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Beaverhead-Deerlodge National Forest
Canada Lynx Habitat Forest Plan Amendment

Environmental Assessment

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Executive Summary

In 2000, when the Canada lynx (lynx) was listed under the Endangered Species Act (ESA) as threatened by the U.S. Fish and Wildlife Service, the Forest Service agreed to identify and map lynx habitat and lynx analysis units (LAUs) on several national forests, including the Beaverhead-Deerlodge National Forest (Forest). The Forest uses lynx habitat maps to understand if an area can support residential lynx. LAUs are defined analysis areas that contain lynx habitat and provide context for effects of forest management activities. The initial mapping effort in 2000 lacked precision and refinement because recommended data for identifying lynx habitat was not available for the Forest and the process for delineating LAUs was not completed.

At the time of federal listing, the Forest was not considered "occupied[1]" by lynx. Several verified lynx observations in 2017-2019 prompted the change to occupied status in 2020 (Western Lynx Biology Team 2020). In 2020, the Forest updated the lynx habitat map and LAU delineations to incorporate improved data sources, relevant science, and recommendations from the Interagency Lynx Biology Team.

This plan amendment would modify where the 2009 Beaverhead-Deerlodge Land and Resource Management Plan's Wildlife Standard 7 would apply on the Forest by replacing the 2000 lynx habitat and LAU maps with the 2020 updated maps. This amendment does not propose any active management; all existing forest plan lynx conservation components would remain in place.

Introduction

A plan amendment may be analyzed through an environmental impact statement, an environmental assessment, or a categorical exclusion, depending upon the scope and scale of the amendment and its likely effects. Scoping and preliminary analysis did not reveal that the proposed plan amendment would likely have significant environmental effects.

The purpose of this environmental assessment is to provide sufficient evidence and analysis to determine whether to prepare an environmental impact statement or a finding of no significant impact. This document provides a discussion of the purpose and need for the proposal, alternatives, environmental effects of the proposed action and alternatives, and a listing of agencies, persons, and Tribal, State, and local governments consulted. This amendment would align the Forest Plan's Wildlife Standard 7 with the best available scientific information.

Plan Area

The Beaverhead-Deerlodge National Forest, hereafter Forest, manages approximately 3.39 million acres in southwest Montana. These National Forest System lands are in portions of Beaverhead, Butte-Silver Bow, Deer Lodge, Granite, Jefferson, Madison, Powell, and Gallatin counties. The Forest is characterized by the landscapes of mountain ranges interspersed with expansive valleys. Straddling the Continental Divide, the Forest features the headwaters of

[1] Occupation is defined as having at least two verified lynx observations since 1999 unless they are verified to be transient individuals or there is evidence of reproduction in a National Forest (USFS and FWS 2006).

significant river systems along with a variety of open sagebrush grasslands and forested areas. The geographic spatial boundary for this analysis includes the entirety of the Beaverhead-Deerlodge National Forest except for the Elkhorn landscape (Figure 1). The Helena-Lewis and Clark National Forest jointly manage activities on the Elkhorn landscape with the Beaverhead-Deerlodge National Forest. This environmental assessment does not include effects from management actions on the Elkhorn landscape because the 2021 revised Forest Plan for the Helena-Lewis and Clark National Forest covers this administrative area and includes management direction for Canada lynx habitat. Effects to lynx in the Elkhorn landscape were analyzed within the consultation on the 2021 Forest Plan for the Helena-Lewis and Clark National Forest (FWS 2021).

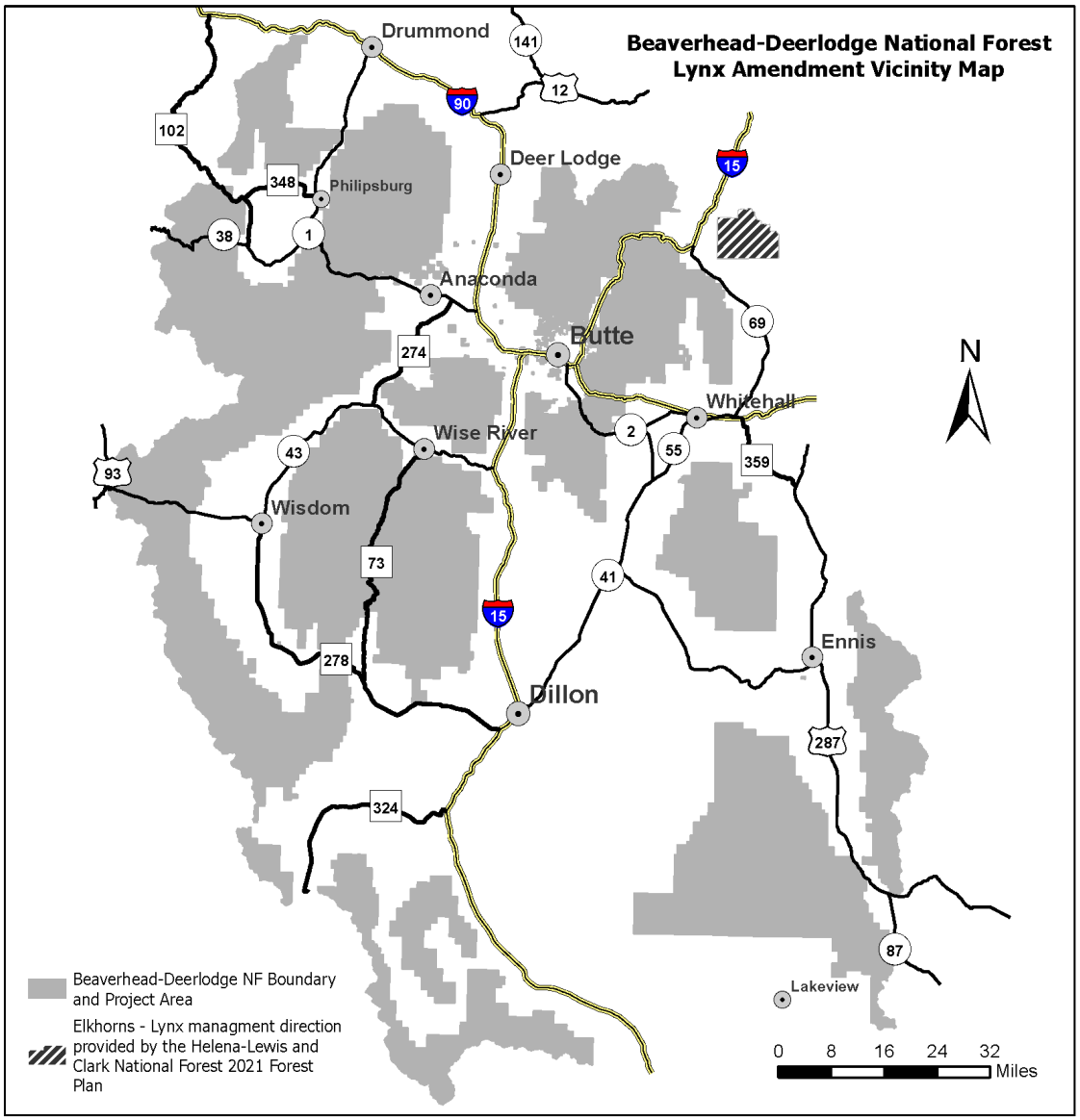

Figure 1. Plan area vicinity map.

Planning Regulations for Plan Amendments: Substantive Requirements

The proposed plan amendment is subject to the land management planning regulations at 36 CFR 219, also known as the 2012 Planning Rule. The 2012 Planning Rule requires determination of which specific substantive requirements within 36 CFR 219.8-219.11 are directly related to the plan direction being added, modified, or removed by the amendment (36 CFR 219.13(b)(5)). The responsible official has determined that the directly related requirement is 36 CFR 219.9 (b)(1): The requirement to determine whether or not the plan components required by 36 CFR 219.9 (a) provide the ecological conditions necessary to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species and maintain a viable population of each species of conservation concern within the plan area.

The responsible official has determined that the other substantive requirements at 36 CFR 219.8-219.11 do not apply because they are either not related or only indirectly related to the proposed amendment.

The emails distributed to 398 potentially interested parties on March 7, 2025, to 377 parties on May 31, 2025, and the legal notices published in *The Montana Standard* on March 8, 2025, and on May 31, 2025, included notice that 36 CFR 219.9 (b)(1) was likely to be directly related to the proposed amendment.

Best Available Scientific Information Requirement

The planning rule also requires documentation of how the best available scientific information was used to inform the plan amendment, including a determination of what information was most accurate, reliable, and relevant to the issues being considered (36 CFR 219.3). A description of the best available scientific information that was used to develop Alternative 2 for the proposed plan amendment is discussed in this environmental assessment.

Background

Species Description

The Canada lynx (*Lynx canadensis*) is a medium-sized forest carnivore that is strongly associated with one primary prey species, the snowshoe hare (*Lepus americanus*). Lynx may opportunistically feed on other prey such as squirrels, but this makes up a very small proportion of their diet. Both the lynx and its primary prey are highly adapted to survive in climates where winters are characterized by deep accumulations of soft, fluffy snow (Koehler and Aubry 1994, FWS 2023). Lynx have long legs and large, furry feet that allow them to efficiently travel across deep snow in pursuit of hares. Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare (Ruediger et al. 2000).

As its name implies, the Canada lynx is mainly found in Canada, and its distribution is associated with the North American boreal forest habitats. In the northern part of their range including Canada, lynx population cycles correspond with fluctuations in snowshoe hare population cycles. Lynx presence in the southern part of the range including the contiguous United States is likely due, in part, to influxes of dispersing lynx at the peak of population cycles in the north

(Interagency Lynx Biology Team 2013). In the contiguous United States, lynx naturally occur at low densities compared with the larger population in Canada, because the habitat in the more southern latitudes is naturally more fragmented, as it transitions from true boreal forest of the north to boreal/subalpine and montane forests. This patchy habitat distribution limits densities of snowshoe hare, preventing both hare and lynx populations in the United States from reaching the high numbers found in Canada. In the western United States, lynx are most common in the northwestern part of Montana, decreasing in abundance to the south and east (Koehler and Aubry 1994).

History that Led to This Proposed Amendment

In July 1998, the U.S. Fish and Wildlife Service (FWS) published a proposed rule to list the Canada lynx as a threatened species. In response to the onset of the listing process, an interagency lynx coordination effort produced the Lynx Conservation Assessment and Strategy (LCAS)[2] (Ruediger et al. 2000) and the Forest Service entered into a Conservation Agreement with the FWS (USFS and FWS 2000). The Forest Service agreed to identify and map lynx habitat and lynx analysis units (LAU) on National Forest System administrative units listed in the LCAS by March 31, 2000; the Beaverhead-Deerlodge National Forest (Forest) was named as one of these administrative units.

The Forest produced a lynx habitat map and delineated LAUs in 2000[3], referred to as Alternative 1 in this analysis. Since that time, the Forest has determined that the 2000 mapping overestimated lynx habitat and improperly delineated LAU boundaries due to several factors:

- Alternative 1 did not include snow as a habitat component.
- Alternative 1 did not distinguish between primary and secondary habitat.
- Alternative 1 relied on satellite imagery of existing vegetation rather than habitat type to identify habitat.
- The Alternative 1 LAU delineation process included the entire Forest in LAUs. All subwatersheds that intersect the Forest administrative boundary were identified as LAUs. No refinement of these LAUs occurred even though more steps in the LAU delineation process were outlined by the LCAS (Ruediger et al. 2000). This incomplete process resulted in coarsely-identified lynx habitat and many LAUs that did not meet the LCAS mapping criteria (Ruediger et al. 2000). See Appendix A of this document for a complete description of the Forest's 2000 lynx habitat and LAU mapping process.

In 2004, the Lynx Biology Team visited the Forest to review the lynx habitat maps and subsequently made several recommendations to update the map and LAU boundaries (Claar et al. 2004). However, the Forest did not update the 2000 habitat maps following this review because,

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[2] A national interagency Lynx Biology Team with representatives from Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management and the National Park Service was appointed by a national lynx steering committed in the late 1990s and operated as a group throughout the 2013 revision of the LCAS (Interagency Western Lynx Biology Team 2022).

[3] The Forest created a lynx habitat map and designated lynx analysis unit boundaries in 2000. This mapping effort was named "2001 lynx habitat map" in our Forest GIS files. They are one in the same in this analysis and referred to as "2001" in the 2021 biological assessment.

at that time, the Forest was not occupied by lynx, the FWS did not consider the Forest an area where lynx "may be present,[4]" and the Forest Plan did not provide lynx management direction.

In March 2007, the Northern Rockies Lynx Management Direction[5] (NRLMD) was amended to Land and Resource Management Plans of National Forests in Montana, and parts of Idaho, Wyoming, and Utah (all National Forests in the Northern Rockies Lynx Planning Area), including the Beaverhead-Deerlodge National Forest (USFS 2007b). The NRLMD was designed to conserve and promote recovery of Canada lynx by reducing or eliminating adverse effects from land management activities on National Forest System (NFS) lands. It does this through application of objectives, standards, and guidelines that apply to lynx habitat in LAUs in occupied habitat and in linkage areas.

The Forest Service formally consulted with the FWS on the effects of the NRLMD (FWS 2007, USFS 2007a). The FWS 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 (FWS 2007).

New Information and Changed Circumstances

A change in occupancy status based on verified lynx observations in 2017, 2018, and 2019 prompted the Forest to update the lynx habitat map and delineation of LAUs. This important change in occupancy status required application of the NRLMD whereas previously, as an unoccupied Forest, the NRLMD did not apply. The NRLMD states, "Until such time as these National Forest System lands become occupied they should consider the following management direction, but are not required to follow it." Knowing that the initial (2000) mapping process overestimated lynx habitat and resulted in many undersized LAUs, the Forest updated the lynx habitat model and LAUs (2020 updated map, i.e. Alternative 2).

The Forest Service, FWS, Interagency Lynx Biology Team, and the Regional Forester for the Northern Region all expected that lynx habitat maps would require updates.

- From the NRLMD final environmental impact statement at page 99: "during site-specific project analysis, maps of lynx habitat would be reviewed and updated based on local information."

- From the NRLMD biological opinion at pages 3-4: "Lynx habitat maps were developed using the best available information regarding lynx habitat types, as well as the best mapping resources available to the Forest Service at the time. The types of mapping resources and technology available on each Forest varied, and thus the accuracy and precision varied as well…Thus, we expect that lynx habitat maps and LAUs would be further refined and improved as information becomes available" (FWS 2007).

- From the third edition of the LCAS at page 87: "Lynx habitat was identified using criteria described in the 2000 LCAS. In some areas, better information on identifying lynx habitat is currently available. Where new vegetation databases will improve identification

[4] Therefore, consultation with FWS was not required.
[5] NRLMD is referenced many times in this document, therefore the Record of Decision (USFS 2007b) and the Final Environmental Impact Statement (USFS 2007c) will only have citations for the first instance of each reference.

of lynx habitat, we encourage updating maps. Where information in new maps suggests LAUs need adjusting, coordinate changes with FWS" (Interagency Lynx Biology Team 2013). "As core area delineations and lynx habitat maps continue to be refined, we expect that the areas to which conservation measures are applied will change accordingly" (page 89, Ibid.)

- In 2016, the Forest Service Northern Region Regional Forester issued a letter of direction outlining expectations for mapping updates when new information and/or data bases are available to inform improved and more spatially accurate mapping of lynx habitat. It included direction that mapping updates would be coordinated with the Regional Office (Marten 2016).

Purpose and Need for the Amendment

The purpose of this Forest Plan amendment is to apply the best available scientific information to more accurately identify lynx habitat and LAUs to result in the best possible outcomes for lynx habitat management. There is a need to update where Forest Plan Wildlife Standard 7 applies on National Forest System lands managed by the Beaverhead-Deerlodge National Forest. Wildlife Standard 7 incorporates the Northern Rockies Lynx Management Direction (NRLMD) Record of Decision into the Forest Plan. NRLMD objectives, standards, and guidelines apply to management projects in lynx habitat, in lynx analysis units (LAUs), in occupied habitat, and in linkage areas. Therefore, identification of lynx habitat and delineation of LAUs determines *where* the NRLMD applies in addition to the NRLMD objective, standard and guidelines that apply to all projects within linkage areas in occupied habitat.

While designed to conserve and promote recovery of Canada lynx, the NRLMD was also designed to complement the Forest Service's multiple-use directive. Therefore, it is also important to identify areas within the Forest that do not provide habitat for lynx where we can work toward achieving other Forest Plan goals.

The need to update the identification of lynx habitat and LAU boundaries is based on the availability of improved mapping information as well as the change in occupancy status on the Beaverhead-Deerlodge National Forest. Additionally, the public has expressed the desire to provide input on habitat map updates through the NEPA process.

If the Forest does not take action to amend the Forest Plan, the Alternative 1 lynx habitat model and LAU boundaries would remain. Alternative 1 is problematic because:

- It failed to identify lynx habitat in some areas where it exists because it relied on satellite imagery of existing vegetation instead of using habitat type to identify habitat.

- It over-maps lynx habitat because it erroneously included many areas that lack consistent winter snow. These errors are explained in detail later in this analysis. Incorrectly classifying additional acres as lynx habitat unnecessarily focuses lynx management on areas that would not sustain lynx as they lack essential habitat characteristics for lynx to be successful. Over estimating lynx habitat also limits vegetation management needed for other Forest Plan purposes.

- Alternative 1 delineated under-sized LAUs that do not contain enough primary lynx habitat and therefore do not align with the design of the NRLMD that governs the pace of vegetation management at the scale of a LAU.

Issues

Issues are identified through public comment and agency discussions when there is a clear cause and effect relationship between the proposed action and the potential effects to resources. The analysis addresses three issues:

- Issue 1: Effects of the Modification of LAU Boundaries and Habitat Model. How does the modification of lynx analysis unit boundaries and the use of an updated habitat model affect the management of habitat and contribute to the recovery of Canada lynx on the Beaverhead Deerlodge National Forest?
- Issue 2: Consideration of Best Available Science. Does the analysis of effects consider science on Canada lynx habitat that has been published since the signing of the Northern Rockies Lynx Management Direction?
- Issue 3: Providing for Connectivity. Does the analysis consider the need for connectivity between areas of high-quality lynx habitat?

Alternatives

Alternatives Considered but not Analyzed in Detail

Several comments were received that requested the responsible official consider alternative approaches to meeting the purpose and need for the project. We have considered these potential alternatives and provide rationale below for why they are not analyzed in detail.

Alternative to Restore Functionality of Lynx Habitat and Connectivity

The development of an alternative to restore functionality and connectivity for lynx is outside the scope of this amendment. Functionality is partially dependent on the structural stage conditions of the available lynx habitat and is not addressed by this amendment because the purpose of this Forest Plan amendment is to more accurately identify lynx habitat and LAU boundaries for NRLMD application. Additionally, the NRLMD already includes direction to restore functionality of lynx habitat and to maintain connectivity through the following components, which is not dependent on the identification of habitat or LAU boundaries:

- Objective VEG O1. Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.
- Objective VEG O2. Provide a mosaic of habitat conditions through time that support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe hare habitat in both the stand initiation structural stage and in mature, multi-story conifer vegetation.
- Objective VEG O3. Conduct fire use activities to restore ecological processes and maintain or improve lynx habitat.

- Objective VEG O4. 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.
- Guideline VEG G1. 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 (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.
- Guideline VEG G5. Habitat for alternate prey species, primarily red squirrel, should be provided in each LAU.
- ALL O1. Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.
- ALL S1. New or expanded development and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.
- ALL G1. Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses.
- LINK O1. In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.
- LINK S1. When highway or forest highway construction or reconstruction is proposed in linkage areas, identify potential highway crossings.
- LINK G1. NFS lands should be retained in public ownership.
- LINK G2. Livestock grazing in shrub-steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.

Alternative to Increase the Amount of LAUs in the Forest

A commentor requested an alternative to increase the amount of LAUs on the Forest. It is unclear if the commentor meant that the proposed action should have more acres in LAUs and/or increase the number of LAUs. Regardless, this suggestion is considered through Alternative 1, which designated the entire Forest as LAUs.

Alternative to Use Montana Natural Heritage Program Lynx Habitat Map

Commentors suggested that we include the Montana Natural Heritage Program's (MTNHP) lynx habitat models in the Forest's updated lynx habitat model to provide linkage pathways and to identify lynx habitat. Forest and MTNHP staff discussed the accuracy of the MTNHP lynx habitat models. The MTNHP did not endorse the use of their lynx habitat models at fine scales (i.e. for project analysis), nor did they consider their lynx map best available scientific information because the Forest's updated habitat map based on habitat types (potential vegetation types) is more accurate. The MTNHP Canada Lynx Predicted Suitable Habitat Modeling paper discusses the model's limitations and suggested uses. This paper and notes from the meeting with MTNHP are available in the project files. Summarized topics during this meeting include:

- The inductive model should not be used for planning efforts on land areas smaller than one quarter of a public land survey system section (160 acres). Optimal and moderate suitability classes represent landscapes where suitable habitat is often more continuous, whereas the low suitability class represents landscapes where suitable habitat is less continuous, scattered, or patchy. Moderate to optimal suitability classes should generally be considered a species habitat. The Forest mostly overlaps with "low" or "unsuitable" with some areas of "moderate."
- The deductive model has locational uncertainties that exceed the land cover dataset (30 by 30 meters), which may intersect with incorrect ecological systems. Lynx observation dates do not coincide with time of vegetation classification (e.g., a lynx location may have occurred long before the vegetation was classified as 'insect-killed forest'). This results in overpredicting the amount of suitable habitat across the lynx's presumed range in Montana.
- MTNHP's modeling program focuses on statewide biodiversity. Models are not refined for individual species and do not use species-specific variables that would improve model performance.

Based on MTNHP's assessment of their model, we did not analyze this suggested alternative in detail.

Alternative to Use Historic Observations to Identify Lynx Habitat

Commentors requested that the Forest build a habitat model based on vegetation types historically used by lynx and historical observations. This alternative was not analyzed in detail because there is no credible science suggesting that the vegetation types we currently understand to be lynx habitat would have been different historically.

Further, relying on historic observations to model habitat would be problematic for a variety of reasons. *Lynx rufus* (bobcat) and *Lynx canadensis* (Canada lynx) were often not differentiated in earlier observation records (McKelvey et al. 1999). Information on whether the lynx was a resident or transient is usually lacking from observation databases and therefore, even if we had accurate location data for a verified observation, that location may have coincided with a lynx who was moving from one residential area to another through non-lynx habitat. Most historic records lack location information specific enough to correlate to a habitat type. Ambiguous occurrence data does not inform reliable distribution models because even multiple occurrence records in a given area cannot be equated with a resident, viable population (Ivan et al. 2024).

Commentors cite Thornton and Murray (2024) to support their assertion that historical habitat should inform habitat identification. The Forest Service does not consider Thornton and Murray (2024) to be the best available scientific information to inform lynx habitat modeling due to issues with model design and validation, extensive extrapolation, and ambiguous source data that led to questions about the plausibility of results (Ivan et al. 2024). Thornton and Murray's model included overly broad vegetation covariates, few training data from the area of interest, and lacked adequate validation. Vegetation categories selected for the model encompass a wide range of forest conditions and likely cause the model to over-predict habitat. For example, Thornton and Murray's model predicted high relative habitat probability in Arizona, New Mexico, Nevada, South Dakota, and California, which is untenable based on known habitat and climatic requirements for lynx and snowshoe hares.

This model also contradicts Olson et al. (2021), which is considered the best available science for landscape level lynx distribution by the Interagency Western Lynx Biology Team[6] (Interagency Western Lynx Biology Team 2022).

Alternative 1: No Action

Alternative 1 would apply Forest Plan Wildlife Standard 7 to approximately 2,021,598 acres of modeled lynx habitat on National Forest System (NFS) lands in 353 LAUs, as mapped in 2000. There would not be any revisions to the map under this alternative.

Alternative 1 modeled lynx habitat and LAUs are depicted in Figure B1 (Appendix B - Maps) and details about the number of acres of lynx habitat by ownership by LAU are displayed in Appendix C. Alternative 1 modeled lynx habitat within proposed LAUs is summarized in Table 1 below.

Table 1. Summary of Alternative 1 modeled lynx habitat within LAUs.

Alternative 1	All ownerships	NFS land	Non-NFS land
Total area of LAUs	6,613,019 acres	3,359,252 acres 51 percent	3,253,767 acres 49 percent
Range of LAU sizes	4,721 to 49,509 acres	0 to 33,334 acres	0 to 39,305 acres
Modeled Habitat within all LAUs	2,415,312 acres	2,021,598 acres 84 percent	393,693 acres 16 percent
Range of Modeled Habitat within Individual LAUs	105 to 24,102 acres	0 to 24,055 acres 0 to 100 percent	0 to 7,838 acres 0 to 100 percent

Alternative 2: Proposed Action

Alternative 2 would apply Forest Plan Wildlife Standard 7 to approximately 1,481,876 acres of modeled lynx habitat on NFS lands in 77 LAUs. Alternative 2 models 539,722 fewer acres of lynx habitat on Forest lands than Alternative 1.

Alternative 2 modeled lynx habitat and LAUs are depicted in Figure B2 (Appendix B - Maps) and details about the number of acres of lynx habitat by ownership by LAU are displayed in Appendix C. Alternative 2 modeled lynx habitat within proposed LAUs is summarized in Table 2 below.

Table 2. Summary of Alternative 2 modeled lynx habitat within LAUs.

Alternative 2	All ownerships	NFS land	Non-NFS land
Total area of LAUs	2,950,677 acres	2,596,770 acres 88 percent	353,907 acres 12 percent

[6] The Western Lynx Biology Team was formed in 2019 in response to a need to evaluate new lynx science that was mostly pertinent to the western United States and enacted by an interagency and inter-regional Steering Team of Federal, regional and state directors within the Forest Service, U.S. Fish and Wildlife Service, and Bureau of Land Management within the geographic scope of the western range of the Canada lynx (Interagency Western Lynx Biology Team 2022)

Alternative 2	All ownerships	NFS land	Non-NFS land
Range of LAU sizes	17,188 to 94,618 acres	10,994 to 76,658	0 to 26,315
Modeled Habitat within all LAUs	1,599,268 acres	1,481,876 acres 93 percent	117,392 acres 7 percent
Range of modeled Habitat within Individual LAUs	12,588 to 29,031 acres	6,477 to 29,661 acres 44 to 100 percent	0 to 9,774 acres 0 to 56 percent

Actions Common to All Alternatives

Both Alternative 1 and 2 would continue to implement the NRLMD through Forest Plan Wildlife Standard 7. No new Forest Plan components are proposed nor are there any changes to the existing Forest Plan or NRLMD lynx objectives, standards, or guidelines proposed for either alternative. The life of the 2009 Revised Forest Plan serves as the temporal bounds for this analysis.

Potentially Affected Environment and Environmental Consequences

Canada Lynx Affected Environment

Canada Lynx Habitat Components Not Directly Related to this Amendment

There are several components of lynx habitat that this environmental assessment for the proposed amendment does not analyze in detail because they are not related to the identification of lynx habitat and LAU boundaries. These include forested structural stage conditions and denning habitat. Connectivity and linkage areas likewise are not related to the identification of lynx habitat and LAU boundaries, but they are discussed because of public comment received. Effects of updating lynx habitat identified and delineation of LAU boundaries are analyzed.

Best Available Scientific Information

Best available scientific information related to identification of lynx habitat and delineation of LAU boundaries is listed here and summarized in this section and in Appendix A.

- Canada Lynx Conservation Assessment and Strategy Second Edition (Ruediger et al. 2000)
- Canada Lynx Conservation Assessment and Strategy Third Edition (Interagency Lynx Biology Team 2013)
- Northern Rockies Lynx Management Direction final environmental impact statement, Record of Decision, Biological Assessment (USFS 2007a) and Biological Opinion (FWS 2007)

- Seasonal Resource Selection of Canada Lynx in Managed Forests of the Northern Rocky Mountains (Squires et al. 2010)
- Multiscale habitat relationships of snowshoe hares (*Lepus americanus*) in the mixed conifer landscape of the Northern Rockies, USA: Cross-scale effects of horizontal cover with implications for forest management (Holbrook, Squires, Olson, Lawrence, et al. 2017)
- Understanding and predicting habitat for wildlife conservation: the case of Canada lynx at the range periphery (Holbrook, Squires, Olson, DeCesare, et al. 2017)
- Habitat selection by Canada lynx: making do in heavily fragmented landscapes (Vanbianchi et al. 2017)
- Species Status Assessment for the Canada Lynx (*Lynx canadensis*) Contiguous Unites States Distinct Population Segment (FWS 2017)
- Improved prediction of Canada lynx distribution through regional model transferability and data efficiency (Olson et al. 2021)
- Species Status Assessment Addendum for the Canada Lynx (*Lynx canadensis*) Contiguous Unites States Distinct Population Segment (FWS 2023)
- Recovery Plan for the Contiguous United States Distinct Population Segment of Canada Lynx (*Lynx canadensis*) (FWS 2024a)
- Numerous additional publications, also considered best available scientific information, indicate that snow is an essential component of lynx habitat and are listed in Appendix A.

The Lynx Conservation Assessment and Strategy (LCAS) was developed to provide a consistent and effective approach to conserve Canada lynx on federal lands in the conterminous United States. A national interagency Lynx Biology Team[7] assembled the best available scientific information to produce the LCAS and solicited an independent scientific peer review of the document. The NRLMD relied on the LCAS (Ruediger et al. 2000) to develop land management plan direction that conserves and promotes recovery of Canada lynx. The third edition of the LCAS (Interagency Lynx Biology Team 2013), is also a source of best available scientific information that provides a thorough review of lynx and lynx management. Both editions of the LCAS include a discussion of the components of lynx habitat, define lynx habitat, and the habitat components that female lynx need on their home ranges. This informed the Alternative 2 habitat model and LAU delineation, see Appendix A.

Numerous research publications discuss ecological conditions that lynx need in their home ranges including hare densities, snow conditions and sufficient boreal/subalpine habitat. This includes

[7] A national interagency Lynx Biology Team with representatives from Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management and the National Park Service was appointed by a national lynx steering committed in the late 1990s and operated as a group throughout the 2013 revision of the LCAS (Interagency Western Lynx Biology Team 2022).

Squires et al. (2010), Holbrook, Squires, Olson, Lawrence et al. (2017), Holbrook, Squires, Olson, DeCesare, et al. (2017), Vanbianchi et al. (2017), and FWS (2017, 2023).

The Olson et al. (2021) habitat model is based on GPS locations of lynx of three populations from Washington, Montana and Wyoming and is a highly predictive model of lynx habitat validated using withheld and independent data. The Western Lynx Biology Team (this includes the Forest Service) considers Olson et al. (2021) to be best available science for landscape-level regional model predictions of lynx distribution.

The Species Status Assessment is the FWS's evaluation of the best available scientific information, including elicited professional judgments and opinions of recognized lynx experts. The report includes a description of the ecological requirements and population dynamics of the species, an evaluation of the historical and current condition of lynx populations in the Distinct Population Segment (DPS) and the factors that appear to have influenced them, and an assessment of near-term and longer term viability of the DPS (FWS 2017). The Addendum to the species status assessment (SSA) is FWS's evaluation of relevant new scientific information that became available since the completion of the 2017 SSA (FWS 2023).

The FWS's Canada Lynx Recovery Plan (FWS 2024a) identifies recovery actions intended to prevent extinction or irreversible decline in the DPS in the foreseeable future, prevent a significant decline in population size, habitat quality, or other negative impact, and all other actions necessary to provide for full species recovery. The most important recovery need for Canada lynx is decisive action to address the effects of global climate change. Other important actions include managing forests using the best available science to conserve, improve, or restore lynx and snowshoe hare habitat within SSA units, monitor the quality and distribution of lynx habitat in all SSA units, conduct research and monitoring to develop and implement proactive forest management strategies to improve lynx habitat resiliency, and maintain or enhance connectivity with the DPS and between SSA units, among others.

Since the adoption of the NRLMD in 2007, additional information and scientific research related to Canada lynx have become available and/or published. Research published since the NRLMD is not in conflict with the direction outlined within the NRLMD but rather helps to refine nuances of how lynx use habitat within their home range.

Beaverhead-Deerlodge National Forest Lynx Habitat Designations

The FWS designated critical habitat for lynx in 2006 (FWS 2006) and revised critical habitat in 2009 (FWS 2009) and 2014 (FWS 2014). In 2024, the FWS proposed another revised designation of critical habitat (FWS 2024b). The FWS has not designated, nor has it proposed critical habitat on the Beaverhead-Deerlodge National Forest (FWS 2024b).

In a Recovery Outline for Lynx, the FWS (FWS 2005) categorized lynx habitat in the continental United States as "core," "secondary," or "peripheral" based on historical and current occupation by lynx. Areas with verified records of lynx presence over time and recent evidence of reproduction are identified as core areas. The Forest has no core areas for lynx. Areas with historical records of lynx presence, but no documentation of reproduction, are identified as secondary areas. Peripheral areas are those with only sporadic detections of lynx. Secondary and peripheral habitat contributes to lynx distribution and persistence by providing dispersal habitat to and from core areas, but otherwise, the role of these areas in sustaining lynx populations remains

relatively unknown (Interagency Lynx Biology Team 2013). The Forest has been classified as providing areas of secondary and peripheral habitat for lynx.

The FWS's Species Status Assessment (SSA) of lynx identified six geographic units in the contiguous United States with strong historical or recent evidence of resident lynx populations (FWS 2017, 2023). Most of the Forest is outside of these geographic units although a portion of the Pintler Ranger District is part of the Northern Rockies SSA geographic unit. The lack of overlap with focal areas and only one verified lynx observation on the Forest since February 2020 supports the designation of the Forest as a secondary/peripheral area for Canada lynx.

Canada Lynx Environmental Consequences

Comparison of Alternative 1 and Alternative 2 Lynx Habitat Identification

In brief, Alternative 1 applied a classification of existing forest cover type from satellite imagery combined with aspect to model lynx habitat. Alternative 2 used modeled and surveyed habitat type and presence of adequate light/fluffy snow to identify lynx habitat. Disturbance data was used to validate potential vegetation types in the Alternative 2 process.

It is important to make a point of clarification regarding existing vegetation types and potential vegetation types because the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000, Interagency Lynx Biology Team 2013) refers to both. The 2000 LCAS noted that in the Rocky Mountains lynx habitat is primarily in lodgepole pine, subalpine fir and Engelmann spruce existing vegetation types, and the third edition of the LCAS (Interagency Lynx Biology Team 2013) states that in the Northern Rocky Mountains geographic area, lynx occur primarily in spruce-fir potential vegetation types. These excerpts from both editions refer to the same kinds of vegetation; primary vegetation type refers to existing vegetation and potential vegetation types refers to habitat type, also described as the site's potential (see Appendix A for further explanation). Lodgepole pine occurs very rarely as a stand-alone habitat type on the Forest, but it often exists as a persistent early seral species in spruce and in subalpine fir habitat types. The full process for delineating LAU boundaries and lynx habitat in both Alternatives is explained in detail in Appendix A to the environmental assessment.

Table 3 displays the methodology outlined by the best available scientific information to identify lynx habitat.

Table 3. Comparison of Alternative 1 and Alternative 2 lynx habitat modeling including habitat components outlined by best available scientific information.

Habitat Components	Primary and Secondary Vegetation Identified	Primary Vegetation types are Lodgepole, Subalpine fir and Engelmann Spruce	Secondary Vegetation Types Includes Cool, Moist Douglas-fir and Grand fir	Snow Conditions	Proximity of secondary vegetation to primary vegetation
Source	LCAS (Ruediger et al. 2000) and NRLMD	Aubry et al. (1999) in Ruediger et al. (2000), NRLMD Appendix B (USFS 2007c), LCAS third edition (Interagency Lynx Biology Team 2013)	Ruediger et al. (2000), NRLMD Appendix B (USFS 2007c)	Ruediger et al. (2000), NRLMD Appendix B (USFS 2007c), Squires et al. (2010), additional research-see Appendix A	Lewis et al. (2011), Ruediger et al. (2000)
Alternative 1	Alternative 1 did not differentiate between primary and secondary vegetation	Alternative 1 included these as well as other existing vegetation types in combination with aspect as described in Appendix A	Alternative 1 included certain aspect combinations with Douglas-fir and all aspen existing vegetation types in general lynx habitat	Snow conditions were not included in the Alternative 1 habitat model	Spatial arrangement and juxtaposition of secondary vegetation to primary vegetation was not included in the Alternative 1 habitat model
Alternative 2	Alternative 2 differentiated primary and secondary vegetation	Alternative 2 classified subalpine fir and Engelmann spruce potential vegetation types as primary habitat, this includes lodgepole pine as described elsewhere	Alternative 2 identified moist Douglas-fir and grand fir potential vegetation types as secondary vegetation	Alternative 2 applied a snow depth-low snow density model to refine preliminary lynx habitat, areas that do not contain enough “light, fluffy” snow were excluded from the habitat model	Alternative 2 included secondary vegetation patches in final designation of habitat only if they were adjacent to primary vegetation

The alternatives use different methodology to model lynx habitat. Different methodology included data sources to identify lynx habitat vegetation, whether primary and secondary vegetation types were distinguished, and whether winter snow was applied as a lynx habitat component. Alternative 1’s query for identification of lynx habitat relied on Satellite Imagery Land Classification (SILC), a 1990s data set of vegetative conditions. Alternative 2’s query for identification of lynx habitat relied on modeled potential vegetation type (Jones 2004) and was supplemented by field surveys of potential vegetation type where available.

The LCAS (Ruediger et al. 2000) included an adjacency review of secondary vegetation to primary vegetation as a habitat identification step. Primary vegetation types are lodgepole, subalpine fir and Engelmann spruce. Secondary vegetation types include other cool, moist habitat

types (e.g. some Douglas-fir) where intermingled and immediately adjacent to primary habitat types. Isolated secondary vegetation types do not provide habitat conditions necessary to support lynx, but lynx may use areas where primary and secondary vegetation intermingle because lynx are highly mobile (USFS 2007b, Interagency Lynx Biology Team 2013). In Alternative 1, cover types (such as aspen, Douglas fir, Engelmann spruce, lodgepole pine, and others) with specific aspects were used to identify lynx habitat; Alternative 1 did not differentiate between primary and secondary habitats. Alternative 2 appropriately included an adjacency review of secondary vegetation types to primary vegetation when identifying lynx habitat.

In June 2004, Lynx Biology Team members visited the Forest to compare the April 2000 habitat mapping effort to locations on the ground. In the document describing their findings, (Claar et al. 2004), it was noted that the April 2000 mapping effort was not amended to include the August 2000 Regional Forester Direction to differentiate between primary and secondary vegetation, and that the Forest did not have potential vegetation type available and instead used Satellite Imagery Land Classification (SILC, existing vegetation) to produce the map. The documented review recommended that the Forest update the map with the application of potential vegetation type and update LAU boundaries to contain 6,400 acres of primary vegetation. The Forest did not address these recommendations until 2020 when occupancy status changed from unoccupied to occupied.

Snow in winter is an important component of lynx habitat. The LCAS (Ruediger et al. 2000) explained that lynx occur in mesic coniferous forests that have cold, snowy winters, provide a prey base of snowshoe hare (Ruggiero et al. 2000), and that both snow conditions and vegetation type are important factors to consider in defining lynx habitat. Holbrook, Squires, Olson, DeCesare, et al. (2017) determined that intermediate snow depths and the distribution of snowshoe hares were the strongest predictors of where lynx selected their home ranges. Winter is the most limiting time for lynx in terms of finding sufficient prey to survive. The lynx winter diet is primarily restricted to snowshoe hares, due to both species' adaptation to snow, combined with the ecology of alternate prey species and competing predators.

In the Species Status Assessment, its addendum (FWS 2017, FWS 2023), and the Recovery Plan (FWS 2024), the FWS recognized that lynx and snowshoe hares are snow-adapted species and that ecological requirements include both boreal forest and snow conditions. An abundance of published literature supports the fact that lynx need snowy environments in the winter in their home ranges (see Appendix A for additional discussion). Alternative 1 did not include any consideration of location of winter snow in its habitat model. Alternative 2 appropriately included snow as a part of the habitat mapping process. See Appendix A for details.

Comparison of Alternative 1 and Alternative 2 LAU Delineations

In brief, Alternative 1 included the entire Forest in LAU delineations by designating each subwatershed as a LAU. Alternative 2 drew LAU boundaries around areas containing an adequate amount of habitat to support a theoretical female lynx home range and therefore less of the Forest was designated in LAU boundaries.

LAUs should be "right-sized" to include the amount of primary habitat needed to sustain a female lynx and therefore would be larger in more fragmented habitat or in areas that include more non-habitats such as alpine tundra, rock scree slopes and dry forest types (Ruediger et al. 2000). The adjacency of primary habitat polygons that are included in a LAU should be considered in the context of how far a female lynx travels in a day (3-6 miles) and used as a factor in delineating LAUs to be sure they contain enough primary habitat arranged in a way that a female lynx does

not spend too much energy traveling among foraging areas. The second and third editions of the LCAS and the NRLMD provide guidance for delineating LAU boundaries. Table 4 displays this direction; the full process for delineating LAU boundaries and lynx habitat in both Alternatives is explained in detail in Appendix A.

Table 4. Comparison of Alternative 1 and Alternative 2 lynx analysis unit delineation processes outlined by best available scientific information

LAU Delineation Methodology	Size of LAUs should be 25-50 square miles (16,000 to 32,000 acres) in contiguous habitat	Each LAU includes at least 10 square miles (6,400 acres) of primary vegetation	Daily movement distances of female lynx (3-6 miles) accounted for in habitat patch distribution
Source	LCAS (Ruediger et al. 2000), LCAS third edition (Interagency Lynx Biology Team 2013)	LCAS (Ruediger et al. 2000), LCAS third edition (Interagency Lynx Biology Team 2013)	LCAS (Ruediger et al. 2000), NRLMD Appendix B (USFS 2007c), LCAS third edition (Interagency Lynx Biology Team 2013)
Alternative 1	Sizes of LAUs range from 4,721 to 49,509 acres. Mapped lynx habitat ranges from 105 to 24,102 acres (includes all ownerships).	LAU delineation did not ensure that at least 6,400 acres of primary vegetation were included because primary vegetation was not identified during the 2001 habitat modeling process.	LAU delineation did not ensure that habitat patches were close enough to be reached by the distance a female lynx could travel in a day. This step was not part of the LAU delineation process.
Alternative 2	Size of LAUs range from 17,188 to 94,618 acres. Mapped lynx habitat ranges from 12,588 to 29,031 acres (includes all ownerships).	All LAUs delineated included at least 6,400 acres primary habitat, see Appendix A, Step 3 of delineating LAUs for Alternative 2.	Daily movement of female lynx accounted for in LAU delineation process, see Appendix A, Step 4 of delineating LAUs for Alternative 2.

The LCAS provided direction that LAUs should contain 25-50 square miles of contiguous habitat and include a 10 square mile minimum of primary habitat, as well as consider continuity of habitat patches and daily movements of females. The LCAS (Ruediger et al. 2000) noted that LAUs should likely be larger in less contiguous, poorer quality, or naturally fragmented habitat. Alternative 1 LAU delineation did not apply any of this direction. The Alternative 1 process resulted in 353 LAUs that range in acres of total size (all ownerships) from 4,721 to 49,509 acres. Of these, only 17 LAUs (5 percent) meet the minimum of 16,000 acres of habitat (habitat identified on all ownerships by Alternative 1 habitat model).

Alternative 2 applied all the pertinent direction from the LCAS (Ruediger et al. 2000, Interagency Lynx Biology Team 2013) and the NRLMD to delineate 77 LAUs that range in size from 17,188 to 94,618 acres (all ownerships). Most of the (49 of 77) delineated LAUs are larger than 32,000 acres which is not surprising because the Forest is a considered a secondary area defined by the Canada Lynx Recovery Outline (FWS 2005) and LCAS (Interagency Lynx Biology Team 2013) where habitat is naturally patchier and less productive. Of the 49 LAUs that are larger than 32,000 acres, all have at least 25 percent lynx habitat and 45 of them have over 30 percent lynx habitat. The mapped lynx habitat modeled by Alternative 2 ranges in individual LAUs from

12,588 to 29,031 acres (all ownerships). Only 11 of the Alternative 2 LAUs have less than 16,000 acres of lynx habitat recommended by LCAS and of these, 10 have over 14,000 acres of lynx habitat. All the Alternative 2 LAUs include the minimum of 6,400 acres of primary habitat. Habitat patches in each LAU were included only if a theoretical female lynx could move among patches within a typical distance traveled in a day.

The total acres of Forest ownership in the Alternative 1 LAU delineations is 3,359,252 acres (essentially the entire Forest) and in the Alternative 2 LAU delineations is 2,596,770 acres; the difference in Forest ownership between these LAU delineations is 762,482 acres.

Alternative 2 LAUs exclude areas of the Forest that lack adequate winter snow, which results in less area designated in an LAU when compared to Alternative 1. The most prominent change in LAU delineation between the alternatives is that the southwest portion of the Forest around the Tendoy and southeastern Beaverhead mountains (the Lima-Tendoy Landscape and lands south of Highway 324 and west of Interstate 15)[8] are not designated as a LAU in Alternative 2. This area does not support lynx and lynx habitat because it is relatively dry and spruce fir habitat types are rare (Western Lynx Biology Team 2020).

VMap classification for existing vegetation classes was queried for the entirety of both the Alternative 1 and Alternative 2 LAU boundaries by Forest ownership (VMap is a data source explained in Appendix A). The results of this query reveal that the Alternative 1 LAU boundaries included over three hundred thousand more acres of non-lynx habitat vegetation types (ponderosa pine, limber pine, juniper, grass, shrub, urban areas, sparsely vegetated areas, and whitebark pine) than did the Alternative 2 LAU delineation. Also, the Alternative 1 LAU delineation includes almost twice as many acres of Douglas-fir which is likely the inclusion of dry site Douglas-fir, which is not lynx habitat, and was excluded in the Alternative 2 LAU delineations.

Importantly, this comparison also shows that there is little difference in the acres of lynx existing vegetation types (subalpine fir, Engelmann spruce and lodgepole pine) identified in both LAU boundaries (only a 5 percent difference between LAU delineations). This supports that both LAU delineations properly include lynx habitat types. Therefore, although the Alternative 2 LAUs contain 762,482 fewer acres of NFS lands than the Alternative 1 LAUs, the lands excluded from Alternative 2 LAUs are not lynx habitat.

Issue 1: Effects of the Modification of Lynx Analysis Unit Boundaries and Habitat Model.

How does the modification of lynx analysis unit boundaries and the use of an updated habitat model affect the management of habitat and contribute to the recovery of Canada lynx on the Beaverhead-Deerlodge National Forest?

Lynx is a forest carnivore with highly specialized habitat needs which are met only where the inherent capability of the lands of the Forest can support lynx habitat. A forested stand either is or is not a boreal forest or mesic coniferous forest with adequate snow conditions with the potential to provide lynx habitat. Management actions can only affect whether that stand is currently in a condition that provides optimal lynx foraging conditions, i.e. high densities of snowshoe hares or

[8] The Olson et al. (2021) species distribution model determines that this area would not support residential lynx; see Issue 2.

other habitat components that lynx need to survive (structural stage is outside the scope of this amendment). Appropriately identified lynx habitat will result in the best habitat management for lynx because NRLMD would be applied to the correct areas. The Forest relies on habitat modeling to indicate where we have lynx habitat when planning forest management projects. In cases where the habitat model missed identifying an area of lynx habitat that in fact is lynx habitat (errors of omission), the NRLMD may not be applied.

Alternative 2 more accurately identifies lynx habitat than does Alternative 1. Alternative 1 used the combination of existing vegetation with aspect to model lynx habitat, which is a poor surrogate for potential vegetation type because existing vegetation is an ephemeral condition influenced by forest succession and disturbances. In comparison, Alternative 2 used potential vegetation type to model habitat, which is a better indicator of a forested stand's ability to provide lynx habitat (at some point in the stand succession process) than existing vegetation because it is based on the habitat type of a site, a persistent characteristic. A habitat type is a classification system that describes a site potential in the absence of disturbance and does not change over time whereas the existing vegetation is a description of a stand only at the time of observation and can change based on disturbance events. Potential vegetation types identified by the LCAS as lynx habitat include all areas capable of providing habitat for lynx, regardless of their current condition. Definitions of existing vegetation and potential vegetation are provided in Appendix A.

A LAU is a static analysis area represented by polygons containing enough primary habitat spatially arranged in a way that could support a reproductive female on a home range. They are used during effects analysis and monitoring to describe management of lynx habitat through the NRLMD standards, objectives, and guidelines. It is important to first accurately identify lynx habitat, because the spatial arrangement of an adequate amount of primary habitat is used to delineate LAUs. In cases where habitat is over-mapped the NRLMD may not effectively limit the amount of modification to lynx habitat in a given area.

Alternative 1 habitat model over-mapped lynx habitat, including acres with vegetation that lynx would not use (e.g. dry forest types, grasslands, sagebrush, etc.). The Alternative 1 model does not differentiate between primary and secondary habitats and resulted in selecting some cover types that would not support lynx because they did not contain or were not adjacent to primary vegetation. Numerous lynx research publications clearly support that winter snow conditions are an important habitat identifier. Alternative 2 used potential vegetation type and presence of adequate winter snow to model habitat, resulting in more accurately identified lynx habitat than Alternative 1, which did not. For these reasons, Alternative 1 over-mapped lynx habitat.

The Alternative 1 LAU delineation process resulted in under-sized LAUs that did not include the minimum about of habitat needed to sustain a female lynx. The Forest identified a four-step process to identify LAUs in 2000 but only completed step one which selected all subwatersheds that intersect the Forest boundary. The second, third, and fourth steps would have included removing subwatersheds that did not contain lynx habitat, trimming portions that do not contain or are not adjacent to lynx habitat, and combining or modifying boundaries to meet LCAS criteria for LAU size and minimum amounts of primary vegetation lynx habitat within each.

The Alternative 1 LAU process resulted in:

- Ninety-five percent of the 353 Alternative 1 LAUs do not contain enough lynx habitat to support a female on a home range. Because primary and secondary vegetation types were not differentiated, we cannot report how many LAUs contain a minimum of 6,400 acres

of primary habitat. As a result, it is likely that fewer than five percent of these LAUs include the minimum amount of primary habitat recommended by the LCAS (Ruediger et al. 2000).

- Large areas of low elevation dry forests and non-forested areas were included in LAUs because snow was not used to model habitat; the Western Lynx Biology Team states that conservation efforts applied to these areas would be ineffective (Interagency Western Lynx Biology Team 2022).

The NRLMD objectives, standards, and guidelines are designed to help manage lynx habitat within each LAU. LAUs should contain enough lynx habitat that is arranged in a way that a female lynx can travel among habitat areas without expending too much energy. The LCAS provided guidelines for delineating LAUs that informed the NRLMD.

Alternative 1 did not result in a set of meaningful analysis units for lynx because they do not align with the intention of the NRLMD.

Alternative 2 incorporated guiding direction provided by the second and third editions of the LCAS and the NRLMD final environmental impact statement to define LAU boundaries and resulted in a set of LAUs that can provide appropriate context for analysis of project effects to lynx and lynx habitat. Therefore, the objectives, standards and guidelines that apply to lynx habitat under Alternative 2 would result in better habitat management for lynx. Alternative 2 delineated LAUs that contain the amount and arrangement of lynx habitat needed to sustain a female on a home range. The result is that NRLMD vegetation management objectives, standards and guidelines are applied appropriately and effectively.

Over the past 10 years, the Forest has harvested an average of 1,487 acres of timber and applied prescribed fire to about 3,120 acres each year. The NRLMD encourages vegetation management in lynx habitat where the current structural stage is not providing snowshoe hare habitat (lynx foraging habitat). Given the small acreage treated each year compared to the total number of forested acres, it is especially important to properly identify lynx habitat where we could apply silvicultural treatments to encourage desired conditions for lynx foraging habitat.

The mapping process in Alternative 2 (as described in Appendix A) excluded some patches of lynx habitat from LAU inclusion because: (1) they did not meet the minimum size primary vegetation requirement (10 square miles or 6,400 acres) or contribute to other lynx habitats sufficiently adjacent to meet LAU minimum requirements; (2) were too far from other more contiguous areas of lynx habitat and would not be reached within a days travel distance for a residential lynx; or (3) occur in areas without adequate snow conditions favorable for lynx. These habitat patches outside of LAU boundaries are not expected to be used by resident lynx but they may provide “stopover” habitat for dispersing lynx. These habitat patches are not subject to NRLMD components and therefore, small lynx habitat patches outside LAUs may be reduced, altered, or rendered unsuitable through various forest management actions.

Forest management actions in areas of potential lynx habitat outside of LAUs could affect individual dispersing lynx although this is not expected to be significant because lynx are capable of moving across large areas of non-habitat (Ivan 2012, Vanbianchi 2015, Vanbianchi et al. 2018) and are flexible in response to habitat fragmentation (Hornseth et al. 2014, FWS 2017, see Issue 3 discussion). Vegetation treatments including harvest, precommercial thinning and broadcast burning occurs on approximately 4,721 acres annually across the forest (0.2 percent of total

forested acres), not all of which is lynx habitat. Vegetation management at this very small scale relative to large scale nature of lynx dispersal movements considered in context with small parcels of lynx habitat mapped outside of LAUs and the behavioral plasticity demonstrated by dispersing lynx would not be sufficient to result in population-level negative consequences for resident lynx (FWS 2017, page 105).

An individual lynx may avoid areas that are undergoing active management and disperse elsewhere with less human activity. This effect is discountable and insignificant; a project would have to overlap in both time and space with an individual dispersing lynx for this to occur. The likelihood of this happening is extremely unlikely as the Beaverhead-Deerlodge has few dispersing individuals and only one record of a resident lynx. A transient lynx would likely find other areas of suitable stopover areas with less disturbance during dispersal. In addition, the Forest Plan contains several standards that protect lynx habitat outside of LAUs that lynx may utilize for stopover areas (refer to the Connectivity analysis in the Lynx Report).

Better lynx habitat modeling and appropriate LAU sizes result in positive outcomes to lynx habitat management compared to models that overestimate lynx habitat. This allows us to focus on conserving, improving, or maintaining habitat for this species where it matters while still managing for other natural resources, such as other species, ecosystem health, and fire resiliency.

Issue 2: Consideration of Best Available Science.

Does the analysis of effects consider science on Canada lynx that has been published since the signing of the NRLMD?

Best available scientific information directly related to the proposed amendment has been reviewed and considered in this effects analysis. Science related to identification of lynx habitat and description of lynx home ranges to inform LAU delineation is relevant to this analysis. Research published after the NRLMD confirms the premise of the NRLMD habitat descriptions: lynx prefer spruce, subalpine fir, and lodgepole pine forest vegetation types that support snowshoe hares and include winter snow conditions (Squires et al. 2010, Holbrook, Squires, Olson, Lawrence, et al. 2017, Holbrook, Squires, Olson, DeCesare, et al. 2017, Vanbianchi et al. 2017, FWS 2017, 2023, 2024a).

The Western Lynx Biology Team (this includes the Forest Service) considers Olson et al. (2021) (Olson model) best available scientific information for landscape-level regional model predictions of lynx distribution. The Olson model determined areas that could be used by reproductive and residential lynx using a different, but complementary approach to NRLMD.

Olson et al. (2021) (Olson model)

The Olson et al. (2021) model is based on a set of biotic and abiotic predictive covariates determined by locations from 93 individual lynx; snow, precipitation, cold temperatures and long-term forest presence were the primary environmental predictors in the model. This model was applied to areas that lacked location data, including the Forest, to predict areas where a reproductive (high habitat probability) or residential (moderate habitat probability) lynx could live. This habitat probability map provides complete coverage for the landscapes and areas across the Forest, assigning areas as either high, moderate, or low habitat probability (see Figures B3 and B4 in Appendix B - Maps).

The Olson model is a large landscape model, not designed for project specific analysis because it is based on large-scale landscape-level covariates and created to indicate areas that are likely to support lynx reproductive populations (high relative probability). Alternative 1 and Alternative 2 habitat models were based on identifying individual forested stands that provide lynx habitat and where enough habitat in a given area exists to support a residential female (LAU). The intention for Alternative 1 and 2 modeling is for project-level analysis to disclose effects to individual lynx and habitat based on proposed actions, which often include tree harvest. It is not appropriate to compare Alternative 1 and 2 timber stand habitat classifications to Olson et al. (2021) because the models were based on different inputs with different intentions for use. However, comparing LAU overlap to the Olson model moderate and high habitat probability areas is appropriate because these areas ostensibly represent residential lynx areas and indicate areas where conservation actions are most beneficial for species recovery.

Although created for different purposes, the Alternative 2 LAU delineation includes 99 percent of reproductive and residential lynx habitat (high and moderate lynx habitat probability) identified by the Olson model. Given that the Olson model habitat probability map is a coarse-filter (250-meter cells) at a large scale (multiple states and Canada), some exclusion of moderate and high probability habitat at the forest-level is expected because the Forest mapped lynx habitat at a finer scale. Most of the Olson model reproductive and residential areas excluded are relatively small and surrounded by low suitability habitat patches and therefore aren't as valuable to lynx as more contiguous habitat patches. Alternative 2 LAUs exclude most of the low relative habitat probability areas (areas unlikely to contain residential lynx habitat where only dispersal is expected).

In comparison, Alternative 1 contains all the high and moderate relative habitat probability, but because Alternative 1 LAUs include the entire Forest, all the low probability areas where a lynx is unlikely to reside or meet life history needs are also included. The Olson model found that precipitation in winter and summer is important to lynx distribution, likely because it is correlated with the types of vegetation that provide lynx habitat. Snow density informed both the Alternative 2 and the Olson model, but not the Alternative 1 habitat model which likely accounts for Alternative 1's inclusion of all the low lynx habitat probability. The Olson model supports the conclusion that Alternative 1 over-mapped lynx habitat. See Figure B3 for a map of Alternative 1 LAUs and Olson et al. habitat probability and Figure B4 for a map of Alternative 2 LAUs and Olson et al. habitat probability in Appendix B – Maps.

Both Alternatives result in providing NRLMD objectives, standards, and guidelines for more habitat than the authors of Olson et al. (2021) suggest is necessary and who state that conservation actions should be focused on the high probability habitat. Alternative 2 would result in NRLMD objectives, standards, and guidelines applying to high, moderate, and some areas of low Olson model relative probability areas within LAUs. Alternative 1 would result in NRLMD objectives, standards, and guidelines applied to Olson modeled habitat in high, moderate, and all of the low habitat probability areas identified on Forest, which would apply NRLMD to many areas that do not support lynx life history needs. This may prevent management necessary to support other wildlife species, ecological functions, or fuel reduction in places not important to lynx.

The Forest has chosen not to adopt the Olson model as an approach to lynx management direction. The Olson model is a habitat model; it is not management direction. Alternative 2

LAUs include 99% of the habitat that the Olson model identified as residential and reproductive habitat areas and the NRLMD would provide objectives, standards, and guidelines in these areas.

Western Lynx Biology Tiered Habitat (Spatial Framework)

The Western Lynx Biology Team (WLBT) Spatial Framework for the Conservation of Canada Lynx Habitat in the Western U.S. (Interagency Western Lynx Biology Team 2022) used Olson et al. (2021) to identify high quality lynx habitat, i.e. habitat areas that would provide the highest conservation value for lynx. WLBT applied threshold values (to capture a high proportion of areas of known lynx home ranges and verified lynx location data that excludes areas of low conservation value), minimum patch sizes that could support multiple home ranges (20,000 acres), and reproductive habitat quality (areas with fifty percent or more of highest-quality habitat) to identify key conservation and recovery areas. The Spatial Framework refined and reduced the area where the WLBT thinks management direction to conserve/recover lynx populations is appropriate by 40 to 50 percent compared to existing maps of lynx habitat across the Northern Rockies.

The Spatial Framework groups lynx habitat into tiers based on habitat quality. Tier 1 areas include habitat with the highest potential for supporting long-term occupancy and reproduction and established lynx home ranges. Tier 2 areas include habitat with the potential to support lynx occupation and promote connectivity that is located between Tier 1 habitat areas where we could expect periodic lynx occupancy and perhaps occasional reproduction. In Tier 3 areas we would expect only dispersing/transient individuals that may use the area as a stopover for foraging and shelter during long dispersal movements. Outside of tiers we would expect only very rare use by actively dispersing individuals.

Within the administrative boundary of the Forest, the Spatial Framework Tier 2 and Tier 3 polygons total 791,160 acres; most of this consists of Tier 2 polygons (716,770 acres; 91 percent). Less than one percent (1,782 acres) of tiered polygons are outside of Alternative 2 LAUs. Because Alternative 1 LAUs cover the entire Forest, all the Tier 2 and 3 polygons are within LAUs. see Figures B5 and B6 in Appendix B – Maps; Tier 2 polygons ostensibly represent potential lynx occupancy as do LAUs.

The tiered habitat identified supports the classification of the Forest as a secondary/peripheral area because no Tier 1 habitat (i.e. reproduction and occupancy) was identified on the Forest. The small number of lynx detections in the last ten years corroborates the Spatial Framework tiered habitats identified on the Forest. Despite continued survey efforts, only one observation has been verified on Forest since February 2020, indicating that lynx only infrequently move through or temporarily reside in the area.

The Forest has chosen not to adopt the WLBT tiered habitat approach as lynx management direction for a variety of reasons.

- The Forest is a part of the Northern Rockies Lynx Planning Area which includes all national forests with Canada lynx habitat in Montana, Idaho, and Wyoming. All these forests formally adopted the NRLMD through plan amendments and are still operating under this direction. The FWS in their Species Status Assessment noted that lynx conservation measures and habitat management guidance adopted by the Forest Service via formally amended or revised management plans (NRLMD) had a positive influence on distinct population segment lynx populations that occur on Federal lands and will continue to provide benefits as long as those

measures and guidance are implemented (FWS 2023). The Forest will continue to implement the NRLMD until a cohesive plan for adopting a new comprehensive set of management direction is developed, because the current standards are beneficial to this species.

- If the Forest were to change our lynx conservation management approach separately from the rest of the Northern Rockies Lynx Planning area units, our management approach may no longer be complementary to other efforts to recover Canada lynx. Other units continue to implement the NRLMD and some of these areas are more important to lynx conservation because they have reproductive individuals, therefore it is especially important that the Forest lynx management direction supports other forests in the planning area.
- Inconsistencies in structural stage definitions and methodology between (Holbrook et al. 2019) and the NRLMD definitions and classifications have not been reconciled. The Forest lacks data to classify structural stage according to WLBT (which is based on Holbrook 2019) and therefore we do not currently have the capability to understand whether we are meeting the Framework's desired targets of structural characteristics; we can only approximate Holbrook et al. 2019 structural stage information, but we lack understanding of whether this meets the WLBT structural stage intention (Allen et al. 2025).
- The management recommendations of WLBT are not standards or formal direction. The Framework notes that "it is not a comprehensive lynx conservation strategy" and to "sustain high-quality lynx habitat into the future, a landscape level, comprehensive wildfire risk/fuel reduction strategy is needed that could re-pattern the landscape to increase forest resiliency by reducing the likelihood of extensive wildfire spread to mature forest areas of lynx habitat. A complete lynx conservation strategy would also address other potential impacts, such as habitat fragmentation, human disturbances, and recreation for which there are new scientific findings." In addition, WLBT describes *recommended* structural stage conditions but does not provide accompanying standards to limit management actions or suggest the level of habitat alterations that would cause adverse effects to lynx. Because the framework does not include landscape-level wildfire risk/fuel reduction or conservation strategies for habitat fragmentation, human disturbances, and recreation or implementable standards to meet lynx habitat goals, the WLBT recommendations are not poised to replace existing forestwide lynx management direction.
- Alternative 2 incorporates 99% of the tiered habitat in LAU boundaries and is a more conservative approach to provide habitat protection compared to the WLBT tiers. The Framework used the Olson model (considered best available science) to focus lynx conservation to places that included the highest habitat probability. Tier 2 and 3 area on the Forest (791,160 acres) is approximately half of the lynx habitat identified by Alternative 2 (1,625,806 acres).
- Alternative 2 provides habitat redundancy for potential impacts by climate change or wildfire that could reduce the availability of lynx habitat on the Forest in the future. The FWS concluded that ongoing and projected climate warming is likely to negatively affect cold climatic conditions that maintain the boreal and montane ecosystems to which lynx are highly adapted. The Service anticipated that continued warming could cause a northward and upslope contraction of these systems potentially resulting in a substantial decrease or possible elimination of lynx habitats (FWS 2005). Climate-driven changes in natural disturbance regimes such as increased size, frequency and intensity of wildland fires and forest insect outbreaks are expected to continue and further impact lynx habitat. The Alternative 2 approach would apply NRLMD objectives, standards, and guidelines to twice the amount of

habitat than WLBT who notes that "there may be a need to maintain and/or enhance the remaining lynx habitat in these affected areas." Alternative 2 would meet that need through maintaining more habitat than identified by WLBT in case wildfire severely burns a large area there would be other areas already maintained as lynx habitat.

Issue 3: Providing for Connectivity.

Does this analysis consider the need for connectivity between areas of high-quality lynx habitat?

Definitions from the NRLMD final environmental impact statement and record of decision speak to connectivity in two contexts: residential lynx movement within a home range and lynx dispersal movement through a linkage area, i.e. leaving one residential area in search of another.

- "A linkage area provides connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys, or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks."
- "Habitat connectivity consists of an adequate amount of vegetation cover arranged in a way that allows lynx to move around. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat; wooded riparian areas may provide travel cover across open valley floors."

The NRLMD included a linkage area map Figure 1-1 (Figure B7 in Appendix B - Maps) that illustrates "only general locations" and the concept that lynx may disperse between isolated mountain ranges as indicated by arrows. These arrows are drawn across areas of non-lynx habitat and across all ownerships. Every isolated mountain range has an arrow. Per the NRLMD, "Linkage area maps were identified by an interagency group of biologists and state transportation planners…maps were used to determine which highways might be affected by the proposal…State and federal highway officials are using this data to identify potential wildlife crossings."

Shrub-steppe plateaus are low-rainfall natural grasslands/shrublands. This habitat naturally has patchy cover because it is dominated by sagebrush, grass and bitterbrush. Because shrub-steppe plateaus, with their paucity of vegetative cover, can provide lynx habitat connectivity, we assume that any type of habitat on the Forest would provide an adequate amount of vegetation cover arranged in a way that allows lynx to move to more suitable habitats. Shrub-steppe habitats are protected by NRLMD LINK G2: "livestock grazing in shrub-steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes." This direction is not limited to LAUs because linkage area direction applies to areas between blocks of lynx habitat.

Riparian corridors provide connectivity by making continuous forest or shrub cover available (Hickenbottom et al. 1999). Wooded riparian areas are protected by the Forest Plan Aquatic Resources Standard 27: Vegetation and/or fuel management prescriptions in Riparian Conservation Areas (RCAs) will be for the purpose of restoring, enhancing, or protecting the physical and biological characteristics of the RCA including Riparian Management Objectives. Vegetation and/or fuel treatments, for the purpose of protecting urban interface, private property, and public safety in RCAs shall be designed so as not to prevent the attainment of desired stream

function. This standard is attained by including 50-foot to 300-foot no-cut buffers[9] in our vegetation management project designs. Riparian areas occur in every landscape of the Forest providing continuous linear high elevation to low elevation travel cover connectivity in every watershed regardless of LAU designation. Therefore, riparian connectivity will remain available to lynx across all landscapes of the Forest and is not dependent on alternative selected.

Open habitats are not barriers to lynx connectivity and lynx have been documented to move through a large variety of habitat types (Vanbianchi 2015, Vanbianchi et al. 2018). Infrastructure such as interstates, highways, developed ski areas and other human developments, and habitat fragmentation may impede very localized movements but lynx have demonstrated landscape level movements that suggest features such as interstates and other human developments are ultimately not an impediment to dispersal. Lynx are flexible in their response to habitat fragmentation caused by human modifications (FWS 2017, Hornseth et al. 2014), meaning they are more sensitive to habitat loss than to the reduced connectedness among patches of habitat. These modifications include temporary activities such as forest management (thinning, fuels reduction, etc.) or permanent changes, such as major road construction (highways), residential and commercial development, mineral extraction, and utility and wind energy developments (FWS 2017). Fragmented areas may support fewer snowshoe hares than contiguous suitable forest habitats and lynx typically select areas that improve foraging opportunities (Fuller and Harrison 2010, Squires et al. 2010, Lewis et al. 2011). Because of this preference, fragmentation may alter lynx habitat selection (Koehler 1990, Lewis et al. 2011) or increase competition with competing carnivores (Buskirk et al. 1999).

The 2009 Forest Plan includes many standards limiting road construction, energy, minerals, oil and gas development and commercial activities, and permanent alterations of lynx habitat due to these types of activities are rare. Vegetation management actions, wildfire, and insect and disease can cause temporary habitat alterations and fragmentation across the landscape. Although some forest management (e.g. thinning) can benefit lynx by creating, maintaining, or restoring a mosaic of high-quality habitat, it may also fragment habitat into more isolated parcels depending on treatment type, location, and size (Holbrook et al. 2018). This may reduce the probability of lynx movements across a forested landscape (Squires et al. 2013), although traveling lynx generally tolerate poorer habitats while still selecting for the same kinds of features (such as forest cover) (Vanbianchi et al. 2018), and lynx occupancy is affected by habitat loss but not by habitat fragmentation on a landscape scale (Vanbianchi 2015, Hornseth et al. 2014). Although the largest source of anthropogenic fragmentation in the Distinct Population Segment (DPS) is vegetation management (timber harvest, silvicultural treatments and prescribed fire), there is no evidence that habitat loss and fragmentation from forest management or other anthropogenic activities resulted in population-negative consequences for resident lynx in the DPS or resulted in extirpation of lynx from areas that previously supported persistent resident lynx (FWS 2017).

There are no known dispersal corridors on the Forest, due to the lack of resident individual lynx on Forest and the corresponding absence of individuals to study. However, we do have dispersal information from eight lynx fitted with satellite collars reintroduced in Colorado who left and traveled through Yellowstone National Park or the Big Horn Mountains into Montana. Two of these eight individuals moved northward through the east and northern part of the Beaverhead-

[9] A 50-foot buffer minimum is a streamside management zone law, and often project design prescribes buffers 100-foot or larger to provide shade to control water temperature and to have adequate wood recruitment.

Deerlodge (specifically the Madison, Gravelly, Tobacco Root, Jefferson River, Upper Clark Fork, Boulder River, Clark Fork-Flints and Upper Rock Creek Landscapes) between 2004-2007 (Ivan 2012). Exact lynx dispersal routes cannot be ascertained because locations were recorded one day each week. This data documents that lynx travel through extensive areas of non-habitat during dispersal, which is supported by other research (Vanbianchi et al. 2018, Holbrook, Squires, Olson, DeCesare, et al. 2017, Buderman et al. 2018). Note that none of these eight lynx moved through the Lima-Tendoy area during their travels between Colorado and Montana.

Genetic evidence in the DPS of Canada lynx indicates no significant barriers to connectivity. There are no indications of significant loss or current stressors to the genetic health or adaptive capacity of lynx populations in the DPS (FWS 2017). High gene flow is occurring across most of the continental range of lynx likely due to high dispersal rates, large dispersal distances, and the absence of significant barriers (e.g., water (Row et al. 2012)) to genetic exchange (FWS 2017). Research indicates that lynx can and do disperse across large areas that are not lynx habitat (Mowat et al. 1999, Ivan 2012, Vanbianchi et al. 2018) which aids in gene flow. Although changes to forest structure can restrict lynx movements (Squires et al. 2013) and lynx generally avoid recent clearcuts and open patches in winter (Squires et al. 2010), these alterations do not drive genetic isolation in this species (Schwartz et al. 2002). Among peripheral populations (those within 165 kilometers of the lynx geographical range), there was some reduced genetic variability, but it was unlikely caused by human disturbance such as habitat loss or fragmentation (Schwartz et al. 2003, FWS 2017). In the future, it is possible the potential for genetic drift may increase if lynx and hare habitats shift northward and upslope due to climate warming (FWS 2017) and other stressors (trapping, forest management, and development) intensify the impacts of climate change for this species (Carroll 2007).

Alternative 2 delineates fewer acres in LAUs and identifies less lynx habitat compared to Alternative 1. This is not expected to have effects to connectivity for the following reasons:

- Linkage areas would not change because of the proposed action. The NRLMD provides the same protection for linkage areas under both alternatives because the linkage areas are not dependent on lynx habitat or on LAU boundaries. The designation of an area as a LAU does not confer any additional protection to linkage areas or habitat connectivity. We would only expect lynx to use areas outside of Alternative 2 LAU boundaries when making dispersal movements because these areas are not residential lynx habitats. Designation of a LAU would not affect the ability of a lynx to disperse through an area.
- The entirety of the Forest could be used by a lynx to make long-distance movements between blocks of suitable habitat. The NRLMD defines connectivity as an adequate amount of vegetation cover that allows lynx to move around; it does not specify that only lynx habitat provides connectivity cover. Low cover habitats such as shrub-steppe plateaus provide adequate travel cover for connectivity. Evidence from reintroduced lynx that left Colorado and moved through Montana proves that lynx move through large areas of non-lynx habitat including through areas with low to no travel cover. Protected riparian corridors across the Forest in every drainage provide continuous linear high elevation to low elevation habitat connectivity.
- The Forest recognizes that any type of vegetative cover can provide connectivity and facilitate lynx movements (based on dispersal evidence cited above). Therefore, habitat connectivity does not depend on protecting preferred lynx habitat within LAUs, but rather ensuring lynx have adequate habitat to move through at larger scales. Anthropogenic

disturbance effects to lynx on the Forest result from a variety of activities, such as vegetation management projects (timber harvest and prescribed fire, which occur on less than one percent of the entire Forest every 10 years), recreation (e.g., trail maintenance), mineral exploration, or infrastructure maintenance (e.g., recreation residences, road repair). Presence of humans and equipment are usually temporary and at any given time there are many areas of the Forest free from disturbance that lynx could travel through.

- When considering the context of the amount of vegetation management the Forest does on an annual basis (which is not expected to change based on selection of Alternative), removal of vegetation outside of LAU boundaries would not result in a barrier to lynx dispersal. Forests could be clearcut and these areas are still expected to be used by a dispersing lynx because research indicates that although they prefer forested cover, lynx will disperse across large areas of open habitat and other areas that are not lynx habitat as they move from one island mountain range to another.
- Home range habitat connectivity would not be affected by selection of alternative because the NRLMD Standard ALL S1 directs that vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area. Some localized avoidance is possible from vegetation management, but individuals can easily avoid areas with active management (during both dispersal and residential movements) because there is ample undisturbed habitat across the forest (the Forest harvests and burns only about one percent of forested habitats every 10 years). The Forest analyzes disturbance effects from proposed management actions, regardless of whether the area is designated in a LAU. Disturbance effects may vary depending on the type and duration of the project.
- Alternative 2 does not designate the Lima-Tendoys as a LAU because the area is dominated by warm, dry habitats and therefore lacks residential lynx habitat preferences. Olson et al. (2021) habitat probability map confirms the lack of lynx habitat in this area. Under Alternative 2, there would be no NRLMD vegetation management standards applicable and therefore no limits on the amount of stand initiation or mature multistory forest that may be changed through vegetative treatments. However, other Forest Plan direction is in place to limit the size of forest openings created, to maintain old growth forest conditions, and to protect riparian vegetation. Whether or not we have LAUs designated in the Lima-Tendoys, these are relatively open habitats and a lynx moving through this area would be no different than the eight lynx who moved between island mountain ranges across non-forested areas that lack specific lynx habitat objectives, standards and guidelines.

Although Alternative 2 delineated less of the Forest in LAUs, all areas would be subject to Forest Plan standards that may provide additional protections for lynx to improve or maintain habitat connectivity. These standards include:

- Aquatic Resources Standard 27: Vegetation and/or fuel management prescriptions in Riparian Conservation Areas (RCAs) will be for the purpose of restoring, enhancing, or protecting the physical and biological characteristics of the RCA including Riparian Management Objectives. Vegetation and/or fuel treatments, for the purpose of protecting urban interface, private property, and public safety in RCAs shall be designed so as not to prevent the attainment of desired stream function.
- Lands Standard 1: Energy transmission facilities shall be located only in designated utility corridors shown on the Utility Corridor and Communication Site map. Energy gathering or distribution facilities may be located outside of designated corridors.

- Minerals, Oil, and Gas Standard 2: Any new road constructed for oil and gas activity will be obliterated unless the road is needed as part of the Forest Service permanent transportation system.
- Recreation and Travel Management Standard 1: Permanent road construction is not allowed in summer non-motorized allocations or in areas evaluated for wilderness potential.
- Recreation and Travel Management Standard 4: Extreme sport courses such as motocross trails, technical mountain bike courses, and motor vehicle challenge routes will not be constructed.
- Recreation and Travel Management Standard 11: Commercial timber harvest is prohibited in recommended Wilderness.
- Recreation and Travel Management Standard 12: Road construction is not permitted in recommended Wilderness.
- Timber Management Standard 2: On lands suitable for timber production, the maximum size of openings created by one regeneration harvest operation shall not exceed 40 acres. Exceptions can be made where a natural event, such as fire, insect, disease, or windthrow created an undesirable opening. A regeneration harvest larger than 40 acres may be allowed after public notice, and review and approval by the officer one level above the responsible official. This only applies to harvest on suitable timber lands for timber production activities.
- Timber Management Standard 3: On lands suitable for timber production, even aged management regeneration harvest shall not occur unless the stand has reached the culmination of mean annual increment. An exception occurs where the primary purpose of treatment is for wildlife enhancement, visual enhancement, riparian area improvement or public safety or protection of property. The culmination of mean annual increment of growth requirement does not apply to cutting for experimental or research purposes; to non-regeneration harvests, such as thinning or other stand improvement measure; to management of uneven aged stands or to stands under uneven aged silvicultural system; and to salvage or sanitation harvesting of timber stands which are substantially damaged by events such as fire, insects, disease or windthrow. This only applies to harvest on suitable timber lands for timber production activities.
- Timber Management Standard 5: When trees are cut to achieve timber production objectives the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands.
- Timber Management Standard 6: The Timber Harvest Classification Protocol establishes where timber harvest is not allowed and where timber harvest is permitted to meet other forest objectives (see Forest Plan, Chapter 3, pages 39-42).
- Vegetation Standard 1: Mechanical vegetation treatments and prescribed fire in old growth stands (see Forest Plan Glossary) do not reduce the age and number of large trees and basal area below the ‘minimum criteria’ required for Eastern Montana old growth in Green et al, Table 3. Removing hazardous fuels within old growth stands is allowed if conducted in a manner that meets this requirement. This requirement does not apply to hazard tree removal and other public safety needs.
- Wildlife Habitat Standard 1: From October 15 to December 1 Hunting Units that exceed the open motorized road and trail density objective will have no net increase in designated open motorized road and trail mileage (Scale - Hunting Units on National Forest lands).

- Wildlife Habitat Standard 2: Landscapes that exceed the open motorized road and trail objective will have no net increase in designated open motorized road and trail mileage (Scale – Landscapes on National Forest System lands).
- Wildlife Habitat Standard 3: Mechanical vegetation treatments will: Retain all snags greater than 20 inches dbh (except for hazard trees). In addition, do not reduce the number of snags greater than 15.0 inches dbh per acre in treatment units below the levels shown in Table 12, calculated as an average for the total treatment unit acreage in a project area. This calculation allows variability among treatment units, which produces a more natural clumpy distribution. (See Forest Plan Chapter 3, page 48). If there are insufficient snags in treatment units, live trees in the same size class must be retained and counted towards the snag requirement. These would be in addition to any requirements of standard 4. These per acre requirements do not apply to the treatment units if analysis shows the levels of snags will be met for the project area as a whole. If, in the project area as a whole, there are insufficient live trees and/or snags greater than 15.0 inches dbh, the standard is deemed complied with by retention of the existing live trees and/or snags greater than 15.0 inches dbh in the treatment units.
- Wildlife Habitat Standard 4: Do not reduce the number of live trees greater than 10.0 inches dbh per acre in regeneration harvest treatment units (to provide future snags) below the levels shown in Table 13 on the next page [of the Forest Plan]. (See Forest Plan Chapter 3, page 49).
- Wildlife Habitat Standard 12: Provide habitat for species requiring large woody debris in forested habitat types by retaining post project outcomes for regeneration harvest of the following: (Scale project): Lodgepole cover type-6 pieces/ac with small end diameter equal to or greater than 8 inches and 10-ft long; Douglas-fir cover type-6 pieces/ac with small end diameter equal to or greater than 12 inches and 10-ft long.

Both Alternatives provide connectivity habitat for lynx because they identify connected habitat between SSA geographic units, across areas outside of LAUs, between Olson et al. high and moderate probability habitat areas, and between the WLBT Tier 2 and 3 polygon patches where lynx may disperse to find areas with higher-quality habitat. Both Alternatives identify lynx habitat in the areas between Olson high and moderate patches and Tier polygons, thereby providing NRLMD objectives, standards, and guidelines for lynx habitat in these areas and providing connectivity and redundancy in case a high-severity wildfire or other disturbance agent causes modeled lynx habitat to change to unsuitable conditions (lacking cover and snowshoe hare habitat).

Cumulative Effects

The proposed action is programmatic in nature, consisting of direction that would be applied to future management activities. It does not prescribe site-specific activities on the ground or irreversibly commit resources. There are no direct environmental consequences therefore the analysis discusses only indirect and cumulative effects of the alternatives, including disclosing the indirect effects of not taking action. Direct effects, if any, would result from site-specific projects and will be evaluated when those decisions are made.

The Canada lynx is protected as a threatened species with designated critical habitat, requiring conservation measures by all land management agencies, resulting in a collective suite of management plans geared toward conserving lynx and designated critical habitat for the species. All national forests with Canada lynx habitat in Montana, Idaho, and Wyoming formally adopted the Northern Rockies Lynx Management Direction (NRLMD) through plan amendments (USFS

2007b), and the national forests are still operating under this direction. Lynx management direction focuses on protecting the key components of lynx habitat and primary constituent elements of designated critical habitat for lynx. Therefore, cumulative effects for Canada lynx and designated critical habitat for lynx would result in consistent management across the national forests in northwestern Montana that provide connectivity with source populations in Canada.

Bureau of Land Management (BLM) lands near lynx habitat on the Forest are managed by the Dillon plan (BLM 2006) and Butte plan (BLM 2009) field offices. These plans follow guidance from the LCAS (Ruediger et al. 2000, Interagency Lynx Biology Team 2013), which lead to management consistent with national forest direction contained in the NRLMD. Other BLM plans in lynx habitat areas also include guidance from the LCAS.

The Montana Department of Natural Resources and Conservation has a Habitat Conservation Plan (Montana Department of Natural Resources and Conservation 2011) for managing forested State trust lands. The Habitat Conservation Plan commits to protecting lynx habitat by minimizing impacts of forest management on important habitat elements for lynx and prey species, with a goal to support Federal lynx conservation efforts in a manner consistent with the NRLMD. In addition, Montana Fish, Wildlife and Parks developed a State Wildlife Action Plan (Montana Fish Wildlife and Parks 2015), which identifies habitat community types, focal areas, and wildlife species that warrant conservation attention. The State Wildlife Action Plan does not identify Canada lynx as a species of greatest conservation need but does identify conifer-dominated forest and riparian areas as community types of greatest conservation need in the ecoregions that support lynx, which is consistent with NRLMD objectives, standards, and guidelines. Since the lynx was listed as threatened, Montana Fish, Wildlife and Parks has revised trapping regulations to minimize the potential for lynx to be caught in traps set for other species.

Other States in the Northern Rockies Planning area including Idaho, and Wyoming also have wildlife action plans that protect lynx habitat and commit to population conservation.

Alternative 2 more accurately identifies lynx habitat and therefore no negative cumulative effects to lynx are anticipated when considering this proposed action in concert with all the objectives, standards, and guidelines for lynx habitat that are contained in other Forest Plans, State wildlife conservation plans, BLM, and Tribal plans. In their Species Status Assessment addendum, the FWS noted that lynx conservation measures and habitat management guidance adopted by the Forest Service and BLM via formally amended or revised management plans have had a positive influence on distinct population segment lynx populations that occur on Federal lands and will continue to provide benefits as long as those measures and guidance are implemented The cumulative effects are large, contiguous areas of low human impact for lynx.

Possible effects to lynx from climate are anticipated to occur by 2050 and are disclosed in the FWS Species Status Assessment (SSA), the addendum to the SSA, and the Recovery Plan (FWS 2017, 2023, 2024a). The potential effects of continual diminishment of snow conditions and northward and upslope retreat of boreal forests in the future are unlikely to be abated by any potential management actions (FWS 2017). Certain management actions can nonetheless improve forest resilience, notably forest thinning treatments to reduce stand density. Forest stands with lower stocking rates experience reduced competition for water, sunlight, nutrients and space improving individual trees' resiliency to insects, disease and wildfire. Forest thinning treatments in lynx habitat are restricted by the NRLMD. More areas erroneously identified as lynx habitat under Alternative 1 unnecessarily constrains active management in dry forests that would improve forest resiliency. Therefore, Alternative 1 could lead to less resiliency in our forests

where the forested conditions are generally most in need of treatment (lower elevations with natural high frequency fire return intervals that have been interrupted by fire suppression).

Consideration of Effects of the Forest Plan Amendment to Other Resources

Consideration of Effects to Other Wildlife and Plant Species

We considered effects of this Forest Plan amendment to wildlife species other than Canada lynx (wildlife report in project files) including ESA-listed plant and animal species. Due to the programmatic nature and narrow focus of this project, only the Canada lynx requires detailed analysis of effects beyond what was analyzed in the 2009 Forest Plan final environmental impact statement.

The NRLMD provides specific direction designed to conserve Canada lynx, a species who has highly specialized habitat needs. Species who share the need for certain lynx habitat components as part of their life history needs would benefit from more accurate lynx habitat mapping. Wildlife species that have less specialized vegetative habitat requirements such as grizzly bear and elk would not be affected by selection of Alternative 2. Species such as bull trout, harlequin duck, Northern bog lemming, mountain goat, whitebark pine and monarch butterfly have their own specialized sets of habitat requirements, which are not the same as those for Canada lynx and would not be affected by this proposed amendment.

This programmatic amendment does not cause any on-the-ground disturbances or physical habitat changes for any listed, sensitive or management indicator species. Species such as Greater sage grouse have diametrical habitat needs, sage grouse relies on sagebrush, sagebrush-grasslands and juniper communities which are not lynx habitats. Greater sage grouse would benefit from accurate identification of LAUs and lynx habitat (Alterative 2) because the NRLMD would not be inappropriately applied to habitats that need to be managed for sage grouse. Conifer encroachment projects that would benefit sage-grouse could occur even if timbered stands have horizontal cover for lynx because these stands are no longer within a LAU. Lynx are extremely unlikely to select these areas for residency near sage-grouse habitat because of the lack of snow, few hares, and extremely patchy horizontal cover.

Effects to species would be analyzed for proposed project-specific actions.

Potential Effects to Vegetation Management

We considered the effects of the forest plan amendment to vegetation management activities such as timber harvesting, fuels reduction activities, aspen restoration, and other vegetation management activities identified under the 2009 Forest Plan. Both alternatives would allow for vegetation management to continue with site-specific analysis occurring at the project level. Proposed treatment areas would continue to be evaluated to determine the effects of proposed vegetation management on lynx habitat and to evaluate compliance with the NRLMD. Alternative 2 would help to focus analysis of effects to lynx on areas with greater potential for lynx habitat and the NRLMD direction will guide vegetation management accordingly.

For fuels management activities, if the activities are located within the wildland urban interface as defined by the Healthy Forest and Restoration Act, treatment of lynx habitat will be guided by the amount of exemption acres agreed to in consultation. When comparing the two alternatives,

Alternative 2 allows for fewer exemption acres within the wildland urban interface although we do not expect to use the amount of allowable exemption acres under either alternative. Both Alternatives allow for fuels management to occur across the forest, in compliance with the NRLMD.

Therefore, we find that the forest plan amendment is expected to have similar effects to vegetation management as those found within the 2009 Forest Plan final environmental impact statement.

Potential Effects to Grazing, Mining, and Recreation

We also considered the potential effects of the forest plan amendment to other resource management activities such as grazing, mining, and recreation that were analyzed under the 2009 Forest Plan final environmental impact statement. We found that these activities were guided by the NRLMD direction included in the 2009 Forest Plan and do not anticipate any change in effects beyond what was analyzed.

Listing of Agencies and Persons Consulted

Agency Consultation

We met with Montana Fish Wildlife and Parks, the Montana Natural Heritage Program and the FWS Montana Ecological Services Field Office to discuss this proposed project.

Tribal Consultation

Letters were mailed to the Shoshone Bannock Tribe, Confederate Salish and Kootenai Tribe, Blackfeet Tribe, and Crow Tribe on March 6, 2025. Each letter included a brief description of the project and invitation to share concerns as well as initiate government-to-government consultation.

Public Participation

The project first appeared in the *Schedule of Proposed Actions* on January 15, 2025, at which time the project website was also made public at https://www.fs.usda.gov/r01/beaverhead-deerlodge/projects/67523. An email bulletin with information about the opportunity for public comment on this project was distributed to 398 potentially interested parties on March 7, 2025. Legal notice publication in the *Montana Standard*, newspaper of record, occurred on March 8, 2025, thereby initiating the 30-day public scoping comment period. The scoping period ended on April 7, 2025, during which 10 comments were received.

The legal notice publication announcing the availability of the draft environmental assessment in the *Montana Standard*, newspaper of record, was published May 31, 2025. Twelve comments were received during the 30-day comment period starting June 1, 2025. Comments and responses to these comments are in the project files.

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