegetation management projects should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority for treatment should be given to stem-exclusion, closed-canopy structural stage stands to enhance habitat conditions for lynx or their prey. In other words, emphasis should be on those stands that do not currently provide snowshoe hare habitat, which in turn may improve snowshoe hare habitat over the long-term. Adverse effects to lynx are not anticipated as a result of treatments in a stem exclusion or similar stage. Such stands are characterized as having a closed canopy with limited understory, lacking dense cover preferred by hares and are generally not progressing towards year-round snowshoe hare habitat. Treatment of stem exclusion stands would open up the stands and encourage an increase in horizontal cover (understory regeneration). Thus, treatments in these stands do not reduce existing snowshoe hare habitat and have the potential to improve the habitat for snowshoe hares by either creating openings to allow understory growth or stimulating the regeneration of dense stands of young trees used by hares.

Guideline VEG G5 is focused on habitat for alternate prey species, primarily red squirrel and directs that such habitat should be provided in each LAU. Red squirrel habitat typically contains snags and downed wood, generally associated with mature or older forests, which may be used by lynx for denning if the required components are provided and it is in close proximity to snowshoe hare habitat. Guideline VEG G11 directs that denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees (“jack-strawed” piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future. Denning habitat elements are generally found distributed across the action area. Vegetation management projects may result in localized effects to denning habitat by removing existing coarse woody material and/or affecting its recruitment. This can affect the quality and quantity of available lynx denning habitat. In most cases, denning habitat is not known to be limited within lynx habitat in the action area, and the vegetation management objectives, standards, and guidelines either directly or indirectly promote the development and retention of adequate amounts of denning habitat. In the cases where denning habitat may be affected by vegetation management, Guidelines VEG G5 and VEG G11 would minimize the potential for effects by requiring that such habitat be provided and well distributed. Therefore, vegetation management is unlikely to result in adverse effects to denning habitat.

Vegetation management activities proposed under the 2009 Revised Forest Plan may result in some level of disturbance effects to lynx if lynx are in the project area during project implementation. Such disturbance is expected to be insignificant as areas free of disturbance are typically available if a lynx needed to adjust movement patterns during implementation. While vegetation treatments could alter structural stages of potential lynx habitat, they are not likely to result in the construction of any barriers known to inhibit lynx movements. The vegetation management standards and guidelines work together to promote the vegetation management objectives. In addition to the vegetation management standards, standard ALL S1 also applies to vegetation management projects in that vegetation management projects must maintain habitat

connectivity in an LAU and/or linkage area. Having this standard apply to each LAU (which represents a lynx home range) would maintain connectivity among LAUs and throughout the larger landscape, thus minimizing the potential impacts to habitat connectivity and linkage areas from vegetation management. Site-specific projects are not likely to impede lynx movement or reduce habitat connectivity. We do not expect habitat connectivity or linkage to be adversely affected from vegetation management projects conducted under the 2009 Revised Forest Plan. Treatments proposed under the 2009 Revised Forest Plan are not expected to preclude any future use of an area by a resident lynx (if present) or a transient lynx should they pass through the area.

Based on the best available information, the Service concludes that the NRLMD, which is incorporated into the 2009 Revised Forest Plan, would conserve the most important components of lynx habitat: a mosaic of early and mature multi-story forests with high levels of horizontal cover and structure. These components ensure habitat that maintains its inherent capability to support both snowshoe hare prey base and adequate lynx foraging habitat (snowshoe hare habitat) and denning habitat. These standards and guidelines are applicable to all vegetation management actions on at least 94 percent of occupied lynx habitat within the action area. As analyzed below, areas within the WUI as well as some resource benefit activities (totaling approximately 6 percent of occupied lynx habitat) may occur under the exemptions from and exceptions to the standards. However, Guideline VEG G10 would apply and requires consideration of the standards in designing fuel treatment projects. Where these standards and guidelines are applied to vegetation management projects, we anticipate few projects, if any, would have adverse effects on lynx.

### **Exemptions from and exceptions to vegetation management standards for fuel treatment projects in the WUI and activities for other resource benefit**

The NRLMD includes exemptions from Standards VEG S1, VEG S2, VEG S5, and VEG S6 to allow for fuel treatment projects within the WUI. In addition, exceptions listed in VEG S5 and VEG S6 would allow some activities for other resource benefit such as to protect structures, for research, and/or to promote the conservation of tree species such as whitebark pine and aspen. These exemptions and exceptions would allow actions that may have adverse effects on lynx in occupied lynx habitat by reducing the horizontal structure of natural forest succession phases, and/or affecting the mosaics of the forested landscape in localized areas (i.e. affecting snowshoe hare habitat). For the same reasons as explained above, we do not expect adverse effects to other lynx habitat features, such as denning habitat or stem exclusion habitat, from vegetation management using the exemptions and/or exceptions.

Under implementation of the 2009 Revised Forest Plan, the Forest has estimated that a maximum of 88,910 acres of snowshoe hare habitat within occupied lynx habitat could be treated using the exemptions for fuel treatment projects within the WUI and an additional 6,590 acres of snowshoe hare habitat within occupied lynx habitat could be treated using the exceptions for activities for other resource benefit (U.S. Forest Service 2021a). Thus, the total maximum amount of snowshoe hare habitat within occupied lynx habitat that could be treated under the 2009 Revised Forest Plan and NRLMD standards through 2036 is 95,500 acres or about 6 percent of occupied lynx habitat in the action area. These acres are not likely all providing snowshoe hare habitat but could potentially provide it at some point over the life of the 2009 Revised Forest Plan and could potentially result in adverse effects to lynx via impacts to snowshoe hare habitat. Thus, although unlikely, the worst case scenario of treating

approximately 95,500 acres of snowshoe hare habitat over the life of the 2009 Revised Forest Plan is considered for the purpose of this effects analysis (Table 3).

**Table 3. Acres of snowshoe hare habitat that may be treated in occupied lynx habitat under the 2009 Revised Forest Plan using the exemptions from and/or exceptions to the NRLMD vegetation standards (adapted from U.S. Forest Service 2021a).**

	Occupied Lynx Habitat (acres)
<b>Total Acres of Lynx Habitat on Forest Lands</b>	1,481,830
<b>Acres of Lynx Habitat in WUI</b>	573,071
<b>Maximum Acres of Snowshoe Hare Habitat Treated Using Exemptions for Fuel Treatment Projects in the WUI</b>	88,910
<b>Maximum Acres of Snowshoe Hare Habitat Treated Using Exceptions for Activities for Other Resource Benefits</b>	6,590
<b>Total Acres of Snowshoe Hare Habitat Treated Using Exemptions and/or Exceptions</b>	95,500
<b>Percent of Occupied Lynx Habitat where exemptions and exceptions could be used</b>	6 %
<b>Percent of Lynx Habitat in WUI where exemptions could be used</b>	16%

The biological assessment describes the amount of lynx habitat treated since 2009 as part of hazardous fuels projects was 567 acres (as measured under the previous habitat model). Of this amount, 366 acres were considered snowshoe hare habitat (49 acres of stand initiation and 317 acres of multi-story). The Forest expects to increase fuels treatments up to 10,000 acres per year and it is possible 35,100 acres of lynx habitat could be treated as part of the wildland-urban interface by 2036 (U.S. Forest Service 2021a). It is unlikely the entirety of treatment would focus within stand initiation or mature, multi-storied habitats as the distribution of lynx habitat on the Forest is not wholly concentrated within the WUI. The extent and distribution of these projects would likely limit the magnitude of impacts on lynx, as 61 percent of lynx habitat administered by the Forest occurs outside of the WUI boundary. Based on the amount of snowshoe hare habitat treated over the past 12 years as well as the estimated amount that could be treated in the WUI by 2036, it is highly unlikely that all 95,500 acres of snowshoe hare habitat would be treated under the exemptions from and exceptions to the vegetation management standards would actually be treated. However, because future activities are unknown, the maximum amount of snowshoe hare habitat that could be treated over the life of the 2009 Revised Forest Plan, and in turn may adversely affect lynx, is analyzed here.

It is important to note that mapped lynx habitat consists of a mosaic of various forest structural stages and not all mapped lynx habitat is providing snowshoe hare habitat at the same time. However, at a programmatic scale such as the 2009 Revised Forest Plan, it is not possible to accurately map snowshoe hare habitat at every point in time for the life of the plan. Forest structural stages change over time and what is providing snowshoe hare habitat today may not be at some point in the future and what is not providing snowshoe hare habitat today may provide such in the future. In addition, treated areas have the potential to provide snowshoe hare habitat

again, over time. Thus, we are analyzing the maximum amount that could be treated to be sure we do not overlook any potential effect. While the amounts provided in Table 3 display the maximum amounts of snowshoe hare habitat that could be treated, it is not expected that this maximum would be reached all at the same time and will likely never be reached.

The 2009 Revised Forest Plan is a framework programmatic action and does not authorize, fund, or carry out an action but provides direction for future actions that may be authorized, funded, or carried out by the Forest. Any action subsequently authorized, funded, or carried out under the 2009 Revised Forest Plan will be addressed in subsequent section 7 consultations, as appropriate. Future site-specific consultations on projects will provide both the amount of snowshoe hare habitat within the action area LAU(s) and the amount of snowshoe hare habitat affected by the action, thus, analyzing the specific amount of snowshoe hare habitat that will be affected. Based on the history of vegetation management on the Forest, we expect that such an analysis will likely reveal that much of the treatments will not occur within snowshoe hare habitat.

For perspective on the total amount of snowshoe hare habitat that may be treated with projects that may adversely affect lynx, the average home range size of a lynx was reported as 53,375 acres for males and 21,745 acres for females (Squires et al. 2004b). Acres treated are expected to be distributed throughout the Forest, over 78 LAUs, and are not likely to be excessively concentrated within any one LAU or group of adjacent LAUs. Thus, adverse effects, while possible, are likely to affect only portions of any individual lynx home range. Further, many of the WUI areas occur at lower elevation (i.e. near the lower edge of lynx habitat) and are less likely to be the highest quality lynx habitat, which may reduce the potential overall effect of the exemptions and exceptions. Under the NRLMD, vegetation management that adversely affects lynx would not be allowed in the majority of lynx habitat.

The exemption from Standard VEG S1 for fuel treatment projects within the WUI would affect the forest mosaic by allowing more than 30 percent of lynx habitat within an LAU to be in a stand initiation structural stage not yet providing winter snowshoe hare habitat. The exemption for fuel treatment projects in the WUI in Standard VEG S2 would allow more than 15 percent of an LAU to be regenerated to a stand initiation structural stage within a decade. Where exemptions from Standards VEG S1 or VEG S2 are used within the WUI, adverse effects to lynx may occur by temporarily reducing the quality and productivity of lynx foraging habitat until treated stands begin to provide snowshoe hare habitat.

The exemption from Standard VEG S5 for fuel treatment projects in the WUI would reduce natural levels of horizontal structure in early successional phases by allowing precommercial thinning during the stand initiation structural stage, prior to when the stand no longer provides winter snowshoe hare habitat. It is well documented that such thinning in hare habitat results in a corresponding decrease in the abundance of snowshoe hares (see Ruggiero et al. 2000). Thinning dense stands of young trees may adversely affect lynx by reducing the capacity of these stands to produce snowshoe hares. Similarly, the exemption for fuel treatment projects in the WUI from Standard VEG S6 would likewise allow management actions that would reduce the horizontal cover and thus the quantity and quality of snowshoe hare habitat in older, multi-story stands, potentially resulting in adverse effects to lynx. Research has documented the importance of these multi-story stands as foraging habitat for lynx and for hares (Squires et al. 2010), especially during the winter months. Thus, exemptions used under either Standard VEG S5 or VEG S6 may reduce the capacity of an LAU to support lynx reproduction and/or occupancy.

Overall, use of the exemptions from Standards VEG S5 and VEG S6 are limited to areas within the WUI and the anticipated adverse effects would occur on no more than 88,910 acres of snowshoe hare habitat within occupied lynx habitat. The site-specific impact would depend upon the size of the treated area as well as the inherent capacity of the site to produce snowshoe hares and may not always result in adverse effects. In addition, in most cases, these reductions are temporary as vegetation typically grows back and would likely provide snowshoe hare habitat again, over time.

While exemptions are in place for fuel treatment projects in the WUI, Guideline VEG G10 directs that such projects should be designed considering Standards VEG S1, VEG S2, VEG S5, and VEG S6 to promote conservation. Thus, while some adverse effects to lynx may occur by use of the exemptions, consideration of the standards in designing fuel treatment projects may result in minimizing such effects.

The NRLMD also allows exceptions to Standards VEG S5 and VEG S6 for activities that would protect structures from wildfire, for research, to conserve other vegetation communities such as whitebark pine and aspen, and/or for incidental removal during salvage harvest. Such treatment could reduce the quantity and/or quality of snowshoe hare habitat by reducing the horizontal cover, potentially affecting the ability of an LAU to support lynx reproduction and/or occupancy. The maximum amount of treatment in occupied lynx habitat estimated by Forest to occur under the exceptions to the Standards VEG S5 and VEG S6 is 6,590 acres. However, the site-specific impact would depend upon the size of the treated area as well as the inherent capacity of the site to produce snowshoe hares and may not always result in adverse effects.

In summary, vegetation management under the NRLMD would promote forested landscape patterns that maintain or restore lynx habitat. This positive effect would occur for the most part throughout lynx habitat in the action area with the exception of treatments within snowshoe hare habitat associated with vegetation management exemptions and/or exceptions. Actions implemented under the exemptions from and/or exceptions to the vegetation standards of the NRLMD may adversely affect lynx. Adverse effects to lynx as a result of these exemptions and exceptions may occur specifically due to the treatment of snowshoe hare habitat. This includes treating up to 95,500 acres (about 6 percent) of snowshoe hare habitat in occupied lynx habitat through 2036. Snowshoe hare habitat could be diminished primarily through the removal of the dense horizontal structure of natural forest succession phases and/or altering the mosaics of the forested landscape in localized areas.

Although the exemptions from and exceptions to vegetation management standards may result in some level of adverse effects to lynx, vegetation objectives, standards, and guidelines overall would contribute to creating and maintaining landscape patterns that sustain snowshoe hare and lynx populations. No permanent loss (such as paving or building construction) of habitat or conversion of the boreal forest would occur as a result of vegetation management under the NRLMD. Some vegetative treatments may degrade the function of lynx habitat by delaying the development of high density snowshoe hare habitat through succession; however, they do not remove such habitat from the site. The habitat would retain its inherent capacity to regenerate and while such actions may change the successional stage of a stand, they do not affect that stand's potential to produce snowshoe hare habitat in the future. Although vegetation management under the NRLMD may adversely affect individual lynx, any affected LAUs are

expected to remain capable of producing adequate densities of snowshoe hares to support continual lynx presence.

### *Ongoing Vegetation Management Projects*

As described in the baseline section, nine ongoing vegetation management projects occur within mapped lynx habitat, including:

- Little Hogback Meyers Fire Salvage,
- Roadside 9 Hazardous Fuels Reduction,
- Red Rocks Vegetation Management,
- Fleecer,
- Birch-Willow-Lost Aspen,
- French Creek Aspen,
- Aspen Release 2011,
- East Deerlodge Valley, and
- Trapper Creek Vegetation Management.

Although all the ongoing vegetation management projects have been through lynx consultation as an unoccupied forest, this document reanalyzes the effects of these ongoing vegetation activities to lynx using the 2020 lynx habitat model, as occupied habitat. Thus, this analysis considers any additional effects that may be associated with these ongoing projects when considering the change in the status of lynx from unoccupied to occupied, as resident lynx use habitat differently than transient lynx. Only the uncompleted portions of these projects that may affect lynx were analyzed. Appendix A of the additional information received related to these ongoing projects, which is incorporated by reference, describes all ongoing vegetation projects individually and discusses acres and types of lynx habitat affected by project (U.S. Forest Service 2021b). All ongoing projects met the NRLMD standards with the 2001 lynx habitat model on an unoccupied forest at the time they were signed. After reanalyzing the effects with the 2020 lynx habitat model on an occupied forest, all ongoing vegetation management projects still meet the NRLMD (Ibid.).

Ongoing and approved projects removing timber from lynx habitat on the Forest include Little Hogback/Meyers Fire Salvage, Roadside 9 Hazardous Fuels Reduction, Red Rocks, and Fleecer Vegetation Management Projects. These ongoing timber projects could affect approximately 2,887 acres of lynx habitat. Of that, no acres of snowshoe hare habitat (lynx foraging habitat) would be treated. When complete, the project areas will contain a mosaic of treated and untreated areas that could support the life history needs of lynx or prey species (including alternative prey). In the long-term, these treatments would likely increase foraging opportunities for lynx by creating additional hare habitat in stagnant stands and providing a mosaic of successional stages that would benefit lynx (Holbrook et al., 2019; Holbrook, 2017; Squires et al., 2010). Timber harvest, especially salvage, can reduce the amount of down wood and snags which is important to lynx denning habitat. However, Forest Plan wildlife standards are designed to retain snags, downed wood, and provide for live tree retention for future snags. Due to multiple beetle infestations on the BDNF, denning habitat is not limited as large, contiguous stands of beetle-killed trees are present across the landscape. These stands would provide a jackstraw-type structure of downed trees and snags once the trees fall which would provide both denning habitat for lynx and cover for snowshoe hares forest-wide. The effects related to these ongoing actions would be insignificant.

Three aspen projects under the 2016 Aspen CE (Birch-Willow-Lost, French Creek Aspen, and Aspen Release 2011) and four additional aspen projects within other vegetation management projects (East Deerlodge Valley, Fleecer, Red Rocks, and Trapper) are also ongoing within lynx habitat. These ongoing projects combined could affect approximately 1,387 acres of lynx habitat. Of that, 85 acres occur in stand initiation snowshoe hare habitat (lynx foraging habitat), which are scattered across the Forest. All multi-story mature hare habitat that provides snowshoe hare habitat was dropped from aspen units. While aspen treatments may temporarily remove conifer foraging habitat for snowshoe hares in stand initiation stands they would provide excellent habitat for alternate prey species over the long-term. Many ongoing aspen treatments are in stem exclusion stands, which do not currently provide snowshoe hare habitat. The amount of snowshoe hare habitat treated in these projects is less than 0.02 percent of available snowshoe hare habitat across the Forest. Thus, these projects are not expected to have significant effects to lynx as the amount affected is very minimal and spread out across the Forest.

One ongoing conifer encroachment project (Trapper Creek) and one additional conifer encroachment project proposed within larger vegetation management projects (Red Rocks) are also ongoing. Most encroachment removal occurs within shrub-steppe habitat, outside or on the edge of lynx habitat. These ongoing projects could affect approximately 151 acres of lynx habitat, none of which provides snowshoe hare habitat. While conifer encroachment projects are generally not in lynx habitat, improving shrub and grasslands can improve habitat for alternate prey and can be useful for connectivity during long distance movements between larger patches of habitat. As these projects are very small and scattered across the forest, they will not affect a lynx's ability to move through the landscape. The effects related to these ongoing actions would be insignificant.

In sum, these nine ongoing vegetation management projects that have the potential to affect lynx habitat may affect a total of 4,425 acres of lynx habitat. Of that, 85 acres of stand initiation snowshoe hare habitat may be affected. No multi-story hare habitat would be affected. The amount of snowshoe hare habitat treated in these projects will be scattered across the Forest and would affect less than 0.02 percent of available snowshoe hare habitat on the Forest. Thus, these projects are not expected to have significant effects to lynx as the amount affected is very minimal when compared to the remaining snowshoe hare habitat. Treatment of the remaining acres of lynx habitat would occur in habitat with a limited understory for snowshoe hares such as stem exclusion stands. Treatment of these acres would not result in significant impacts to lynx and has the potential to improve snowshoe hare habitat in the long-term.

These nine ongoing projects are in compliance with the applicable standards and guidelines of the Northern Rockies Lynx Management Direction (NRLMD). The 85 acres of snowshoe hare habitat affected will be treated under exception 4 of VEG S5, which allows stand initiation foraging habitat to be removed for aspen improvement. No other exceptions and no WUI exemptions are used for any of the ongoing projects. In our analysis above, we included a total amount of snowshoe hare habitat that may be treated using the exceptions for activities for other resource benefit (6,590 acres). We conservatively included the acres of smaller projects with insignificant impacts when considered alone, in the total amount of acres analyzed. This ensures that the total acres of snowshoe hare habitat impacted over time, through any number of smaller projects with insignificant individual impacts, does not additively exceed the total acres we anticipated and analyzed above. The ongoing projects will treat 85 acres of snowshoe hare

habitat using the exceptions to VEG S5, well within the 6,590 total acres anticipated and analyzed above. We will subtract these 85 acres from the total of 6,590 acres anticipated above. Thus, the maximum amount of treatment expected in occupied lynx habitat on the Forest under the exceptions to the Standards VEG S5 and VEG S6 is now at 6,505 acres. When added to the 88,910 acres that may be treated under the exemptions from Standards VEG S5 and S6, the total amount of snowshoe hare habitat that may be treated on the Forest under the exemptions from and/or exceptions to the NRLMD standards is 95,415 acres.

### *Fire Management*

One standard in the 2009 Revised Forest Plan provides wildland fire as an available tool for all unplanned ignitions (Fire Management Standard 2) and allows for the use of unplanned ignitions to benefit resources. Both frequent stand-replacing and mixed-severity fires shaped the landscape on the Forest over time. Since the 1980s, 126,271 acres of lynx habitat (per the updated model) have been affected by wildland fires with the amount of regeneration wildfire increasing over time. Wildfire maintains a mosaic of forest successional stages by altering the structure and composition of vegetation that provides habitat for lynx and hares (Interagency Lynx Biology Team 2013). Fires can remove canopy or vegetation completely or partially, depending on severity, and by reverting succession so that young regenerating forests occur within some stands. Lynx may also use newly-burned areas, but use depends on the presence of unburned vegetation, areas where fire skips, and enough cover for travel (Vanbianchi et al. 2017). Depending on vegetation type and fuel moisture, large wildfires (greater than 10,000 hectares in size) may create heterogeneous vegetation conditions, which can support larger densities of hares post-fire (Hutchens and Hodges 2019).

The magnitude of effects from wildfire on lynx or lynx habitat is not possible to quantify as the size, pattern, location, duration, weather, drought conditions, and vegetation types all determine the degree of severity for a given fire. The use of prescribed fire and/or other vegetation management actions may also reduce wildfire severity by altering the available fuels and lessening fire behavior. Like vegetation management actions, wildland fire can alter, remove, or degrade lynx habitat in a way that reduces or eliminates available snowshoe hare habitat and horizontal cover or burn downed woody debris that could provide denning habitat for lynx. Some openings or fragmentation may occur depending on the fire severity or location, which could affect lynx by reducing available habitat for foraging and dispersal. However, wildfires would likely create additional foraging habitat, especially within lodgepole pine stand cover types 10 to 20 years post-fire (Hutchens and Hodges 2019) as post-burn areas re-establish with early successional vegetation.

In certain areas, wildfire would be managed to protect resources at risk. Wildfire suppression has the potential to alter vegetation mosaics and species composition that may reduce the quality and/or quantity of lynx habitat. In western forests, fire exclusion in areas with a history of infrequent fire return intervals has probably not had much impact. But areas where the fire regime was historically frequent or mixed has generally shifted to more intense fire regimes, resulting in forest compositions and structures that are more homogeneous, composed of more shade-tolerant species with more canopy layers, and are more susceptible to severe fires, insects, and diseases. The effects associated with wildfire decisions such as suppression activities will be analyzed during site-specific emergency consultation procedures as applicable.

Objectives, standards, and guidelines in the NRLMD do not apply to wildfire suppression or to wildland fire use (U.S. Forest Service 2007). Although some adverse effects are possible, wildland fire occurs naturally and is likely to maintain a mosaic of forest successional stages and habitat features that could support both hares and lynx over time and across the landscape.

## **Livestock Management**

Approximately 56 percent (915,197 acres) of lynx habitat is within grazing allotments on the Forest. The overlap of lynx habitat and livestock grazing is likely limited because livestock typically do not graze in heavily wooded areas. Livestock management includes grazing of livestock on Forest lands. Livestock may compete with snowshoe hares for forage resources (Ruediger et al. 2000). Browsing or grazing also could impact plant communities that connect patches of lynx habitat within a home range. Effects to snowshoe hare habitat such as riparian willow and aspen communities as a result of livestock grazing are most likely to affect lynx (Interagency Lynx Biology Team 2013). Conversely, appropriate grazing management can rejuvenate and increase forage and browse in some habitats. At the time of the lynx listing, the Service found no evidence that grazing was a factor threatening lynx, therefore, grazing was not addressed in the final lynx listing rule (March 24, 2000; 65 FR 16052). Overall, grazing is not likely to reduce the snowshoe hare prey base or have substantial effects on lynx (Interagency Lynx Biology Team 2013). No existing research provides evidence of lynx being adversely affected by grazing or of lynx movements within home ranges being impeded by grazing practices.

Maintaining existing range infrastructure includes activities such as understory shrub and tree removal (generally less than quarter acre or individual tree removal) around at-risk structures, including fences, corrals, water developments, and others. These activities may or may not occur in lynx habitat, although some available habitat may be slightly altered or reduced. Stands would still provide lynx habitat despite individual tree removal.

The Forest Service has identified one objective and four guidelines related to livestock management. Objective GRAZ O1 guides the Forest to manage livestock grazing to be compatible with improving or maintaining lynx habitat. The NRLMD would reduce the potential for grazing to affect lynx through the guidelines for livestock management practices that provide for: regeneration of trees and shrubs (Guideline GRAZ G1), aspen stands (Guideline GRAZ G2), riparian areas and willow cars (Guideline GRAZ G3), and shrub-steppe habitats (Guideline GRAZ G4). These guidelines should adequately minimize the potential for effects of grazing to lynx and may improve the habitat over baseline conditions.

The quality and quantity of snowshoe hare habitat would not be significantly diminished as a result of grazing livestock. Effects to lynx denning habitat would likely be none to very negligible. Disturbance associated with human activity related to livestock grazing would likely be minimal. Livestock grazing is not expected to create a barrier or impede lynx movement within a potential home range. With the application of the NRLMD guidelines, the effects of grazing across the action area would be minimal and livestock management under the 2009 Revised Forest Plan is expected to either have no effects to lynx or have insignificant and/or discountable effects to lynx depending on site-specific information.

## **Human Use Projects**

Human use projects include actions such as recreation management, Forest roads, and mineral and energy development. Recreation management includes developed ski areas, winter dispersed recreation, and non-winter dispersed recreation. Below we analyze the effects to lynx in general.

### *Recreation Management*

Recreation settings include areas from designated wilderness to rural (such as areas immediately adjacent to small communities or private land inholdings, and others) to urban. The 2009 Revised Forest Plan designates or identifies some specific areas in which management would emphasize recreation values (such as Discovery Ski Area and Maverick Mountain or groomed snowmobile trails) while other areas receive dispersed use. Management or development of recreation sites or facilities would occur in compliance with the 2009 Revised Forest Plan.

The main effect of non-winter recreation is potential disturbance to lynx rather than effects to habitat. While studies that have considered the reactions of lynx to human presence are few, anecdotal information does suggest that lynx are rather tolerant of humans (Interagency Lynx Biology Team 2013). Due to the low susceptibility of lynx to displacement by humans, non-winter recreation presents low risk of effects to how lynx use the action area. Effects to lynx from non-winter dispersed recreation are not likely to be adverse.

Dispersed winter recreational uses and activities, such as snowmobiling, cross-country skiing, and snowshoeing also occur and are expected to continue to occur within the action area. The range of lynx is restricted to forested areas with deep snow conditions during the winter. Lynx evolved in and are highly adapted to a boreal forest environment. Morphologically, lynx are well-adapted to hunting snowshoe hares in deep snow (Murray and Boutin 1991) in densely forested environments. Lynx have very large feet in relation to body mass, which prevents them from sinking deep into snow. This provides lynx with an inherent competitive advantage over many other mammalian carnivores in deep snow conditions. Their primary prey, snowshoe hare are also adapted to living in dense boreal forests in areas with abundant snow. Within the last century, coyotes have expanded their range from western and central prairie regions in North America to forests of the east and far north. Morphologically, coyotes are at a disadvantage hunting in high snow areas, as their feet are fairly small in relation to body mass and they therefore sink into soft snow (Murray and Boutin 1991).

To date, research has confirmed that lynx and coyote populations coexist, despite dietary overlap and competition for snowshoe hare and alternate prey species. In some regions and studies, coyotes were found to use supportive snow conditions more than expected, but none confirm a resulting adverse impact on lynx populations in the area. The best scientific information from near the action area (an area populated by both lynx and coyotes) concludes that coyotes did not require compacted snow routes to access winter snowshoe hare habitat (Kolbe et al 2007, Interagency Lynx Biology Team 2013). In our final rule (March 24, 2000; 65 FR 16052), snow compaction created by human activities was not found to be a threat to the lynx DPS. We also have no evidence that packed snow trails facilitated competition to a level that negatively affects lynx or lynx populations.

The 2009 Revised Forest Plan includes NRLMD Objective HU O1 to maintain the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat. In addition, recreation activities should be managed to maintain lynx habitat and connectivity (Objective HU O2) and rather than developing new areas in lynx habitat, activities should be concentrated in existing developed areas (Objective HU O3). The NRLMD Guideline HU G11 states that designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. Further, Guideline HU G12 limits winter access for non-recreation special uses and mineral and energy exploration and development to designated routes or designated over-the-snow routes.

Winter dispersed recreation such as snowmobiling may indirectly result in insignificant effects to lynx via disturbance and/or snow compaction. Disturbance effects would be temporary, short-term, and spread out over space and time. While snow compaction may occur, the areas of compaction are localized. Thus, adverse effects from winter dispersed recreation are not anticipated.

Developed recreation can result in the direct loss of lynx habitat, and depending on the structural stage, could affect snowshoe hare habitat or lynx denning habitat. Developments such as ski areas can result in permanent loss of lynx habitat through the development of permanently groomed runs and resort infrastructure, such as lift termini, buildings and roads. Some loss of lynx habitat may be unavoidable with development, but at the scale of the Forest, relatively small areas are affected. Two existing ski areas (Discovery Ski Area and Maverick Mountain) are located within the action area. While individual lynx may be affected, operations of the ski areas are not likely to result significant effects related to disturbance. Lynx decreased movement rates in areas with intense back-country skiing and snowmobiling and adjusted temporal patterns by increasing night activity in areas with high-intensity recreation, although lynx still used these areas (Olson et al. 2018). Because the ski areas on the Forest are small in comparison to the Olson et al. (2018) study and have been on the landscape for over forty years, it is more likely lynx would alter behavior rather than avoid these areas. Based on Olson et al. (2018), it is likely lynx would continue to reside or disperse through these areas. Depending of the type of habitat affected, future expansions may result in removal of lynx habitat, which could potentially result in adverse effects via a reduction in existing snowshoe hare habitat or habitat that may become snowshoe hare habitat in the future. The effects of any future expansions related to the ski areas would be analyzed site-specifically and site-specific consultation would occur as applicable.

The NRLMD includes objectives, standards, and guidelines that address the most serious consequence of development, requiring new or expanding permanent developments to maintain, or where possible, promote habitat connectivity within LAUs and linkage areas (Objective All O1, Standard All S1, Guideline All G1, Objective LINK O1, and Standard LINK S1).

Recreational activities should be managed to maintain lynx habitat and connectivity (Objective HU O1), with activities concentrated in existing developed areas, rather than developing new areas in lynx habitat (Objective HU O3). Objective HU O4 provides for lynx habitat needs and connectivity when developing new or expanding existing developed recreation sites or ski areas.

Several guidelines in the NRLMD reduce impacts within the development itself, including: adequately sized inter-trail islands that support winter snowshoe hare habitat (Guideline HU G1), providing foraging habitat for lynx that is consistent with the ski area's operational needs,

especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes (Guideline HU G2), provide for lynx movement and maintain the effectiveness of lynx habitat (Guideline HU G3), and consider the location of access roads and lift termini to maintain and provide lynx security habitat if identified as a need (Guideline HU G10).

Some use of lynx habitat at developed ski areas or immediately adjacent areas by lynx may be possible. If lynx use is precluded by habitat alteration or excessively high levels of human activities, Standard ALL S1 directs that new or expanded permanent development and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area. While nothing is specifically proposed under the 2009 Revised Forest Plan, the NRLMD does not prohibit the development of recreation sites on Forest lands, therefore lynx may be affected by new developed recreation through habitat alteration or loss. Such effects may sometimes be adverse via a reduction in existing snowshoe hare habitat or habitat that may become snowshoe hare habitat in the future. Although effects to denning habitat may occur from new developments, we do not anticipate the effects to be adverse because denning habitat is not limited. The effects associated with any new developments will be analyzed during site-specific consultation as applicable.

### *Roads*

Unlike paved highways, Forest roads rarely receive motorized use at levels that create barriers or impediments to lynx movements. Lynx have been documented using less-traveled roadbeds for travel and foraging (Koehler and Brittell 1990). Recreational, administrative, and commercial uses of forest roads are known to disturb many species of wildlife. In Montana, Squires et al. (2010) concluded that forest roads with use levels that are low had little effect on how lynx used seasonal resources. Lynx show no preference or avoidance of unpaved forest roads, and the existing road density does not appear to affect lynx habitat selection (McKelvey et al. 2000). The best information suggests that the types of roads managed by the Forest Service do not likely adversely affect lynx. Lynx mortality from vehicle strikes are unlikely, and to date have not been documented on Forest lands in the action area given the relatively slow speeds at which vehicles on these roads travel (due to topography and road conditions) and generally low traffic volumes. Any new permanent road construction may affect lynx. The relatively small amount of snowshoe hare habitat affected within the route prism would be minor and likely insignificant. Temporary routes constructed in snowshoe hare habitat may also have minor impacts on lynx and lynx habitat. However, temporary routes are restored and/or decommissioned such that effects are temporary and not permanent and vegetation grows back. Also, the amount of vegetation and area impacted for the linear structures tends to be limited. Thus, impacts to the lynx and lynx habitat as a result of existing Forest roads and new road construction would likely be insignificant.

To reduce highway effects on lynx, Objective HU O6 guides the Forests to work cooperatively with other agencies to provide for lynx movement and habitat connectivity and to reduce the potential of lynx mortality. While this objective relates to highways, which typically do not occur on Forest land, it encourages cooperation with other agencies in order to reduce the potential for effects. Several NRLMD guidelines relate to potential impacts of Forest roads, including upgrading (Guideline HU G6), new permanent roads (Guideline HU G7), cutting brush (Guideline HU G8), and new roads built for project use (Guideline HU G9). These guidelines

generally discourage improving road access for people and minimize impacts of road construction (permanent and/or temporary) and maintenance on lynx.

### *Energy and Mineral Development*

Mining and energy development on Forest lands in the action area may directly impact lynx. New exploration and/or development could result in small, localized effects to lynx, including effects to lynx habitat. Such effects may include disturbance to lynx and minor amounts habitat removal due to surface disturbance from roads and facilities.

NRLMD Objective HU O5 guides the Forest to manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat. The NRLMD also contains the following three guidelines that would minimize the potential impacts of energy and mineral development on lynx by reducing snow compaction (Guideline HU G4), designing reclamation plans that restore lynx habitat (Guideline HU G5), and limiting winter access to designated routes or designated over-the-snow routes (Guideline HU G12). With the application of these measures, the energy and mineral development under the 2009 Revised Forest Plan would likely result in either no effects or only minor, insignificant effects to lynx depending upon the scale of development. The effects associated with any new exploration and/or developments will be analyzed during site-specific consultation as applicable.

### **Linkage Areas**

The 2009 Revised Forest Plan and NRLMD promote and support habitat connectivity for lynx across the landscape (reference the biological assessment for specific standards (U.S. Forest Service 2021a). Connected forest habitats allow lynx to move long distances to find food, cover, and mates. Because the Forest has such large amounts of lynx habitat compared to other land owners, the NRLMD has the ability to impact connectivity.

In addition to the forest plan standards and NRLMD objectives, standards, and guidelines related to site-specific actions, the following objective, standard, and guidelines apply to all Forest projects within linkage areas in occupied habitat, subject to valid existing rights. Such management direction is incorporated to improve connectivity. Objective Link O1 guides the Forest to work with landowners in areas of intermingled land ownership to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat. Coordination among different land management agencies is important to lynx because lynx have large home ranges and may move long distances. Thus, without coordination, the effects of mixed ownership patterns on lynx would likely lead to reductions in habitat connectivity. Standard LINK S1 requires the Forest to identify potential highway crossings when highway or forest highway construction or reconstruction is proposed in linkage areas. In addition, Guideline LINK G1 guides the Forest to retain Forest land in public ownership and Guideline LINK G2 guides management of livestock grazing in shrub steppe habitats to contribute to maintaining or achieving a preponderance of mid- to late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.

In addition, Standard ALL S1 addresses the impacts to lynx from loss of connectivity within occupied habitat in the action area. Standard ALL S1 requires that new or expanded permanent developments and vegetation management projects in a LAU or linkage area maintain habitat connectivity. Thus, under this standard, Forest Service actions will not be permitted to degrade connectivity in occupied lynx habitat or in linkage areas.

The objective, standards, and guidelines described above, as well as additional standards described in the biological assessment (U.S. Forest Service 2021a), would reduce or minimize the potential for effects to lynx in most cases, and therefore the 2009 Revised Forest Plan, incorporating the NRLMD, would ultimately conserve adequate connectivity with occupied lynx habitat. The site-specific effects of projects proposed under the 2009 Revised Forest Plan that may impact connectivity would be analyzed during project-specific consultation. 04. (2013) concluded that while changes to habitat structure can affect lynx movement, there is no evidence that genetic isolation is an issue. We do not anticipate Forest actions carried out under the 2009 Revised Forest Plan to result in adverse impacts to lynx connectivity. Such actions are not likely to create a barrier or impede lynx movements.

### **Effects Summary for Canada Lynx**

The Forest Service designed the NRLMD to address those risk factors to lynx that were relevant in terms of Forest Plan direction. Overall, the 2009 Revised Forest Plan, incorporating the NRLMD, reduces or avoids the potential for adverse effects to lynx. The benefits to lynx come primarily from the vegetation management objectives and implementation of the standards and guidelines. The suite of objectives, standards, and guidelines clearly conserve snowshoe hare and lynx habitat in all occupied, mapped lynx habitat in the action area. However, vegetation and fire management activities implemented under the 2009 Revised Forest Plan may result in some level of adverse effects to lynx, with the main influence from actions that impact snowshoe hare habitat within occupied lynx habitat. The majority of adverse effects to lynx would be a result of the exemptions from (fuel treatment projects in the WUI) and exceptions to (activities for other resource benefit) the NRLMD vegetation standards. Other than vegetation and fire management, the many activities that may be authorized under the 2009 Revised Forest Plan are expected to have relatively minor or less substantial impacts on lynx.

Adverse effects to lynx would occur primarily through the temporary impacts to the dense horizontal structure of natural forest succession phases and/or altering the mosaics of the forested landscape in localized areas. Through 2036, a maximum of 88,910 acres of occupied lynx habitat could be treated using the exemptions for fuel treatment projects within the WUI and an additional 6,505 acres of occupied lynx habitat could be treated using the exceptions for activities for other resource benefit (includes the subtraction of 85 acres related to ongoing projects as described above). In short, some vegetative treatments may degrade the function of snowshoe hare habitat by delaying the development of high density snowshoe hare habitat through succession; however, they do not affect that stand's potential to produce snowshoe hare habitat in the future. The habitat would retain its inherent capacity to regenerate. While some amount of vegetation and/or fire management activities may adversely affect areas of snowshoe hare habitat, the amount is expected to be low overall. The acres of lynx habitat that may be treated via vegetation and/or fire management activities are not likely all providing snowshoe hare habitat at the same time, if ever, but could potentially provide it at some point over the life of the 2009 Revised Forest Plan. Thus, although unlikely, the worst case scenario of treating

approximately 95,415 acres of snowshoe hare habitat over the life of the 2009 Revised Forest Plan is considered for the purpose of this effects analysis. Acres of snowshoe hare habitat treated are expected to be distributed throughout the Forest (action area) and are not likely to be excessively concentrated within any one LAU or group of adjacent LAUs. Thus, adverse effects, while possible, are likely to affect only portions of any individual lynx home range. Any affected LAUs are expected to remain capable of producing adequate densities of snowshoe hares to support lynx presence. Further, many WUI areas occur at lower elevation (i.e. near the lower edge of lynx habitat) and are less likely to be the highest quality lynx habitat, which may reduce the potential overall effect.

We do not anticipate adverse effects to lynx as a result of the vegetation and fire management in stem exclusion stands that do not provide snowshoe hare habitat. We also do not anticipate vegetation and fire management to significantly affect denning habitat. Activities proposed under the 2009 Revised Forest Plan may result in some disturbance effects to lynx if lynx are in the project area during project implementation. Such disturbance is expected to be insignificant as areas free of disturbance are typically available if a lynx needed to adjust movement patterns during implementation. By following the NRLMD, the 2009 Revised Forest Plan is expected to maintain habitat connectivity in any given LAU and/or linkage area. We do not expect habitat connectivity or linkage to be adversely affected from vegetation or fire management projects conducted under the 2009 Revised Forest Plan. While vegetation treatments could alter structural stages of potential lynx habitat, they are not likely to result in the construction of any barriers known to inhibit lynx movements. Site-specific projects are not likely to impede lynx movement or reduce habitat connectivity. Treatments authorized under the 2009 Revised Forest Plan are not expected to preclude any future use of an area by a resident lynx (if present) or a transient lynx should they pass through the area.

## **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

As previously described, the action area has been defined as the approximately 3.39 million acres of Forest land within the administrative boundaries of the Forest, with the exception of the Elkhorn Landscape. The Helena-Lewis and Clark National Forest jointly manages activities on the Elkhorns Landscape with the Beaverhead-Deerlodge National Forest. The effects to lynx in the Elkhorn Landscape are analyzed within the consultation on the 2020 Forest Plan for the Helena-Lewis and Clark National Forest (U.S. Fish and Wildlife Service 2021a). As such, cumulative effects within the Elkhorns Landscape will not be analyzed. Refer to the biological assessment, which is incorporated by reference, for a more detailed description on acres by county and a vicinity map (U.S. Forest Service 2021a). Approximately 1,625,805 acres of lynx habitat occur within the action area, with approximately 95 percent (1,535,180 acres) in federal land ownership.

Vegetation projects, fuel treatment projects, mineral extraction, oil and gas exploration, urban and rural development, recreation site construction and use, road construction, and utility

corridors may occur on non-federal lands with the action area and have the potential to affect lynx. Some corporate and small private lands could be managed for timber products and commodities and thus, could potentially adversely affect lynx. Some private lands may be permanently lost to development. Other types of state and private actions are not likely to adversely affect lynx.

The cumulative effects to lynx may range from insignificant to adverse depending on site-specific conditions and actions. As described above, disturbance affects are not likely to be significant as lynx appear to be tolerant of human activity. Depending on site-specific conditions, actions that may affect snowshoe hare habitat could result in some level of adverse effects via the temporary reduction in quantity and/or quality of snowshoe hare habitat or permanent loss due to development. Some non-federal actions may reduce the availability of den sites through removal of coarse woody debris. Because denning habitat is not limiting throughout the action area, any cumulative effects to lynx denning habitat would be insignificant. Since new developments would likely occur at lower elevations, we do not expect such actions would create a barrier or impede lynx movement.

Not all lands would be developed or used in ways that have negative impacts on lynx. Combined, non-federal lands developed or used in ways that would have negative impacts on lynx constitutes a fairly small proportion of lynx habitat within the action area. Many non-federal lands are and would be adjacent to or interspersed with Forest land and therefore, some of the potential negative effects on the private parcels would be moderated by federal land management.

## CONCLUSION

After reviewing the current status of Canada lynx, the environmental baseline for the action area, the effects of the action, the cumulative effects, and the best available information, it is the Service's biological opinion that the effects of implementing the 2009 Revised Forest Plan on lynx are not likely to jeopardize the continued existence of the Canada lynx. Implementing regulations for section 7 (50 C.F.R. § 402) define "jeopardize the continued existence of" as to "engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

The best available information describes the importance of snowshoe hare habitat to lynx (Squires et al. 2010, Holbrook et al. 2017, Kosterman et al. 2018). The 2009 Revised Forest Plan, including implementation of the NRLMD, will not preclude continued adequate amounts of snowshoe hare habitat needed to sustain lynx in the LAUs within the action area and thus, the habitat in each of the LAUs would remain functional for lynx. The Service concludes that while site-specific projects carried out under the 2009 Revised Forest Plan may result in some level of adverse effects to individual lynx, the level of adverse effects are not reasonably expected to appreciably reduce the numbers or distribution of lynx within the action area. Thus, the proposed action is not likely to appreciably reduce the likelihood of survival and recovery of lynx in the wild, and is not likely to jeopardize the continued existence of the contiguous United States Canada lynx DPS.

Our conclusion is based primarily on the information presented in the biological assessment on implementing the 2009 Revised Forest Plan (U.S. Forest Service 2021a), additional information received during the consultation process, information in our files, and informal discussions between the Service, the Forest, and other personnel. Our rationale for the not likely to jeopardize the continued existence of the Canada lynx conclusion is based on, but not limited to, the following factors summarized below, as detailed earlier in this biological opinion.

- The 2009 Revised Forest Plan, incorporating the NRLMD, will address the risk factors to lynx and is expected to reduce or avoid the potential for adverse effects to lynx from site-specific activities. The 2009 Revised Forest Plan clearly conserves and promotes snowshoe hare and lynx habitat within the action area.
- The 2009 Revised Forest Plan and NRLMD address land management actions that have the most potential to adversely affect key lynx habitat components. While negative effects on lynx may not be totally eliminated, the Service considers the retention of high quality snowshoe hare habitat within occupied lynx habitat as most essential to lynx conservation. The NRLMD vegetation standards directly address the major impacts identified from vegetation management (impacting stand initiation and multi-story stands that provide snowshoe hare habitat). Managing and moderating these impacts will minimize affects to snowshoe hare habitat and production, thus benefiting lynx.
- Site-specific vegetation and fire management projects may result in some level of adverse effects to lynx, primarily through the temporary impacts to the dense horizontal structure of natural forest succession phases and/or altering the mosaics of the forested landscape in localized areas. While negative effects on snowshoe hare habitat and lynx may occur, the 2009 Revised Forest Plan (by following the NRLMD) is expected to adequately minimize the amount of snowshoe hare habitat treated.
- As described in our biological opinion, the majority of adverse effects that may occur would result from actions using the exemptions from and/or exceptions to the NRLMD vegetation management standards. While some amount of vegetation and/or fire management activities may adversely affect areas of snowshoe hare habitat, the amount is expected to be low overall. A maximum of 88,910 acres of occupied lynx habitat could be treated using the exemptions for fuel treatment projects within the WUI and an additional 6,505 acres of occupied lynx habitat treated using the exceptions for activities for other resource benefit. As previously described, the total treatment of 95,415 acres of snowshoe hare habitat is not likely to occur. Although unlikely, the worst case scenario of treating approximately 95,415 acres of snowshoe hare habitat over the life of the 2009 Revised Forest Plan is considered for the purpose of this effects analysis. Lynx would not be adversely affected from actions covered under the 2009 Revised Forest Plan on approximately 94 percent of lynx habitat on the Forest.
- Acres of snowshoe hare habitat treated are expected to be distributed throughout the action area and are not likely to be excessively concentrated within any one LAU or group of adjacent LAUs. Thus, while adverse effects are possible, they are likely to affect only portions of any individual lynx home range. Any affected LAUs are expected to remain capable of producing adequate densities of snowshoe hares to support lynx presence.

- The nature of most vegetation management alteration is temporary and reversible (i.e. forests regrow or can be restored). While project-related activities may adversely affect snowshoe hare habitat, effects would be temporary and no permanent loss of the inherent capacity of treated stands to provide lynx habitat is expected. The habitat would retain its inherent capacity to regenerate. Some vegetative treatments may degrade the function of snowshoe hare habitat by delaying the development of high density snowshoe hare habitat. While such actions may change the successional stage of a stand, they do not affect that stand's potential to produce snowshoe hare habitat in the future.
- Further, many WUI areas occur at lower elevation (i.e. near the lower edge of lynx habitat) and are less likely to be the highest quality lynx habitat, which may reduce the potential overall effect.
- It is important to note that mapped lynx habitat consists of a mosaic of various forest structural stages and not all mapped lynx habitat is providing snowshoe hare habitat at the same time. However, at a programmatic scale such as this, it is not possible to accurately map snowshoe hare habitat at every point in time for the life of the 2009 Revised Forest Plan. Forest structural stages change over time and what is providing snowshoe hare habitat today may not be at some point in the future and what is not providing snowshoe hare habitat today may provide such in the future. In addition, snowshoe hare habitat that may be treated is likely to provide snowshoe hare habitat again, over time. Thus, we are analyzing the maximum amount that could be treated to be sure we do not overlook any potential effect.
- The largest land owner within the Montana portion of the DPS is the Forest Service. The other National Forests also manage their land under the NRLMD, which has either been incorporated into their Forest Plans or has been amended to their Forest Plans. The NRLMD in these Forest Plans and/or amendments have previously undergone section 7 consultation. Portions of the Bureau of Land Management Missoula Field Office (MiFO) is also within lynx habitat and has recently undergone section 7 consultation on their revised resource management plan. While these other National Forests and MiFO may also conduct actions that may adversely affect snowshoe hare habitat and lynx, it was determined by the Service that such effects are not likely to jeopardize the continued existence of the Canada lynx. The impact to snowshoe hare habitat is limited to 6 percent of any individual National Forest, including the 2009 Revised Forest Plan action area, and the MiFO could potentially impact no more than approximately 5,897 acres of snowshoe hare habitat. As such, approximately 94 percent of occupied lynx habitat within Montana would not be adversely affected. Thus, the overall impacts on lynx in this portion of the DPS is relatively small and would not reduce appreciably the likelihood of both the survival and recovery of Canada lynx within the contiguous United States.
- The 2009 Revised Forest Plan is a framework programmatic action and does not authorize, fund, or carry out an action but provides direction for future actions that may be authorized, funded, or carried out by the Forest. Therefore, any action subsequently authorized, funded, or carried out under the 2009 Revised Forest Plan will be addressed in subsequent section 7 consultations, as appropriate. Future site-specific consultations

on projects will provide both the amount of snowshoe hare habitat within the action area LAU(s) and the amount of snowshoe hare habitat affected by the action, thus, analyzing the specific amount of snowshoe hare habitat that will be affected. We expect that such an analysis will likely reveal that much of the treatments will not occur within snowshoe hare habitat.

- We do not anticipate adverse effects to lynx as a result of the vegetation and fire management in stem exclusion stands that do not provide snowshoe hare habitat.
- We also do not anticipate vegetation and fire management to significantly affect denning habitat.
- The potential adverse effects to lynx due to the exemptions for fuel treatment projects in the WUI and exceptions for activities for other resource benefit are offset by the beneficial effects of the NRLMD. Monitoring and recording of actions are required as decisions are signed to ensure that the number of acres treated through exemptions and/or exceptions do not exceed the amounts described here.
- By following the NRLMD, the 2009 Revised Forest Plan is expected to maintain habitat connectivity in any given LAU and/or linkage area. We do not expect habitat connectivity or linkage to be adversely affected from vegetation or fire management project conducted under the 2009 Revised Forest Plan. While vegetation treatments could alter structural stages of potential lynx habitat, they are not likely to result in the construction of any barriers known to inhibit lynx movements. Site-specific projects are not likely to impede lynx movement or reduce habitat connectivity. Treatments proposed under the 2009 Revised Forest Plan are not expected to preclude any future use of an area by a resident lynx (if present) or a transient lynx should they pass through the area.
- Other than vegetation and fire management, the many activities that may be authorized under the 2009 Revised Forest Plan are expected to have relatively minor or less substantial impacts on lynx.
- Activities proposed under the 2009 Revised Forest Plan may result in some disturbance effects to lynx if lynx are in the project area during project implementation. Such disturbance is expected to be insignificant as areas free of disturbance are typically available if a lynx needed to adjust movement patterns during implementation.
- Although unlikely, any other site-specific projects types that may adversely affect lynx are constrained by other standards such as mandating maintenance of connectivity and would likely only affect a relatively small proportion of lynx habitat within the action area. These actions would undergo site-specific consultation to determine such effects.

Forest lands in the action area LAUs are expected to provide conditions that would continue to be conducive to supporting lynx over the life of the 2009 Revised Forest Plan. We conclude that the adverse effects related to the implementation of the 2009 Revised Forest Plan on lynx would be limited in severity and in scale to the extent that lynx habitat would continue to produce adequate densities of snowshoe hares and adequate levels of cover to support continual lynx presence across the action area. Although some projects carried out under the 2009 Revised

Forest Plan may adversely affect individual lynx, the treatments would likely have small to insignificant and nonpermanent effects on the contiguous United States Canada lynx DPS. Therefore, the proposed action is not likely to jeopardize the continued existence of the Canada lynx.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act, and Federal regulations pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission that creates the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The 2009 Revised Forest Plan is a framework programmatic action, i.e. it provides direction for future actions that may be authorized, funded, and/or carried out by the Forest and it does not in itself mandate or approve future implementation of activities on the Forest. For the purposes of an incidental take statement, a Federal action is a framework programmatic action if it approves a framework for the development of future action(s) that are authorized, funded, or carried out at a later time, and any take of a listed species would not occur unless and until those future action(s) are authorized, funded, or carried out and subject to further section 7 consultation. 50 C.F.R. § 402.02. For a framework programmatic action, an incidental take statement may be provided but is not required at the programmatic level; any incidental take resulting from any action subsequently authorized, funded, or carried out under the program that is not addressed below will be addressed in subsequent section 7 consultation, as appropriate.

For some activities implemented under the 2009 Revised Forest Plan, the level of detail available is insufficient to identify with particularity all possible circumstances that may possibly involve the incidental take of lynx. Given the lack of site-specific specificity and information regarding future effects of some actions implemented under the 2009 Revised Forest Plan, providing the amount or extent of take would be speculative and unlikely to provide an accurate and reliable trigger for reinitiation of consultation for some effects. Consequently, with the exception of incidental take related to Canada lynx as described below, other potential for incidental take that we are unable to anticipate at this time is deferred to future consultation on individual projects. Any incidental take resulting from subsequent actions that proceed under the 2009 Revised Forest Plan will be subject to section 7 consultation, as appropriate. In addition, take that may occur due to illegal activities by private citizens within the action area is not exempted in this incidental take statement.

The measures described below are non-discretionary and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Forest (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 C.F.R. § 402.14(i)(3)].

### **Amount or Extent of Take Anticipated**

We anticipate that most of the incidental take associated with implementation of the 2009 Revised Forest Plan, including the NRLMD, would occur in snowshoe hare habitat within occupied lynx habitat when projects are conducted under the exemptions from and/or exceptions to the vegetation standards VEG S1, S2, S5 and S6. We have been provided with explicit estimates on the maximum number of acres of snowshoe hare habitat that could be impacted related to the exemptions from and/or exceptions to NRLMD vegetation standards and we are able to provide an incidental take statement related to the use of these exemptions and exceptions.

We anticipate incidental take in the form of harm, via the modification of snowshoe hare habitat (lynx foraging habitat) that may temporarily result in a decreased production and density of snowshoe hares, the primary prey of lynx. Snowshoe hare habitat would be affected through the treatment of the horizontal structure of natural forest successional phases. As detailed earlier in this biological opinion, snowshoe hare habitat quality may be temporarily degraded on up to 95,415 acres of snowshoe hare habitat within occupied lynx habitat, temporarily decreasing the existing dense horizontal structure required by snowshoe hares for forage and cover and thus affecting lynx foraging. Such impacts may interfere with the normal behavior patterns of a lynx and could potentially result in adverse effects to an individual lynx that may use the area of treatment as part of its home range. The temporary decrease in prey base may translate to some low level of impairment of reproduction and feeding, during some years. Specifically, we anticipate that some adult female lynx within home ranges affected that may be affected by such projects may fail to complete a pregnancy or would be less successful in finding adequate food resources needed to ensure maximum survival potential for kittens. Thus, we expect reproductive impairment and kitten survival to be impacted. Lynx habitat in the action area is expected to remain capable of producing adequate densities of snowshoe hares to support continual lynx presence because adequate amounts of snowshoe hare habitat to sustain hare populations would remain within the action area LAUs.

The amount of incidental take that may occur under the 2009 Revised Forest Plan would be minimized in several ways. The NRLMD is incorporated into the 2009 Revised Forest Plan. By following and incorporating the NRLMD, the 2009 Revised Forest Plan will conserve lynx habitat, including snowshoe hare habitat, throughout the majority (94 percent) of the action area.

While some amount of vegetation and/or fire management activities may adversely affect areas of snowshoe hare habitat using the exemptions from and/or exceptions to the NRLMD standards, the amount is expected to be low overall. Although unlikely, the worst case scenario of treating

approximately 95,415 acres of snowshoe hare habitat within occupied lynx habitat over the life of the 2009 Revised Forest Plan is considered for the purpose of this incidental take statement. Acres of snowshoe hare habitat treated are expected to be distributed throughout the action area and are not likely to be excessively concentrated within any one LAU or group of adjacent LAUs. Thus, adverse effects, while possible, are likely to affect only portions of any individual lynx home range. Any affected LAUs are expected to remain capable of producing adequate densities of snowshoe hares to support lynx presence. The nature of most vegetation management alteration is temporary and reversible (i.e. forests regrow or can be restored). While project-related activities may adversely affect snowshoe hare habitat, no permanent loss of the inherent capacity of treated stands to provide lynx habitat is expected. The habitat would retain its inherent capacity to regenerate. Some vegetative treatments may degrade the function of snowshoe hare habitat by delaying the development of high density snowshoe hare habitat through succession; however, they do not affect that stand's potential to produce snowshoe hare habitat in the future. Further, many WUI areas occur at lower elevation (i.e. near the lower edge of lynx habitat) and are less likely to be the highest quality lynx habitat, which may reduce the potential overall effect.

It is important to note that mapped lynx habitat consists of a mosaic of various forest structural stages and not all mapped lynx habitat is providing snowshoe hare habitat at the same time. However, at a programmatic scale such as this 2009 Revised Forest Plan, it is not possible to accurately map snowshoe hare habitat at every point in time for the life of the programmatic. Forest structural stages change over time and what is providing snowshoe hare habitat today may not be at some point in the future and what is not providing snowshoe hare habitat today may provide such in the future. The 2009 Revised Forest Plan is a framework programmatic action and does not authorize, fund, or carry out an action but provides direction for future actions that may be authorized, funded, or carried out by the Forest. Therefore, any action subsequently authorized, funded, or carried out under the 2009 Revised Forest Plan using the exemptions to and/or exceptions from the vegetation standards will be addressed in subsequent tiered section 7 consultations, as appropriate.

The incidental take we anticipate would be harm to only a very low number of lynx that may inhabit the area impacted. We do not expect all lynx that may occur in the action area to suffer disruptions in normal breeding or feeding patterns, nor would we expect permanent effects. The effects of potential treatment of snowshoe hare habitat on individual lynx are difficult to quantify. The best scientific and commercial data available at this time are not sufficient to enable the Service to determine a specific amount of incidental take of Canada lynx. The amount of take is difficult to quantify for the following reasons:

- Lynx are wide-ranging, not easily detected in the wild.
- Although we have a general understanding of where lynx population centers are, the distribution of individual lynx within the action area is not known.
- Although we have a general understanding that snowshoe hares occur and are widely distributed in lynx habitat across the action area, snowshoe hare densities across the action area are not known.
- We lack information to accurately predict the number of snowshoe hares and alternate prey needed for the survival of adult lynx or kittens.
- Snowshoe hare populations exhibit population cycles in Canada and although not well understood, populations likely fluctuate in the United States as well. This variation could

cloud our ability to demonstrate a direct cause and effect relationship. It may be difficult in many cases to determine whether mortality or injury of lynx is attributable to incidental take of lynx as a result of the proposed action, or whether it was natural mortality or injury of lynx due to natural declines in snowshoe hares.

- We lack information to predict with precision the densities of hares in various habitat and forest stands, before and after specific treatments, especially in relationship to the host of naturally occurring environmental variables that may affect hare densities.
- Discovery or detection of lynx injury or mortality attributed to habitat alteration is very unlikely.

All of these variables are difficult to monitor or census. Thus, it is not practical to express the amount of anticipated take or to monitor take related impacts in terms of individual lynx. According to Service regulations implementing the Act (50 C.F.R. § 402.14(i)(1)(i)) and as stated in the Endangered Species Consultation Handbook (March 1998) (Handbook), some detectable measure of effect should be provided, such as the relative occurrence of the species or a surrogate species in the local community, or amount of habitat used by the species, to serve as a measure for take. Take also may be expressed as a change in habitat characteristics affecting the species (Handbook, p 4-47 to 4-48). In instances where incidental take is difficult to quantify, the Service uses a surrogate measure of take.

Due to the difficulty of estimating the precise number of lynx that would experience incidental take in the manner described, we have developed a surrogate measure to estimate the amount of anticipated take. As lynx are highly dependent on specific habitat for survival (snowshoe hare habitat), the surrogate measure for the number of lynx harmed will be quantified using acres of snowshoe hare habitat within occupied lynx habitat that may be treated under the 2009 Revised Forest Plan using the exemptions from and/or exceptions to the vegetation standards of the NRLMD. The Forest has provided explicit estimates on the number of acres of snowshoe hare habitat that will be impacted within occupied lynx habitat by fuels treatment projects within the WUI and/or precommercial thinning projects for other resource benefit. Thus, the incidental take statement sets a clear standard for determining when the amount or extent of the taking has been exceeded. Snowshoe hare habitat quality could be temporarily degraded on approximately 95,415 acres of snowshoe hare habitat within occupied lynx habitat using the exemptions from and/or the exceptions to the NRLMD vegetation standards, decreasing the existing dense horizontal structure required by snowshoe hares for forage and cover and thus affecting lynx foraging. This acreage represents our **surrogate measure of the incidental take of Canada lynx** that we anticipate through 2036 as a result of implementing the 2009 Revised Forest Plan.

Because the exemptions and exceptions are limited to a total of no more than about 6 percent of occupied lynx habitat on the Forest, the decrease in prey base would translate to some low level of impairment of reproduction and feeding, during some years. Specifically, we anticipate that some adult female lynx within home ranges affected by such projects may fail to complete a pregnancy or would be less successful in finding adequate food resources needed to ensure maximum survival potential for kittens. Accordingly, we expect reproductive impairment and kitten survival to be impacted.

Thus, as described in our surrogate measure above, if more than 95,415 acres of snowshoe hare habitat within occupied lynx habitat are treated through 2036 using the exemptions from and exceptions to the NRLMD vegetation standards, then the level of incidental take we anticipated

in this biological opinion would be exceeded and therefore the level of take exempted would be exceeded. Under CFR 402.16 (1), in this scenario, reinitiation of consultation would be required.

### **Effect of the take**

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. The amount of incidental take described above is low. The Service considers the retention of high quality snowshoe hare habitat in core area as most essential to lynx conservation. The effects of treatments are temporary and no permanent loss of the inherent capacity of treated stands to provide lynx habitat is expected. The vegetation standards would be applied across at least 94 percent of occupied lynx habitat on the Forest, which is expected to remain capable of producing adequate densities of snowshoe hares to support continual lynx presence because snowshoe hare habitat would be left in adequate amounts to sustain hare populations throughout the action area. Also, even in areas treated through exemptions from and exceptions to the vegetation standards, the level of effects to the snowshoe hare prey base will vary depending upon site conditions and proposed treatments, and would not always result in adverse effects or incidental take of lynx. The impacts to lynx will occur on a very small portion of occupied lynx habitat and will not appreciably reduce survival or the recovery of the species.

### **Reasonable and Prudent Measures**

Biological opinions provide reasonable and prudent measures that are expected to reduce the amount of incidental take. Reasonable and prudent measures are those measures necessary and appropriate to minimize incidental take resulting from proposed actions. Reasonable and prudent measures are nondiscretionary and must be implemented by the agency in order for the exemption in section 7(o)(2) to apply. The Service has determined that implementation of the 2009 Revised Forest Plan, which incorporates the NRLMD, will adequately reduce the potential for and minimizes the effect of any incidental take of Canada lynx that may result. As the Forest has incorporated the Service's previous terms and conditions associated with the NRLMD (U.S. Fish and Wildlife Service 2007) into the NRLMD, and thus the 2009 Revised Forest Plan, no reasonable and prudent measures are necessary to minimize the impacts of incidental take of Canada lynx.

### **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with terms and conditions that implement the reasonable and prudent measures. As explained above, implementation of the 2009 Revised Forest Plan will reduce the potential for and minimize the effect of incidental take. Since no reasonable and prudent measures were necessary to minimize the impacts of incidental take of Canada lynx, no terms and conditions are necessary with the exception of the reporting requirements outlined below.

### **Reporting requirements**

To demonstrate that implementation of the 2009 Revised Forest Plan adequately reduces the potential for and minimizes the effect of any incidental take that may result, the Forest shall complete a report with the information listed below for Canada lynx and submit it to the

Service's Montana Field Office by March 1 of each year for the preceding calendar year for the life of the 2009 Revised Forest Plan. This report can be combined with the reporting requirements required in the 2013 biological opinion of the effects of the 2009 Revised Forest Plan on grizzly bears (U.S. Fish and Wildlife Service 2013). The report shall include:

1. In relation to the surrogate measure of incidental take of Canada lynx, an up-to-date record of the total amount of snowshoe hare habitat treated within occupied lynx habitat using the exemptions from and exceptions to the NRLMD vegetation standards.
2. To gauge the validity of our assumptions that the acres of snowshoe hare habitat treated are expected to be distributed throughout the action area and are not likely to be excessively concentrated within any one LAU or group of adjacent LAUs, provide a map spatially displaying project locations and acres of snowshoe hare habitat impacted in relation to LAU boundaries.
3. The information in reporting requirements 1 and 2 shall also be provided in biological assessments for site-specifics project action areas (LAU(s)) at the time of section 7 consultation on site-specific projects. This requirement ensures that projects do not treat more than the amounts described in the proposed action and this incidental take statement.

## **Closing Statement**

The Service is unable to precisely quantify the number of Canada lynx that will be incidentally taken as a result of implantation of the 2009 Revised Forest Plan. Therefore, we use a surrogate measure for the amount of incidental take we anticipate. We use the maximum amount of snowshoe hare habitat that could be treated in occupied lynx habitat using the exemptions from and/or exceptions to the NRLMD vegetation standards as our surrogate measure of incidental take of Canada lynx.

We determined that implementation of the 2009 Revised Forest Plan, which incorporates the NRLMD, adequately reduces the potential for and minimizes the effect of any incidental take that may result. Therefore, reasonable and prudent measures, with their implementing terms and conditions, were not provided. However, reporting requirements were included in order to demonstrate that the 2009 Revised Forest Plan is adequately reducing the potential for and minimizing the effect of any incidental take that may result. If, during the course of the action, the level of take occurring exceeds that anticipated in this incidental take statement, such incidental take represents new information requiring reinitiation of consultation and review of the incidental take statement. The Forest must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

## **CONSERVATION RECOMMENDATIONS**

Sections 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened

species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility for the species.

1. Winter is the most constraining season for lynx and snowshoe hares. Dense horizontal cover of conifers above the snow level is critical to support snowshoe hares in winter. Vegetation management should be designed to provide for winter snowshoe hare habitat as forest stands develop successional over time.
2. Provide a mosaic of lynx habitat that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story coniferous stands to produce the desired snowshoe hare density within each LAU.
3. Use fire and mechanical vegetation treatments as tools to maintain a mosaic of lynx habitat, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes.
4. Provide for continuing availability of lynx foraging habitat (snowshoe hare habitat) in proximity to denning habitat and retain patches of untreated areas of dense horizontal cover within treated areas where possible.

## **REINITIATION NOTICE**

This concludes consultation on the effects of implementing the 2009 Revised Forest Plan on Canada lynx. As provided in 50 C.F.R. § 402.16, reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law and: (1) if the amount or extent of taking specified in the incidental take statement is exceeded; (2) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action.

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