Stonewall Vegetation Project

Revised Biological Assessment

For

Terrestrial Wildlife Species

Lincoln Ranger District

Helena National Forest

Revised by: Date:

/s/ Patrick Shanley August 8, 2016

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SUMMARY

Determination of Effects

This Biological Assessment (BA) analyzes the effects of the Stonewall Vegetation Management Project on the federally threatened grizzly bear, Canada lynx and lynx critical habitat. For grizzly bear the determination of the Biological Assessment is MAY AFFECT, LIKELY TO ADVERSELY AFFECT. The determination is due to the degraded baseline condition in the Red Mountain subunit that would continue to be adverse to grizzly bears since the subunit does not meet the 19/19/68 road density objectives. The Stonewall project however, will not add to the adverse effects upon grizzly bear. For Canada lynx the determination is MAY AFFECT, LIKELY TO ADVERSELY AFFECT due to impacts upon lynx habitat. Similarly, the determination for Canada lynx Critical Habitat is MAY AFFECT, LIKELY TO ADVERSELY AFFECT.

Consultation Requirements

In accordance with the Endangered Species Act (ESA), its implementation regulations (50 CFR 402.13), and FSM 2671.4, the Helena National Forest has requested written concurrence from the United States Fish and Wildlife Service (FWS) with respect to determinations of potential effects on Canada lynx, Canada lynx Critical Habitat, and grizzly bear.

This Revised Biological Assessment conforms to legal requirements set forth in Section 7 of the Endangered Species Act (19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14 (c), requirements in Forest Service Manual Direction (FSM 2672.42) and consultation requirements identified in the Helena National Forest (HNF) Forest Management Plan (Forest Plan) (USDA FS 1986).

The Forest will reinitiate consultation if: 1) the amount or extent of take is exceeded, 2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, 3) the action is modified in a manner causing affects to listed species or critical habitat not previously considered or 4) a new species is listed or critical habitat designated that may be affected by the action.

INTRODUCTION

The purpose of this Revised Biological Assessment (BA) is to analyze the potential effects of the proposed federal action on all threatened or endangered species and their habitats occurring within the proposed action influence area. Threatened, endangered, and proposed species are species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL 94-588). Under provisions of the Endangered Species Act (ESA), Federal agencies shall use their authorities to carry out programs for the conservation of listed species, and shall insure any action authorized, funded, or implemented by the agency is not likely to: (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species; or (3) adversely modify proposed critical habitat (16 USC 1536).

This BA analyzes the potential effects of the proposed federal action on all threatened, endangered or proposed species known or suspected to occur within the Stonewall Vegetation Project influence area (Table 1). Species considered were identified by the USDI FWS Montana Field Office species list (updated 01/20/16) for the Helena National Forest (USDI FWS 2016). This BA analyzes potential effects to the federally listed species and/or habitats that could be affected by the proposed federal action including: grizzly bear (*Ursus arctos*), Canada lynx (*Lynx Canadensis*) and lynx critical habitat. Life

history information on these species can be found in the reference document "The Distribution, Life History, and Recovery Objectives For Region One Threatened, Endangered, and Proposed Terrestrial Wildlife Species" (USDA FS 2001) and is incorporated by reference in this Biological Assessment.

Table 1. Threatened or Endangers Species Known or Suspected to Occur.

Species	Status	Occurrence
Canada Lynx (*Lynx Canadensis*)	Threatened /Critical Habitat	Resident
Grizzly Bear (*Ursus arctos*)	Threatened	Resident

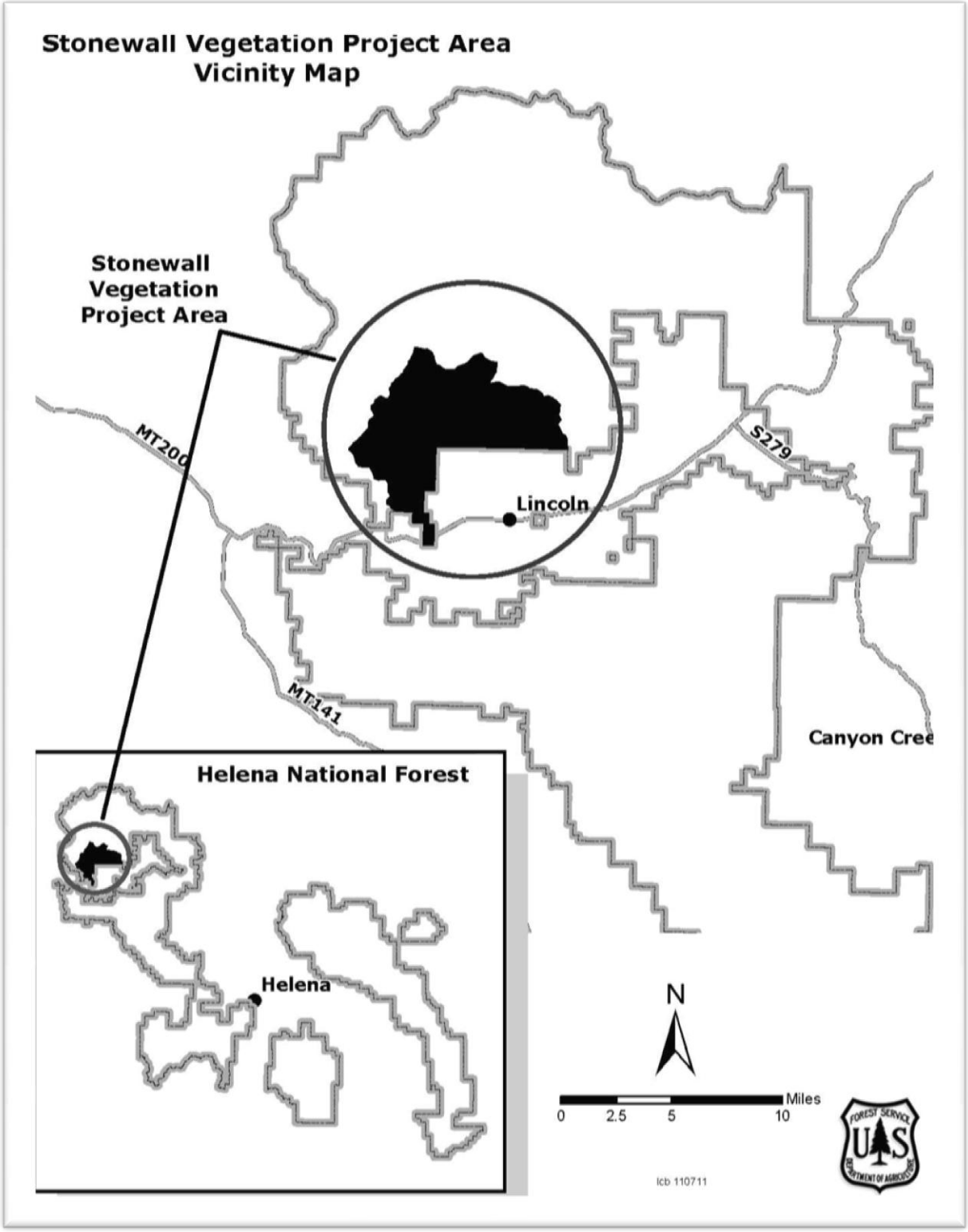
Project Area

The Stonewall Vegetation Management Project is located on the Lincoln Ranger District of the Helena National Forest. The project area is within the Blackfoot River Drainage approximately three miles north and west of Lincoln, Montana (see project vicinity map). The Stonewall project area totals 24,006 acres and with the exception of a few small, scattered parcels of private land consists entirely of National Forest System (NFS) lands. Elevation ranges from approximately 4,400 feet at the southern tip along the Blackfoot River to approximately 8,500 feet along the northern boundary. All treatment acres occur in Lewis and Clark County west of the continental divide. The legal description includes various sections within T14N, R9W; T15N, R9W; and T15N, R8W.

Approximately 95 percent of the project area is forested with primarily mature forest conditions. Young regenerating stands that exists in the southwest portion of the project area are largely the result of past harvest activities. Ponderosa pine and dry Douglas-fir predominant at lower elevations while moist Douglas-fir and subalpine fir predominant at mid and upper elevations. Whitebark pine is scattered across the project area at upper elevations with aspen occurring as a minor component of many stands widely scattered across the project area.

The southwest portion of the project area is bordered by the Lincoln Gulch subdivision and other scattered residences along the forest boundary. In addition, The Lincoln Gulch Historic Site (site of Old Lincoln Town) and the Lincoln Gulch Cemetery occur on NFS lands in T14N, R9W, Sec. 8, near the forest boundary. As such, the Stonewall project will serve to reduce fuels in the Wildland Urban Interface (WUI) to reduce the risk of wildland fire to adjacent landowners and residences. The WUI was defined in the Tri-County Community Wildfire Protection Plan (2005). All proposed harvest units occur within the WUI while prescribed burn units would occur both within and outside the WUI. Within the WUI, private lands as well as lower elevation project area lands along the Forest boundary, where dry Douglas-fir and ponderosa pine habitats dominate, also serve as elk winter range.

Livestock grazing within the project area includes the Stonewall cattle allotment and the Keep Cool/Liverpool sheep allotment. The Stonewall cattle allotment includes 2,000 acres of FS lands within the project area, primarily within the lower reaches of the Beaver Creek and Stonewall drainages. The Keep Cool/Liverpool sheep allotment occurs in the southeastern portion of the project area and includes approximately 8,530 acres of FS lands. Both allotments fall predominantly within the identified WUI and overlap elk winter range areas.


Stonewall Vegetation Project Area
Vicinity Map
Stonewall
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Proposed Project

The Stonewall Vegetation Project focuses on reducing hazardous fuel buildup and improving forest health in the Stonewall Project Area by using various vegetative treatments including commercial, non-commercial, and prescribed fire treatments. In total, the Stonewall Vegetation Management Project would treat approximately 4,868 acres including: commercial harvest of 1,423 acres; precommercial thinning of 690 acres, and prescribed burning of approximately 2,755 additional acres. Secondary treatments include various burn treatments within commercial and precommercial treatment units ranging from pile burning to broadcast burning. Commercial logging operations include 70% tractor logging and 30% skyline logging. Precommercial thinning acres include 67% mechanical treatment and 33% hand treatment with chainsaws. Within both low and mixed severity prescribed burn only units it is anticipated that 30 to 70% of the acres within a given unit would be burned. Fire created openings up to 5 acres in size may be created in low severity burn units whereas openings up to 30 acres may be created in mixed severity burn units.

Reforestation: Where regeneration treatments are proposed, a combination of natural and artificial reforestation (hand planting) of desired species is planned.

Roads: Approximately 32.4 miles of road would be utilized as haul routes during project implementation. This includes 31.5 miles of existing roads requiring maintenance or improvements and four new road segments totaling 0.9 miles to access four harvest units that would be constructed then obliterated immediately following harvest activities. Temporary roads would be constructed to the minimum standards necessary for log hauling; road surface width would be limited to truck bunk width plus 4 feet. Obliteration of temporary roads following their use includes installing drain dips, outsloping, scarifying, seeding, and re-contouring. Each of the four new road segments will be obliterated within 1-2 years of construction therefore there will be no change in total road miles following project completion. In addition, there will be no changes to public motorized access during or after project implementation. *Road Maintenance (Best Management Practices – BMPs):* Best Management Practices are required under Timber Sale Contracts prior to hauling of timber over these roads. The objectives of road maintenance are to provide benefits to the streams in the project area. Maintenance work could include culvert installation, replacement of existing culverts with larger culverts, installation of drainage dips and surface water deflectors, placement of rip-rap to armor drainage structures, aggregate surface replacement, aggregate placement to reinforce wet surface areas, ditch construction and cleaning where needed, and surface blading to restore drainage efficiency of the road surface.

Project duration and operating period: It is anticipated that mechanical treatments involving tractor and skyline operations will be completed within four years; prescribed burning activities for mechanical treatment units within five to six years; prescribed burning of units with no mechanical treatments and hand treated precommercial thin units completed over a ten year period, and any tree planting within 10 years. Noxious weed monitoring would be conducted post-implementation to determine treatment needs over time. All road work and logging activities would be restricted between 12/1 and 5/31 to avoid impacts to wintering big game and wet spring soil conditions.

Project implementation is anticipated to commence once the consultation process is completed and the Final Record of Decision (ROD) issued. The anticipated release of the final decision is early 2016. The proposed vegetation treatments, acres and associated activities are summarized in Tables 2 and 3 below.

Changes to the Revised Selected Action – Decision Alternative

In August and September of 2015 two wildland fires, Sucker Creek and Klondike, occurred within the Stonewall Vegetation Management Project analysis area. Subsequently, the Draft ROD Alternative analyzed in the May 5, 2015 Biological Assessment (BA) was modified to account for the changed conditions. Changes in the Final Decision Alternative include: reducing acres proposed for prescribed burning and some unit prescription modifications to account for vegetative changes within the analysis area. As a result, this document serves to revise the terrestrial species BA by describing changes to the proposed action, updating the baseline conditions and revising the effects analysis for grizzly bear, lynx, and lynx critical habitat.

The Sucker creek fire occurred on the eastern edge of the project area within Lynx Analysis Unit BL-08 and the Red Mountain grizzly bear subunit. It burned approximately 2,435 acres of lynx habitat in BL-08 of which 21 acres occurred in the eastern most prescribed burn unit, unit 79. No other proposed treatment units were affected. The Sucker Creek fire burned to the north and east of the project area and consumed approximately 600 acres within the 2003 Snow Talon fire perimeter.

The Klondike fire occurred in the northwestern portion of the project area within LAU BL-07 and the Arrastra Creek grizzly bear subunit. This fire burned approximately 550 acres in rocky, sparsely forested habitat in the head of the drainage. Of this, approximately 253 acres occurred within prescribed burn unit 88. In total, only 92 of the 550 burned acres supported potential lynx habitat.

The FEIS addressed a No Action Alternative (Alt 1) and two Action Alternatives. Alternative 2 was developed as the Proposed Action and Alt 3 was developed in response to comments. As shown in Table 2 below, Alt 2 proposed treating the most acres through commercial and noncommercial harvest treatments and prescribed burning. Alternative 3 was developed with greater emphasis on wildlife habitat resulting in fewer total acres treated, minimal temporary road construction, and fewer road maintenance miles. The Draft ROD Alternative was developed as a combination of Alts 2 and 3. With some exceptions including changes to treatment group 10 (discussed in more detail in table 3) the Draft ROD Alternative more closely resembled Alt 3 than Alt 2. The Final Decision Alternative, hereafter referred to as the Decision Alt, serves to address the changed condition following the 2015 fires and reflects additional refinements to proposed treatments.

Table 2. Project Treatment Summary by Alternative.

Grand Total Project Treatments (acres)	Alt 2	Alt 3	Draft ROD Alt	Decision Alt
	8,563	**6,564**	**6,449**	**4,868**
Total Commercial Harvest Treatments (acres)	**1,968**	**1,073**	**1,389**	**1,423**
• Tractor logging (total acres)	1,305	709	968	1,002
• Skyline logging (total acres)	663	364	421	421
Total Precommercial Thin Treatments (acres)	**1,132**	**822**	**883**	**690**
• Mechanical	639	537	591	398
• Hand treatments	493	285	292	292
Total Burning Treatments (acres)	**8,040**	**6,155**	**6,027**	**4,447**
• Total burning within commercial and precommercial harvest units (acres)*	2,577	1,487	1,850	1,692
• Total prescribed burning outside commercial and precommercial harvest units (acres)	5,463	4,668	4,177	2,755

Total Road Miles Used for Haul	**48.2**	**44.2**	**32.4**	**32.4**
• Roads Built for Project Use then Obliterated (miles)	2.6	0.4	0.9	0.9
• Road Maintenance (miles)	45.6	43.8	31.5	31.5
Timber Volume (Ccf)	**22,022**	**14,299**	**18,498**	**18,498**

*Reflects the total unit acres that include some type of burning prescription following harvest treatments (i.e pile burning, jackpot burning, site prep burning, and broadcast burning) therefore, the actual acres burned will be considerably less.

The primary change to the Draft ROD alternative for commercial and precommercial treatments centers on changes to the 193 acre Unit 51. Under the Decision alt, Unit 51was dropped from precommercial thinning as proposed under group 2 in the Draft ROD alt. However, to reduce fuels along private boundaries of the unit, 47 acres would be improvement cut, pruned, piled and burned. The remaining 146 acres in unit 51 would remain untreated. Under the Decision alt the 47 acres of improvement cut are included in group 10 as reflected in table 3 below. This serves to increase total commercial harvest acres even though only minor amounts of commercial product may be recovered from these acres. Conversely, total commercial harvest acres are also reduced by 13 acres in unit 1 that were dropped to mitigate potential fisheries concerns. As a result there is a 34 acre net gain in total commercial harvest acres in table 2 for the Decision alt. Collectively, for commercial and precommercial harvest acres, the Decision alt reflects a 159 acre decrease over the Draft Rod alt due to acres dropped from harvest treatment in units 51 and 1.

The biggest change reflected in the Decision alternative is the 1,977 acre reduction in mixed severity prescribed burn treatments (group 8) compared to the Draft ROD alt. Due to the 2015 Sucker Creek fire, those portions of prescribed burn units within LAU BL-08 that are outside the WUI and outside designated whitebark pine restoration treatment areas were dropped in the Decision alt. The 555 acres of whitebark pine restoration (units 79, 82, 83) that were part of the larger burn polygons are included in group 11 under the Decision alternative resulting in a net reduction of 1,422 acres of prescribed burn only treatments. Collectively, the changes to commercial and precommercial treatments (units 51 and 1) and the reduction in acres proposed for prescribed burning (units 84, 83, 82, and 79) comprise the 1,581 acre reduction in total project treatment acres between the Draft Rod and Decision alternatives.

The miles of temporary road construction and road maintenance would remain unchanged from the Draft Rod Alt. Additional details of specific changes for the Decision alt for group treatment descriptions are provided below in Table 3.

Table 3. Draft ROD and Decision Alternative Comparison by Treatment Group

GROUP #: BRIEF TREATMENT DESCRIPTION HARVEST TREATMENT, FUELS TREATMENT	**DRAFT ROD ALT**	**DECISION ALT**	**CHANGES FROM DRAFT ROD TO DECISION ALT**
Group 1: Intermediate Harvest to Promote Mature Open Forests	**235**	**235**	No Change
Improvement Cut, Underburn	235	235	
Group 2: Intermediate Harvest to Thin Young Forests	***883***	***690***	193 acre (Unit 51) reduction in precommercial thinning within LAU Bl-08; 47 acres of unit 51 treated under group 10 to reduce fuels along private lands.
Precommercial Thin	422	422	
Precommercial Thin, Handpiling, Burn Piles	14	14	
Precommercial Thin, Piling, Burn Piles	64	64	
Precommercial Thin, Underburn	141	141	
Precommercial Thin, Underburn or Slash	*242*	*49*	

GROUP #: BRIEF TREATMENT DESCRIPTION HARVEST TREATMENT, FUELS TREATMENT	**DRAFT ROD ALT**	**DECISION ALT**	**CHANGES FROM DRAFT ROD TO DECISION ALT**
Treatment along PVT			
Group 3: Regeneration Harvest in Areas of High Mortality Retaining Seed and Shelter Trees	***489***	***476***	13 acre reduction in unit 1 due to fisheries concerns
Seedtree with Reserves, Broadcast Burn	29	29	
Seedtree with Reserves, Jackpot Burn	54	54	
Seedtree with Reserves, Slashing, Handpile, Burn Piles	18	18	
Seedtree with Reserves, Underburn	211	211	
Shelterwood (Group) with Reserves, Jackpot Burn	30	30	
Shelterwood (Group) with Reserves, Site Prep Burn	*96*	*83*	
Shelterwood (Group) with Reserves, Underburn	21	21	
Shelterwood with Reserves, Site Prep Burn	30	30	
Group 4: Regeneration Harvest in Areas of High Mortality Retaining Rare Live Trees	**184**	**184**	No Change
Clearcut with Reserves, Broadcast Burn	73	73	
Clearcut with Reserves, Jackpot Burn	39	39	
Clearcut with Reserves, Site Prep Burn	54	54	
Clearcut with Reserves, Underburn	18	18	
Group 5: Intermediate Harvest to Remove Minor Amounts of Dead/Dying Trees	**25**	**25**	No Change
Sanitation, Slashing, Handpiling, Burn Piles	25	25	
Group 6: Low Severity Prescribed Fire to Create Mortality Patches 5 to 10 acres	**549**	**549**	No Change
Low Severity Fire, Openings <5 acres	549	549	
Group 7: Mixed Severity Fire to create mortality patches up to 5, 10, or 20 acres	**363**	**363**	No Change
Mixed Severity Fire, Openings <5 acres	36	36	
Jackpot Burn	326	326	
Group 8: Mixed severity fire to create mortality patches up to 30 or 75 acres	***3,265***	***1,288***	1,977 acre reduction within BL-08 outside WUI in units 84, 83, 82, 79; of this 555 acres of whitebark treatment included in new Group 11
Mixed Severity Fire, Openings <30 acres	*2,032*	*1,288*	
Mixed Severity Fire, Openings < 75 acres	*1,233*	*0*	
Group 10: Intermediate Harvest to Promote Mature Open Ponderosa Pine and Regenerate Aspen	***456***	***503***	47 acres of unit 51 (in group 2 under Draft Rod Alt) added to treat fuels along private lands. Now identified as unit 51a. Group 10 includes units 46, 47, 75, 51a. Unit 75 (99 ac) is a commercial and precommercial thin.
Improvement Cut, Underburn	358	358	
Commercial/Precommercial thin, underburn	99	99	
Improvement Cut, Prune, Pile and Burn	*0*	*47*	
Group 11: Whitebark Pine Restoration	Included in Group 8	***555***	New Group under Decision Alt. Acres included in group 8 under Draft Rod. Includes units 82, 83, 79
Improvement Cut (Hand), Pile and Burn, Jackpot burn		*555*	
Grand Total Project Treatments (acres)	**6,449**	**4,868**	**1,581 acre decrease**

Species Assessment - Canada Lynx

Methodology

The Helena National Forest Land and Resource Management Plan was amended in March 2007 by the Northern Rockies Lynx Management Direction (NRLMD) (USDA FS 2007b). This multi-region amendment established management direction to conserve and promote the recovery of the Canada lynx, by reducing or eliminating adverse effects from land management activities on National Forest System lands, while preserving the overall multiple use direction in existing forest plans. This management direction incorporated new science on lynx and was based on recommendations in the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000). The NRLMD avoids or reduces the potential for projects proposed under individual Forest Plans to adversely affect lynx through a suite of standards and guidelines that promote and conserve the habitat conditions needed to produce adequate snowshoe hare (lynx primary prey) densities to sustain lynx home ranges, and thus sustain lynx populations.

Following development of the Canada Lynx Conservation Assessment and Strategy, the Forest Service created maps delineating lynx habitat across National Forest System lands and defined Lynx Analysis Units (LAUs) for use in analyzing individual project effects to that habitat.

- The modeling of lynx habitat components, based primarily upon elevation and presence of potential boreal forest vegetative types, was done at the landscape scale and used the best information available. The process used for modeling the different lynx structural habitats can be found in the project file and utilized categories for lynx habitat structure described in the USDI FWS Biological Opinion (BO) (USDI FWS 2007) and NRLMD (USDA FS 2007b). Lynx habitat estimates and maps were derived from R1-VMAP and Pfister et al. (1977). Methodologies and assumptions associated with this data are described in; Pfister et al. 1977, R1 Multi-level Vegetation Classification System and its Relationship to Inventory Data, the Region 1 Existing Vegetation Map Products (2009) and the Eastside R1-VMAP Accuracy Assessment (2010).

- LAUs were developed to organize lynx habitat across the landscape into discrete units for analysis purposes. Each individual LAU is intended to be large enough and contain sufficient amounts of lynx habitat to represent the home range of a breeding female lynx (Ruediger et al. 2000). Watershed boundaries and other discrete landscape features were generally used to delineate LAU boundaries. The LAU (or multiple LAUs) affected by a project is used as the analysis unit upon which direct, indirect, and cumulative effects analyses are performed.

Action Area Description

For the Stonewall Vegetation Management Project, two LAUs, BL-07 and BL-08, are addressed as the action area for analysis of direct, indirect and cumulative effects. The Stonewall Vegetation Management Project area is fully contained within these two LAUs, and no other LAU's are affected by the project. Because most NRLMD direction is applied at the LAU level, and the lynx habitat within each LAU has been affected differently by recent wildfire and other landscape-level influences, direct and indirect project effects are evaluated in this analysis by individual LAU, whereas cumulative effects are evaluated across the combined LAU boundaries.

The NRLMD utilizes classifications of National Forest System lands as "occupied" or "unoccupied" by lynx, based on the Amended Lynx Conservation Agreement between the Forest Service and USFWS (USDA FS and USDI FWS 2006). These definitions are as follows:

- Mapped lynx habitat is considered occupied by lynx when:
    - There are at least 2 verified lynx observations or records since 1999 on the National Forest unless they are verified to be transient individuals; or
    - There is evidence of lynx reproduction on the National Forest
- Areas of lynx habitat not meeting the definition of "occupied" are considered unoccupied.

The NRLMD further classified lynx habitat on National Forest System lands based on the Lynx Recovery Outline (USDI FWS 2005) with respect to their status as core, secondary or peripheral lynx habitat. Definitions of these classifications are provided below:

- **Core areas** have both persistent verified records of lynx occurrence over time and recent evidence of reproduction.
- Areas classified as **secondary areas** are those with historical records of lynx presence with no record of reproduction; or areas with historical records and no recent surveys to document the presence of lynx and/or reproduction. If future surveys document presence and reproduction in a secondary area, the area could be considered for elevation to core. Secondary areas may contribute to lynx persistence by providing habitat to support lynx during dispersal movements or other periods, allowing animals to then return to "core areas."
- In **peripheral areas** the majority of historical lynx records is sporadic and generally corresponds to periods following cyclic lynx population highs in Canada. They contain no evidence of long-term presence or reproduction that might indicate colonization or sustained use of these areas by lynx. However, some peripheral areas may provide habitat enabling the successful dispersal of lynx between populations or subpopulations.

From a lynx management perspective, the Stonewall Vegetation Management Project area is identified as occupied, core lynx habitat. Therefore, all applicable standards and guidelines in the NRLMD that apply to proposed treatments are addressed for LAU BL-07 and BL-08 in this analysis. The project area is also located within designated lynx critical habitat (USDI FWS 2009; USDI FWS 2104). Project effects to designated critical habitat are assessed separately using the combined LAUs as the analysis unit.

Species Status and Biology

The population, distribution, life history, habitat status and recovery objectives for Canada lynx in Region 1 are detailed in Ruggiero et al. (1999), Ruediger et al. (2000), USDI FWS (2006) and USDI FWS (2007). The following is a brief summary of lynx habitat preferences and biology.

Canada lynx are medium-sized cats associated with boreal forests, whose distribution and abundance are linked to snowshoe hare, their primary prey (Ruediger et al 2000). In Montana, lynx habitat generally consists of coniferous forests (lodgepole pine, subalpine fir, and Engelmann spruce), containing a mix of seral stages. Drier forest types (e.g. ponderosa pine and climax lodgepole pine) do not provide suitable habitat (Ruediger et al. 2000, USDI FWS 2009). In the Northern Rocky Mountains, Canada lynx selected home ranges at mid elevations (4,702 ft. to 6,595) with high canopy closure and little open grassland vegetation (Squires et al 2013).

Daily movements of lynx within their home range are centered on continuous forest and they frequently use ridges, saddles, and riparian areas. They avoid large openings (Squires et al 2010), either natural or created when moving through their home range. Average daily movements for lynx in Montana were 4.2

miles per day (Squires et al 2013), with shorter distances moved during the period from parturition until kittens were 2 months old (Olson et al. 2011). Lynx are highly mobile and capable of dispersing long distances (USDI FWS 2007), with dispersal distances of up to 620 miles having been recorded. Movement corridors also vary seasonally, with winter corridors providing for local connectivity of neighboring breeding populations, whereas summer corridors may facilitate long-distance dispersal such as from the range core to periphery (Squires et al. 2013).

Snowshoe hares are the primary prey of lynx in Montana (Squires et al 2006) and throughout their range (Mowat et al. 2000). Red squirrels have been reported to be the second most important food source, although in Montana red squirrel abundance was not a factor in lynx habitat selection (Squires et al 2006). Squires et al (2006) concluded that lynx foraging and habitat selection was strongly driven by the abundance of snowshoe hares.

Lynx typically inhabit gentle, rolling topography. Across its range, dense horizontal cover, persistent snow, and moderate to high snowshoe hare densities are common attributes of lynx habitat (Squires et al 2013). Lynx are adapted for hunting snowshoe hares and surviving in areas that have cold winters and deep, fluffy snow for extended periods. These adaptations provide lynx a competitive advantage over potential competitors such as bobcats (*Lynx rufus*) and coyotes (*Canis latrans*) (Ruediger et al. 2000, Ruggiero et al. 1999, USDI FWS 2007). Because of the patchiness and temporal nature of high quality snowshoe hare habitat, lynx populations require large boreal forest landscapes to ensure that sufficient high-quality snowshoe hare habitat is available at any point in time so that lynx may move freely among patches of suitable habitat and among subpopulations of lynx (USDI FWS 2009).

Lynx den sites are located where coarse woody debris, such as downed logs and windfalls, provide security and thermal cover for lynx kittens, and the amount of structure (e.g., downed, large woody debris) appears to be more important than the age of the forest stand for lynx denning habitat (USDI FWS 2006). Denning habitat may be located along the edges of regenerating forests where trees have blown down into jackstraw piles of woody debris or in mature forest where downed woody debris is available (Squires et al 2006). Also denning habitat in or near foraging habitat is likely to be most functional and selected by females and multiple nursery sites are often used. Downed logs and overhead cover throughout the home range provide security habitat until kittens are old enough to travel (USDI FWS 2007). In Montana, lynx dens are usually located in mature, mesic forests on northeast aspects (Squires et al 2006). Lynx denning sites are not believed to be a limiting factor in Montana (J. Squires personal communication 2007 *in* USDI FWS 2007) and habitat elements associated with denning habitat (i.e. downed wood) are well distributed across National Forests (USDI FWS 2007), including BL-07 and BL-08, the two LAUs affected by the Stonewall Vegetation Management Project.

Lynx productivity is highly dependent on the quantity and quality of winter snowshoe hare habitat, which is a limiting factor for lynx persistence. Winter snowshoe hare habitat may be found in dense young regenerating forests where trees protrude above the snowline and in multi-storied forests where limbs of the overstory trees and understory trees provide horizontal cover. Based on research of the Rocky Mountain Research Station in Montana, in winter, lynx preferentially forage in spruce-fir forests with high horizontal cover, abundant snowshoe hare, deep snow conditions and large diameter trees (Squires et al. 2006, Squires et al 2010). During summer, lynx broadened their resource use to select younger forests with high horizontal cover, abundant shrubs, and small diameter trees and dense saplings (Squires et al. 2010). Given that lynx in Montana exhibit seasonal differences in resource selection, Squires et al. (2010) recommend that managers maintain habitat mosaics. Also because winter habitat may be most limiting for lynx, mosaics should include abundant multi-story, mature spruce-fir forests with high horizontal cover that are spatially well distributed (Squires et al. 2010).

Primary lynx mortality factors based on a Montana study include: predation by mountain lions primarily in the spring and fall (31 percent); starvation primarily in winter (29 percent); unknown factors (22 percent); and trapping/shooting (18 percent) (Squires et al 2006).

Lynx Habitat within the Stonewall Vegetation Management Project Area

The entire project area is within designated occupied and core lynx habitat (USDI FWS 2005, USDI FWS 2006), as well as lynx critical habitat (USDI FWS 2009, USDI FWS 2014).

The project analysis area includes two LAUs:

1) BL-07: west portion of project area; 98% NFS lands.
2) BL-08: east portion of project area; 99% NFS lands.

The baseline acres for the two LAUs are shown in tables 4 and 5 below.

Table 4. Calculation of Lynx Habitat by LAU.

LAU	Total LAU Acres	Permanent Non-lynx Habitat*	Mapped Lynx Habitat	% of LAU Supporting Mapped Lynx Habitat
BL-07	26,662	9,030	17,632	66
BL-08	27,352	5,930	21,422	78

***** Permanent Non-lynx Habitat includes high elevation non-forested habitats, dry forest habitat types, rock outcrops, sites dominated by dry grass/forbs/shrubs, low elevations, and large water bodies if present within the LAU.

Table 5. Existing Lynx Habitat within affected LAUs.

LAU	Stand Initiation (provides winter forage) Acres[1] (% of lynx habitat)	Early Stand Initiation (provides summer forage only) Acres[2] (% of lynx habitat)	Multistory (forage)[3] Acres (% of lynx habitat)	Other[4] (Stem exclusion and Mid Seral; non-foraging) Acres (% of lynx habitat)
BL-07	1,312 (7%)	420 (2%)	8,401 (48%)	7,499 (43%)
BL-08	455 (2%)	9,787 (46%)	2,953 (14%)	8,227 (38%)

[1] Stand initiation structural stage that *currently provides* winter snowshoe hare habitat
[2] Stand initiation structural stage that *currently does not provide* winter snowshoe hare habitat because trees have not grown tall enough to protrude above the snow in winter.
[3] Multistory structural stage with many age classes and vegetation layers that *appears to currently provide* winter snowshoe hare habitat.
[4] Forested conditions that do not fit Categories 1 through 4. Stem Exclusion Structural Stage (closed canopy with understory limited) and; Mid-Seral Structural Stage (multiple age classes and vegetation layers) that do not provide snowshoe hare habitat.

While mapped lynx habitat is abundant within both LAUs, available winter foraging habitat (stand initiation and multi-storied) varies considerably with BL-07 supporting approximately 55% winter foraging habitat and BL-08 supporting only 16%. Within BL-08 this is largely due to the Snow-Talon fire of 2003 which burned over 10,000 acres and the 2015 Sucker Creek Fire resulting in the high percentage

(47%) of early stand initiation in the LAU. It is anticipated that winter foraging habitat in BL-08 will continue to increase substantially over the next 10-30 years as young stands mature. Prior to the 2003 fire that portion of BL-08 and the adjacent LAU BL-06 that included the Copper creek drainage was recognized as the most prolific hare and lynx habitat in the Blackfoot Landscape area.

Due to recent MPB mortality, levels of coarse woody debris continue to increase within both LAUs providing an abundance of denning habitat. Although more concentrated mortality generally occurs in the southern portion of the project area, coarse woody debris has increased across the landscape substantially increasing denning habitat structural components within both LAUs.

Lynx are known to be present within both project LAUs. Lynx use of the upper reaches of the affected LAUs has been documented over time by various winter tracking efforts as well as records in the Montana Heritage Database (2012). However, data regarding lynx use of lower elevation harvest units in the more southern portion of the project area is lacking. Similarly, tracking efforts and hair snare stations in recent years have failed to detect lynx in the southern portion of the project area.

Direct and Indirect Effects

The effects to lynx are evaluated with respect to their compliance with the objectives, standards and guidelines identified in the Northern Rockies Lynx Management Direction (NRLMD) (USDA FS 2007a) and the Biological Opinion (BO) (USDI FWS 2007).

Table 6 reflects the total lynx habitat acres both collectively and by individual LAU that occur within proposed treatment units by treatment group description.

Table 6. Lynx habitat within Proposed Treatment Units by Description Group – Decision Alt

GROUP #: BRIEF TREATMENT DESCRIPTION HARVEST TREATMENT, FUELS TREATMENT	ACRES OF LYNX HABITAT WITHIN PROPOSED TREATMENT UNITS			
	DECISION ALT	TOTAL LYNX HABITAT	LYNX HABITAT BY LAU	
			BL-07	BL-08
Group 1: Intermediate Harvest to Promote Mature Open Forests	**235**	**152**	**152**	**0**
Improvement Cut, Underburn	235	152	152	0
Group 2: Intermediate Harvest to Thin Young Forests	**690**	**568**	**461**	**107**
Precommercial Thin	422	375	373	2
Precommercial Thin, Handpiling, Burn Piles	14	0	0	0
Precommercial Thin, Piling, Burn Piles	64	30	30	0
Precommercial Thin, Underburn	141	120	58	62
Precommercial Thin, Underburn or Slash Treatment along PVT	49	43	0	43
Group 3: Regeneration Harvest in Areas of High Mortality Retaining Seed and Shelter Trees	**476**	**407**	**407**	**0**
Seedtree with Reserves, Broadcast Burn	29	29	29	0
Seedtree with Reserves, Jackpot Burn	54	32	32	0
Seedtree with Reserves, Slashing, Handpile, Burn Piles	18	18	18	0
Seedtree with Reserves, Underburn	211	201	201	0
Shelterwood (Group) with Reserves, Jackpot Burn	30	29	29	0

GROUP #: BRIEF TREATMENT DESCRIPTION HARVEST TREATMENT, FUELS TREATMENT	ACRES OF LYNX HABITAT WITHIN PROPOSED TREATMENT UNITS			
	DECISION ALT	TOTAL LYNX HABITAT	LYNX HABITAT BY LAU	
			BL-07	BL-08
Shelterwood (Group) with Reserves, Site Prep Burn	83	67	67	0
Shelterwood (Group) with Reserves, Underburn	21	1	1	0
Shelterwood with Reserves, Site Prep Burn	30	30	30	0
Group 4: Regeneration Harvest in Areas of High Mortality Retaining Rare Live Trees	**184**	**162**	**162**	**0**
Clearcut with Reserves, Broadcast Burn	73	67	67	0
Clearcut with Reserves, Jackpot Burn	39	35	35	0
Clearcut with Reserves, Site Prep Burn	54	42	42	0
Clearcut with Reserves, Underburn	18	18	18	0
Group 5: Intermediate Harvest to Remove Minor Amounts of Dead/Dying Trees	**25**	**22**	**22**	**0**
Sanitation, Slashing, Handpiling, Burn Piles	25	22	22	0
Group 6: Low Severity Prescribed Fire to Create Mortality Patches 5 to 10 acres	**549**	**96**	**59**	**37**
Low Severity Fire, Openings <5 acres	549	96	59	37
Group 7: Mixed Severity Fire to create mortality patches up to 5, 10, or 20 acres	**363**	**98**	**0**	**98**
Mixed Severity Fire, Openings <5 acres	36	29	0	29
Jackpot Burn	326	69	0	69
Group 8: Mixed severity fire to create mortality patches up to 30 or 75 acres	**1,288**	**843**	**649**	**194**
Mixed Severity Fire, Openings <30 acres	1,288	843	649	194
Group 10: Intermediate Harvest to Promote Mature Open Ponderosa Pine and Regenerate Aspen	**503**	**496**	**315**	**181**
Improvement Cut, Underburn	358	352	218	134
Precommercial thin, underburn	99	99	99	0
Improvement Cut, Prune, Pile and Burn	47	47	0	47
Group 11: Whitebark Pine Restoration	**555**	**507**	**0**	**507**
Improvement Cut (Hand), Pile and Burn, Jackpot burn	555	507	0	507
Grand Total Project Treatments (acres)	**4,868**	**3,351**	**2,229**	**1,124**
Percent of lynx habitat within treatment units	**----------**	**69%**	**---------**	**---------**
Percent of lynx habitat treated by LAU	**----------**	**100%**	**67%**	**33%**

All commercial timber harvest and precommercial thinning (Groups 1-5, 10) would occur within the WUI. This includes 2,113 acres of which 1,803 acres (85%) occur within BL-07 and 310 acres (15%) occur within BL-08. Prescribed burn units (Groups 6-8, 11) include 2,755 acres both within and outside the WUI. Of this, 1,318 acres (48%) occur within BL-07 with 732 WUI acres and 586 non-WUI acres. Within BL-08 burn units include 1,437 acres (52%) with 862 WUI acres and 575 non-WUI acres. In BL-08 the non-WUI acres to be treated include 555 acres of Whitebark pine restoration (Group 11 - units 79, 82, 83) and 20 acres of aspen enhancement (unit 87).

As shown in table 6 approximately 69% of all acres proposed for commercial harvest, precommercial thinning, or prescribed fire treatments support mapped lynx habitat. For proposed commercial and

precommercial treatment units (Groups 1-5, 10) 86% of treatment acres support lynx habitat whereas only 47% of prescribed burn unit acres (Groups 6, 7, 8) support lynx habitat. Group 11 treatment units support 91% lynx habitat however, 98% of the mapped lynx habitat is classified as 'other' habitat. Stand improvement prescription objectives for this group which include reducing competing conifers and retaining all whitebark pine are not anticipated to change the habitat classification. The total acres of lynx habitat affected by the proposed treatments are shown in Table 7 below.

Table 7. Acres of Lynx Habitat treated within affected LAUs

LAU Name	Total Acres	Total Lynx Habitat Acres	Stand Initiation (provides winter forage) Acres[1] (% of lynx habitat)	Early Stand Initiation (provides summer forage only) Acres [2] (% of lynx habitat)	Multistory (forage) [3] Acres (% of lynx habitat)	Other[4] (Stem exclusion; multistory non-foraging) Acres (% of lynx habitat)	Total Lynx Habitat Treated Acres (% of lynx habitat)
BL-07	26,662	17,632	348 (2%)	31 (0.2%)	338 (2%)	1,417 (8%)	2,134 (12%)
BL-08	27,352	21,422	0 (0%)	0 (0%)	155 (0.8%)	956 (5%)	1,111 (5%)

[1] Stand initiation structural stage that *currently provides* winter snowshoe hare habitat

[2] Stand initiation structural stage that *currently does not provide* winter snowshoe hare habitat because trees have not grown tall enough to protrude above the snow in winter.

[3] Multistory structural stage with many age classes and vegetation layers that *appears to currently provide* winter snowshoe hare habitat.

[4] Forested conditions that do not fit Categories 1 through 4. Stem Exclusion Structural Stage (closed canopy with understory limited) and; Mid-Seral Structural Stage (multiple age classes and vegetation layers) that do not provide snowshoe hare habitat.

As reflected in table 7, the total acres of lynx habitat treated would be slightly less than the total acres of lynx habitat occurring within treatment units as reflected in table 6. The difference is due to the inclusion of multi-storied habitat occurring outside the WUI within proposed burn units that would not be treated and therefore are not reflected in table 7. For BL-07 this includes a 96 acre block of mapped multi-storied habitat in unit 88 that would not be treated. In BL-08, multi-storied habitat includes 13 acres within burn polygons outside the WUI that would not be treated. All multistory habitats that would be treated occurs within the WUI. No stand initiation habitat occurs within burn units outside the WUI. Non-WUI target acres for treatment are focused on other lynx habitat which currently does not provide snowshoe hare habitat.

The assumptions involved in the analysis of vegetation management effects on lynx include a) alteration of lynx habitats would occur as shown in Table 8, b) trees would continue to grow, particularly affecting young sapling stands, and c) there would be a lack of other stand-level changes, such as wildland fire and insect epidemics. All timber harvest, precommercial thinning, and prescribed burning were modeled as occurring simultaneously however some treatment activities, prescribed burning in particular, would be implemented over approximately a 10 year period. The alterations in lynx habitat by vegetation treatment type are shown in table 8 below.

Table 8. Vegetation Management Changes in Lynx Habitat Used for Effects Analysis.

Pre-treatment Lynx Habitat	**Regeneration Harvest** (Clearcut, Seedtree, Shelterwood)	**Intermediate Harvest** (Commercial Thin Improvement Cut)	**Precommercial Thinning (PCT)**
Multistory (Forage)	Early Stand Initiation	Other	*(Combination would not occur)*
Stand Initiation (Sapling Forage)	*(Combination would not occur)*	Early Stand Initiation	Early Stand Initiation
Other (Not Forage)	Early Stand Initiation	(No change)	Early Stand Initiation
Early Stand Initiation	*(Combination would not occur)*	*(Combination would not occur)*	(No change)

* See table 7 for habitat definitions.

The greatest change resulting from the proposed project treatments would be the conversion of multistory, stand initiation, and other habitat to early stand initiation. Increases in other habitat would also occur from intermediate harvest treatments in multistory. None of the proposed treatments would result in the short term creation of winter hare habitat, multistory or stand initiation, although winter hare habitat would increase over the long term, approximately 20 years or more. The acres of lynx habitat that would be converted to another habitat type are displayed in Table 9. See Table 10, below under the *treatment effects to lynx habitat* section for the resulting percentages of lynx habitats across the two Lynx Analysis Units.

Table 9. Changes in Potential Lynx Habitats due to Vegetation Management

Post-treatment Lynx Habitat	**Early Stand Initiation** [1]	**Sapling Foraging** [2]	**Multistory Foraging** [3]	**Other** [4]
BL-07	+ 1,488 acres	-348 acres	- 338 acres	+ 233 acres
BL-08	+ 318 acres	0	-155 acres	+149 acres

[1] Stand initiation structural stage *that currently does not provide* winter snowshoe hare habitat because trees have not yet grown tall enough to protrude above the snow in winter.
[2] Stand initiation structural stage *that currently provides* snowshoe hare habitat.
[3] Forested multi-storied structural stage with many age classes and vegetation layers *that appears to currently provide* winter snowshoe hare habitat (VEGS6).
[4] Stem Exclusion Structural Stage – Closed canopy with understory limited; does not provide snowshoe hare habitat.

The conversion to early stand initiation includes all regeneration harvest in lynx habitat (group 3 and 4), all precommercial thinning (group 2) and, 50% of prescribed burn unit acres (group 6, 7, and 8). For prescribed fire groups 6-8 the 50% calculation was used because prescription objectives are to burn 30-70% of the units with low and mixed severity fire with possible openings up to 30 acres in size. No multistory habitat would be treated outside the WUI, however all acres of multistory habitat within burn units are included in the calculation to account for burn unit acres that would be treated versus untreated. Collectively, groups 6-8 only support 47% lynx habitat with the majority of that classified as 'other habitat'. For BL-07 'other habitat' both within and outside the WUI, represents 83% of lynx habitat in groups 6-8 and in BL-08 it represents 94% of the lynx habitat. Outside the WUI prescribed fire treatments under groups 6-8 would be confined to BL-07 with the exception of 20 treatment acres identified for aspen enhancement in BL-08 under group 7. Where low severity burning consumes ground fuels but does not kill overstory trees or create openings within 'other habitat' that habitat classification would not change. Therefore, all adjusted acres for burn units (50% of total unit acres) are included as

creating early stand initiation. No stand initiation habitat occurs within burn units outside the WUI and no multi-story habitat would be burned outside the WUI. Within the WUI, multi-story and stand initiation acres within burn units are counted as reductions in multi-story and stand initiation and an increase in early stand initiation.

The conversion to other habitat includes stand improvement cuts in multistoried habitats. In both BL-07 and BL-08 all improvement cuts in multistoried habitat occur within the WUI. No multi-storied habitat would be treated outside the WUI. Current lynx habitat in burn units is predominantly other habitat and 50% of all burn unit acres are included as acres converted to early stand initiation habitat. Within other lynx habitat, low severity fire that does not remove overstory would not change the habitat classification. Similarly, although all improvement cut treatments in the WUI would be followed with underburning that would further reduce understory, treatments in other lynx habitat would not change the habitat classification due to the remaining overstory.

There would be precommercial thinning in 17 acres of early stand initiation and mixed severity fire includes 7 acres of early stand initiation habitat. That classification would not be altered by the thinning or burning.

Treatment effects to lynx habitat. Several studies (Maletzke et al. 2008, Squires and Ruggiero 2007, Squires et al. 2010) have reported that lynx avoid large openings such as those created by regeneration and shelterwood cuts, especially during winter. Removal of larger trees from mature multi-story forest stands to reduce competition and increase tree growth or resistance to forest insects may reduce the horizontal cover (e.g., boughs on snow), thus degrading the quality of winter habitat for lynx (Squires et al. 2010). Similarly, removing understory trees from mature multi-story forest stands reduces the dense horizontal cover selected by snowshoe hares, and thus reduces winter habitat for lynx (Squires et al. 2010).

Both harvest and burning activities within the WUI would treat 493 acres of multistory habitat under the allowable exceptions reducing the availability of winter hare habitat within treatment units and the project area. Spruce/fir habitats which are preferred by lynx are very limited within treatment units in the WUI however. Additionally, the current high stand mortality levels due to recent mountain pine beetle, spruce budworm, and Douglas fir beetle infestations have substantially degraded the habitat quality of many of the stands within the project area in recent years. Although the most extensive mortality has occurred in mature lodgepole and ponderosa pine, considerable mortality has also occurred within Douglas fir. In addition, many of the young regeneration stands have experienced considerable mortality further degrading hare habitat. Therefore, while proposed treatments will further reduce winter hare habitat, it is anticipated that treatments will result in the regeneration of more vigorous stand conditions benefiting lynx habitat over the long term.

The majority of the mapped multistory habitat that would be treated occurs within units 46 and 47 under group 10. Together these units represent approximately 70% (343 acres) of the existing multistory habitat that would be treated. These units border State and private lands along the forest boundary and function as big game winter range. These units occur at the lower elevational range of lynx habitat and the habitat type is Douglas fir/ponderosa pine with a pinegrass/snowberry understory with a south aspect which is not representative of lynx habitat. In the absence of wildfire multiple age classes have developed in portions of these stands although it does not provide suitable winter hare habitat as verified in the field. Approximately 40% of these units would remain untreated to provide cover for elk and other species movements. While the acres of multistory habitat treated in these units are included in the exceptions under Veg S6 for multistory treatments in the WUI the effect upon lynx and lynx habitat would be minimal.

Precommercial thinning has been shown to reduce hare numbers by as much as two and three fold (Griffin and Mills 2004, Griffin and Mills 2007) for a short time. Reducing the density of sapling-sized conifers on 348 acres of young regenerating forests to increase the growth of certain selected trees would promote more homogeneous patches and reduce the amount and density of horizontal cover needed by snowshoe hares (Griffin and Mills 2004, Ausband and Baty 2005, Griffin and Mills 2007, Ellsworth 2009).

Precommercial thinning treatments of stand initiation habitat within the WUI would be treated under the Veg S5 WUI exceptions. Precommercial treatments include both stand initiation habitats currently providing winter hare habitat and older self-pruning regenerating stands with raised canopies that no longer provide winter hare habitat. While many of the stands that currently provide winter hare habitat may continue to provide some level of snowshoe hare habitat post-treatment due to the low canopy cover, the reduction in tree density would not provide suitable winter foraging habitat. These stands may continue to provide some summer foraging habitat for lynx and would continue to provide sufficient cover for lynx movements between more suitable habitat patches due to the low canopy cover remaining.

As described for multi-story habitat treatments above, unit 75 occurs between units 46 and 47 and accounts for 25% (89 acres) of the mapped stand initiation habitat that would be treated under the exceptions. Unit 75 occurs within the same elevational band and represents the same habitat type as units 46 and 47 with big game winter range being a primary habitat function. Due to the stand age (>50 years) and the habitat type the stand currently does not provide winter snowshoe habitat. Therefore, even though these acres are included in the total for Veg S5 exceptions, precommercial thinning of the stand would have minimal effect upon lynx or lynx habitat.

Table 10. Post-project Lynx Habitat within affected LAUs

LAU Name	Total Acres	Total Lynx Habitat Acres	Stand Initiation (provides winter forage) Acres[1] (% of lynx habitat)	Early Stand Initiation (provides summer forage only) Acres [2] (% of lynx habitat)	Multistory (forage) [3] Acres (%of lynx habitat)	Other[4] (Stem exclusion; multistory non-foraging) Acres (%of lynx habitat)
BL-07	26,662	17,632	964 (5%)	1,630 (9%)	8,068 (46%)	6,970 (40%)
BL-08	27,352	21,422	455 (2%)	9,941 (46%)	2,806 (13%)	8,220 (38%)

[1]Stand initiation structural stage that currently provides winter snowshoe hare habitat
[2]Stand initiation structural stage where the trees have not grown tall enough to protrude above the snow in winter.
[3]Multistory structural stage with many age classes and vegetation layers that provide snowshoe hare habitat.
[4]Other – Stem Exclusion Structural Stage – Closed canopy with understory limited; Multistory structural stage with many age classes and vegetation layers that do not provide snowshoe hare habitat.

In any one location, lynx presence may overlap with potential disturbance due to harvest, thinning, burning, temporary road construction, road maintenance and use, or other activities. While there is the potential for disturbance or displacement there is no anticipated risk of mortality to lynx.

Seeding, tree and shrub planting, and shrub slashing would enhance habitat values over time for a variety of species preyed upon by lynx. These and other actions including road maintenance, culvert replacements would not have measurable effects on this species. As previously described, activities such

as prescribed burning, post-harvest burn treatments and planting would occur over several years maintaining the potential to disturb lynx. Conversely, post-harvest activities in treatment units have minimal potential to displace lynx due to the lower potential of lynx occurrences following harvest treatments.

Denning Habitat - Direct effects include those that result from activities or increased human presence that may result in harm or harassment to individual lynx and/or affect reproduction. Scientific literature is limited regarding the effects of human activities and associated disturbance factors that might affect lynx. To date there is little evidence that lynx are particularly sensitive to human disturbance other than near reproductive den sites (Ruediger et al. 2000; Koehler and Brittell 1990) and some authors have described lynx as being generally tolerant of human activities (Ruediger et al. 2000). While there is a possibility that a den site could be affected, due to the MPB mortality that has occurred and the abundance of DWD available, potentially suitable den habitat is widespread. Considering that over 90 percent of the analysis area (combined LAU's) would not be treated, and harvest activities would not occur before June 1, the likelihood that an active native or maternal den would be affected is low.

Potential effects to denning activity will be minimized by the timing of activities. Research in Montana indicates that lynx mate in late winter and females localize at natal dens in mid-May. Squires et al (2006) found that dens were usually located in mature mesic forests on northeast aspects and that during late May and June, lynx may move kittens from the natal den to a series of maternal dens. It is anticipated that proposed burning will occur largely in the fall outside the denning period and distributed across the landscape both temporally and spatially. Harvest would be restricted between 12/1 and 5/31 however, typical wet conditions during spring would further delay operations throughout most if not all of the denning period. In addition, early season operations are anticipated to begin on drier sites at lower elevations where denning is less likely to occur. Less than four percent of the proposed harvest acres occur on preferred north facing slopes and harvest of these acres would likely occur outside the denning period due to wetter conditions.

Research suggests that denning habitat is generally not limiting (USDA FS 2007b p. 15), especially when a substantial portion of the landscape is under Federal ownership. Because 98 percent or more of project area LAU's are under Forest Service Ownership and because there are large blocks of mature forest with significant amounts of coarse woody debris, denning habitat is not considered to be limiting on the landscape.

Some increase in snowmobile use is anticipated to occur in some units post-harvest, particularly in areas of regeneration harvest treatments. However, the winter snowmobile season in the analysis area concludes on March 31 which is outside the denning period and regeneration treatments areas have a low likelihood of being selected by female lynx for denning.

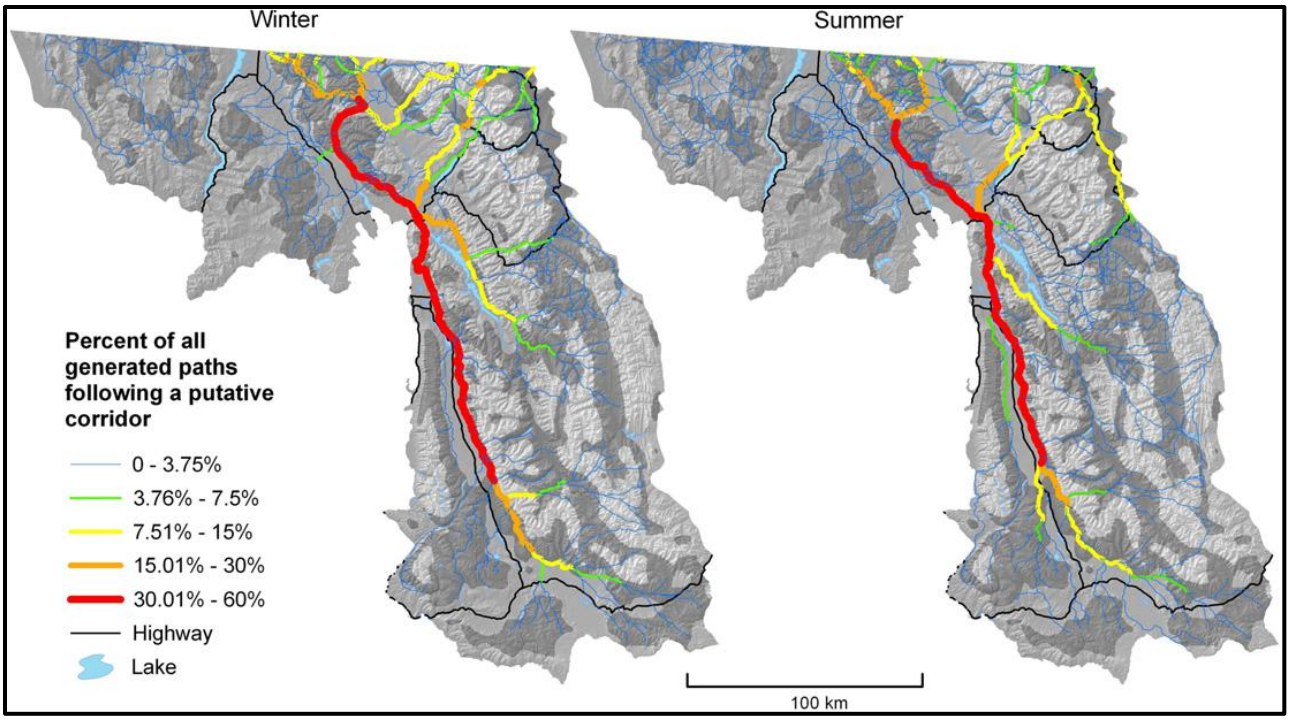
Collectively for these reasons, as well as the widespread availability of unaffected denning habitat, the potential for harvest activities and treatments to negatively affect denning activity or an active den would be minimal.

Linkage Areas and Habitat Connectivity - Maintaining landscape level connectivity between lynx habitat, particularly in the southern extension of its range is important to ensure lynx conservation in the Northern Rockies (Squires et al 2013, USDA FS 2007b). The Upper Blackfoot Valley is broadly identified as a linkage area where connectivity between patches of suitable lynx habitat north and south of Hwy 200 is compromised by open valley bottom conditions predominantly in private ownership, human use and development, Highway 200, and the Blackfoot river. It is well documented that highways with heavy traffic volumes impede lynx and other carnivore movements and are a primary source of mortality for species such as lynx and grizzly bear. The Blackfoot river corridor provides an important travel

corridor to access suitable habitats up and down the river for various species. Grizzly bears in particular are known to regularly use the river bottom for movements between seasonal habitats and to travel around the open valley bottom. Forest cover that provides security to access the river corridor is a key component in maintaining connectivity between suitable habitats to the north and south. The greatest connectivity and most probable travel routes for lynx and bears to move between habitat patches north and south of the Blackfoot river/Hwy 200 corridor occur at either end of the upper Blackfoot valley where public land ownership increases with more contiguous forest on either side of the highway corridor. The project area borders the western edge of the valley bottom where NFS lands and forest cover extend to Hwy 200 providing a potential movement corridor to lands south of the project area.

Squires et al (2013) modeled habitat patches capable of supporting lynx and providing connectivity between populations across the species' range of distribution in the Northern Rockies based on radio tracking data collected in Montana. The model identified the primary putative corridor for lynx connectivity between Canada and the Northern Rockies as extending from the Whitefish Range in the north, along the western front of the Swan Mountains and ending in Seeley, MT. Another putative corridor with Canada was identified as extending along the east side of Glacier National Park to the northern portions of the Bob Marshall Wilderness complex. The putative movement corridors in the study area also identified least cost paths for highway crossings in the study area which included minor crossing areas along Highway 200. One of the modeled crossing areas occurs at the western edge of the upper Blackfoot valley where the Stonewall project is located. The modeling also highlights how the two project LAUS are connected to the surrounding landscape and serve as potential movement corridors with suitable habitats beyond the affected LAUs. As noted by Squires et al (2013) the putative movement corridors for lynx show reasonable correspondence with previously published models for wolverine, wolves, and grizzly bears. The approximate locations of these corridors are displayed in Figure 1.

Figure 1. Putative Lynx Movement Corridors (from Squires et al. 2013)



It is known that lynx are sensitive to changes in forest structure and tend to avoid openings (Koehler 1990, Squires et al 2010, Squires 2013) and that due to the structural changes described under treatment effects, openings created by timber harvest can reduce connectivity and alter the movement of lynx within their home range and across the landscape (Squires et al 2006, Squires et al 2013). Although lynx movements might be altered by the openings created on sites receiving timber harvests and/or mixed severity burning treatments, from a landscape perspective, these sites are scattered, interconnected with unaffected habitat, and are similar to openings created by natural disturbances. It is not expected that prescribed treatments would reduce connectivity between or within LAU's. Also, as described under treatment effects, the proposed temporary roads will not isolate any forest patches and would not affect lands that may be used for dispersal (Squires et al. 2013).

The greatest concentration of commercial and precommercial treatments occur in the southern portion of the project area where National Forest System lands progressively narrow to a mile long strip ½ mile in width before reaching Hwy 200. Treatments within this strip include 83 acres of group shelterwood harvest followed by site pre burning in unit 1 bordering private residences to the east, and 146 acres of low severity burning with openings less than 5 acres in unit 2 along the western and southern borders. A small private mine claim that has been inactive for several decades occurs in the center of the strip and includes approximately 70 acres of private ownership the majority of which supports mature forest cover. In unit 1a, a short segment of temporary road would be constructed to complete harvest activities then obliterated upon completion of the unit all of which is anticipated to occur within a year. Site prep burning of unit 1 is anticipated to be completed within 1-2 years following harvest and prescribed burning activities in unit 2 are anticipated to be completed within a 1-2 year period.

Harvest and burning within unit 1 would leave minimal residual cover throughout the unit serving to deter lynx use. However, the probability of lynx and bears moving through this unit is currently compromised by the close proximity of private residences and the existing road that provides yearlong access to the numerous residences. Unit 2 is located along the ridge further removed from residences and traffic and is not accessible by road providing higher probability of supporting lynx and bear movements to the river corridor. Prescribed burning in unit 2 would result in minimal reduction in mature overstory and

understory vegetation would also be retained in patches throughout the unit since no more than 70% of the unit acres would be treated and not all understory vegetation would be consumed on treated acres. Although cover would be reduced in unit 2, sufficient cover would be retained that treatments are not anticipated to preclude lynx movements. In addition, no activities are anticipated in the near future on the private lands between units 1 and 2 which also support cover for lynx movements. Similarly, private and Bureau of Land Management lands bordering the west side of unit 2 provide adequate cover for lynx movements with minimal human use and disturbance.

For treatment units north of units 1 and 2, the variability in treatment prescriptions, the retention of untreated acres scattered between treatment units and the availability of contiguous NFS lands and BLM lands extending west would retain sufficient suitable habitat for lynx and grizzly bear to move between habitats north and south of Hwy 200. Squires et al (2013) also identified other minor putative corridors crossing Hwy 200 between the project area and Highway 141 as shown in Figure 1. Grizzly and black bears have been observed crossing Hwy 200 in various locations west of the project area and both grizzly and black bear highway mortalities have occurred west of the project area. While the various harvest and burn treatments may serve to temporarily displace lynx and bears during treatment activities and deter use of some treatment sites until sufficient regeneration occurs, the proposed project activities are not anticipated to preclude movements of lynx or grizzly between suitable habitat patches to the north and south of Hwy 200. Connectivity within the project will be degraded over the short term due to the reduction in cover however connectivity would improve over the long term as forest regeneration occurs. The 0.9 miles of temporary road construction would be obliterated within 1-2 years following construction and have very little effect upon connectivity due to their short segments and location on the landscape relative to existing roads. The project would not change public motorized access during the non-winter period.

Some increase in winter motorized use is expected, particularly in areas of regeneration harvest treatments. However, lynx generally avoid large opening, especially during winter (Maletzke et al. 2008, Squires and Ruggiero 2007, Squires et al. 2010) reducing the potential for snowmobile use to disturb or displace lynx. In addition, these areas would not provide winter snowshoe hare for approximately 15-20 years post-harvest at which time trees protruding above the snow would minimize snowmobile use. While some increase in winter snowmobile use is anticipated there would be no new designated or groomed routes and the incidental use is would not result in snow compaction that would increase competition from predators. In units within big game winter range, the FP restricts snowmobile use to designated routes only through winter range only which serves to limit the area post-harvest where snowmobile use may occur. In prescribed burn units, no notable increase in snowmobile use is anticipated since burned trees would be left standing impeding snowmobile travel and there are no existing roads or trails in these areas.

Table 11 below provides a summary of the exceptions claimed for the Stonewall Vegetation Management Project.

Table 11. Summary of NRLMD Exemptions for Stonewall Vegetation Management Project

Exemption	BL-07 (acres)	BL-08 (acres)	Total Acres Combined LAUs
Veg S5 WUI exemptions for PCT	379*	0	379
Veg S6 WUI exemptions for snowshoe hare habitat reduction in MS stands by vegetation management	338	155	493
Total Acres of Treatment Exemptions	**717**	**155**	**872**

Original NRLMD Exemption Allowance (6% of lynx habitat on HNF)	**26,400**
Current Balance for HNF	**26,269 (99%)**
Less Veg S5 and Veg S6 WUI exemptions	**872 (3%)**
Post Project HNF Exemption Balance	**25,397 (96%)**

*Includes 31 acres of early stand initiation scattered as small patches among various stand initiation and other habitats proposed for treatment.

Cumulative Effects

The cumulative effects analysis area for lynx includes the combined LAU's (BL-07 and 08) which total 54,014 acres. This area was chosen because; 1) it includes two adjacent LAUs, 2) it is large enough to evaluate connectivity and landscape level changes that may affect use, 3) and lands to the south include primarily private land which is highly fragmented and does not provide preferred habitat. Cumulative effects include past, ongoing and foreseeable future actions within the cumulative effect (CE) analysis area.

Cumulative impacts include future State, tribal, local or private actions that impact lynx or their habitat. Various State or private activities have spatial or temporal overlap with the proposed action although the majority of State and private lands in the action area do not support suitable lynx habitat due to lower elevations supporting more warm dry forest types. The potential for significant cumulative impacts relative to state and private lands is further limited by the low ownership of State and private lands, less than 2%, within the two project LAUs and the cumulative effects area.

Vegetation management can have beneficial, neutral, or adverse effects on lynx and snowshoe hare prey populations, and the duration of effects varies. Some vegetation management practices mimic natural disturbance processes, while other practices, such as use of herbicides to suppress hardwood regeneration, do not. Past vegetation management activities that clear-cut forests temporarily removed both snowshoe hare and red squirrel habitat, thereby reducing lynx prey densities. Timber harvest also regenerates the forest and provides early successional forests capable of supporting snowshoe hares. Timber harvest may also remove denning and security habitat that require long time periods to regenerate. In association with timber harvest, some level of road construction typically occurs that can facilitate recreational use in lynx habitats that previously received little use.

The majority of State and private lands in the cumulative effects area support open forest conditions due to past and recent management activities largely directed at improving forest health, removing dead and dying in response to insect mortality, and to reduce fuels in the wildland urban interface. Consequently, these lands do not support snowshoe hare habitat, the primary prey of lynx. On state lands, less stringent oversight is mandated and these actions can cumulatively impact lynx populations on federal lands. It is anticipated that future forest management on State and private lands will continue to emphasis forest health and fuels reduction activities that do not benefit lynx habitat. While the residual tree cover on state and private lands does not support lynx foraging habitat lynx may utilize some of these habitats on occasion for dispersal or movements between more suitable habitat patches. State lands are generally scattered parcels throughout the action area and past and future harvest activities are not anticipated to create barriers or impede lynx movements. While future harvest activities will further reduce forest cover and the abundance of dead trees, the impact from these activities on state and private lands will be minimal due to the small proportion of the action area involved and the low habitat suitability of state and private lands due to lower elevations and drier habitat types.

Within the cumulative effects area the extensive tree mortality, particularly in the lodgepole pine where the greatest insect mortality has occurred, has reduced the short term habitat suitability for lynx and

snowshoe hares. Over the longer term of 15-30 years, natural regeneration is expected to provide increased cover and forage for snowshoe hares. The accumulation of down wood will increase the availability of structural components lynx select for denning. The extensive mortality also serves to significantly increase the risk of large scale wildfires that could significantly reduce the availability of suitable lynx habitat for 15-40 years post-fire.

Domestic grazing occurs on much of the action area on private and State lands as authorized livestock allotments on NFS lands but is not anticipated to cumulatively contribute to project related effects to lynx or lynx habitat. The project would not result in any changes to allotment management or stocking levels. Use would remain largely unchanged within allotments and would not increase forage competition between hares and livestock. The presence of livestock during the summer grazing period in conjunction with the limited motorized access would not serve to create barriers or significantly impede the movement of lynx within the action area and habitat connectivity would be maintained.

The Blackfoot-North Divide Winter Travel Plan was implemented in December 2013. In general, snowmobiling primarily occurs on existing roads and trails or in open areas with limited forest cover or associated structural complexity at the ground level. Densely stocked stands, dense regenerating young stands that provide good snowshoe hare habitat, or stands with a high level of dead and down that may provide denning habitat are generally not suitable for snowmobiling. The Winter Travel Plan designated approximately 88,000 acres as winter non-motorized and imposed a winter season ending date of 3/31 for lands north of Hwy 200, with the exception of the Copper Bowls play area that would allow use until 5/31. South of Hwy 200 the season ending date is 4/15. Previously, there were no area restrictions and no season ending date for winter motorized use in the action area. Cumulatively, both travel plans maintain or reduce recreational use in the action area minimizing recreational disturbances to lynx and lynx habitat. Highways 200 and 279 currently provide the most significant impediment to wildlife movements within the action area and are responsible for multiple wildlife mortalities throughout the year, although there are no known lynx mortalities to date. It is anticipated that traffic volume on these highways will increase in future years as the human population in surrounding areas continues to grow. Correspondingly, since many of the action areas summer and winter recreationists come from the surrounding areas, it is reasonable to expect some future increase in highway traffic and an increased potential for lynx mortality.

Climate change is anticipated to influence lynx and lynx habitat with several possible effects of climate change anticipated. These include: (1) potential shifts along elevation or latitudinal gradients in the distribution of the lynx population itself, along with prey species and potential competitors and predators; (2) reductions in overall lynx population size; (3) changes in demographic rates, such as survival and reproduction; (4) changes in co-evolved interactions, such as prey-predator relationships; and (5) direct loss of habitat from changes in forest species composition and changes in the frequency and pattern of forest disturbances (fire, hurricanes, insect outbreaks; McKenzie et al. 2004). The proposed project would not contribute cumulatively to the effects of climate change.

The existing level of development within the action area is relatively low consisting primarily of developments in lower elevation habitats surrounding the town of Lincoln, as well as other scattered homes and/or ranches. Additional future development is anticipated to continue at a moderate level however, the degree of future development is difficult to predict and is limited by the availability of private land suitable for development. Most private lands are at lower elevations and support dry forest types that do not provide lynx habitat minimizing the potential to cumulatively affect lynx. In general, the action area has a low degree of human development and the extensive forest cover provided by the large contiguous block of public lands provides a high degree of connectivity to allow lynx movements within the action area.

Activities associated with exploration and development of leasable minerals could affect lynx habitat by changing or eliminating the native vegetation and contributing to habitat fragmentation. The development of associated roads, powerlines and pipelines to facilitate exploration and development could result in a loss of lynx habitat and contribute to fragmentation of habitat. Currently, several small placer mines occur in the cumulative effects area but there are no proposals for larger scale exploration or development of leasable minerals within the action area.

Based on the above discussion and the direct and indirect effects of the Decision Alternative analyzed in this document, the Decision Alternative is not anticipated to significantly contribute to cumulative adverse effects upon lynx or lynx habitat.

Regulatory Framework and Consistency—Lynx and Lynx Habitat

The Canada lynx was listed as a threatened species under the Endangered Species Act (ESA) in 2000. The Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) was developed to provide a consistent and effective approach to conserve Canada lynx and to assist with Section 7 consultation under ESA on federal lands in the contiguous United States. A Recovery Outline for the Contiguous United States DPS of Canada Lynx (USFWS 2005) was prepared by the FWS. This outline is intended to provide interim guidance for consultation and recovery efforts until a formal recovery plan has been approved. A recovery plan for the lynx is in preparation. In 2007, the Northern Rockies Lynx Management Direction (USDA FS 2007a) amended 18 USFS Forest Plans. The U.S. Fish and Wildlife Service prepared a biological opinion on the effects of the amendment and determined that the NRLMD was not likely to jeopardize lynx (USFWS 2007). The NRLMD has been incorporated as lynx management direction into the Helena National Forest Plan and includes standards and guidelines that are intended to avoid or reduce adverse effects to Canada lynx.

NRLMD Lynx Risk Factors

Table 12 summarizes lynx management standards and guidelines and conservation measures to address factors affecting lynx productivity as outlined in the NRLMD (USDA FS 2007b).

Table 12. Standards and Guidelines in the Northern Rockies Lynx Management Direction.

Direction	Northern Rockies Lynx Management Direction	Consistency
Objective ALL O1	Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.	Some forested connections between older forests would be altered due to reductions in cover, but remaining forests and sapling stands would retain connectivity for lynx. No new permanent roads would be constructed. Connectivity would be maintained within project LAUs and the linkage area. Complies with ALL O1 and ALL S1.
Standard ALL S1	New or expanded permanent development and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.	
Guideline 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.	(Not applicable)
Standard LAU S1	Changes in LAU boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.	(Not applicable)

Direction	Northern Rockies Lynx Management Direction	Consistency
Objective VEG O1	Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.	Proposed treatments are designed to restore naturally occurring fire regimes and associated vegetative communities. Natural succession and disturbance processes would be approximated and habitat components would be maintained. Complies with Veg O1.
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.	The mosaic would be provided over time, including areas of dense horizontal cover. Complies with VEG O2.
Objective VEG O3	Conduct fire use activities to restore ecological processes and maintain or improve lynx habitat.	This project includes prescribed fire treatments that would improve the ability to use naturally ignited wildland fires to accomplish future resource objectives and maintain or restore 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.	Most of the vegetation management proposed would occur in habitats with poorly developed understories or in areas with high mortality due to insect infestations. Complies with Veg O4.
Standard VEG S1	Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages, limit disturbance in each LAU as follows: If more than 30% of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects. This standard does not apply to fuel treatment projects within the Wildland Urban Interface (WUI) as defined by HFRA, subject to limitations.* In addition, fuel treatment projects may not result in more than three adjacent LAUs exceeding the standard.	No vegetation or fuel treatments would result in more than three adjacent LAUs exceeding this standard. BL-08 currently exceeds the standard due to past wildfires. No additional regeneration treatments other than fuel treatments within the WUI would occur in BL-08. BL-07 and other adjacent LAUs would remain below 30%. Far less than 6% of HNF's allowance would be used for fuel treatment exemptions in the WUI. Complies with Veg S1.
Standard VEG S2	Timber management projects shall not regenerate more than 15% of lynx habitat on NFS lands in an LAU in a 10-year period. This standard does not apply to fuel treatment projects within the wildland urban interface (WUI) as defined by HFRA, subject to limitations.*	Less than 15% of lynx habitat by LAU would be regenerated by this project in any 10-year period. Only 5% percent of lynx habitat in BL-08 and 12% of BL-07 would be treated over a ten year period. Complies with Veg S2.
Standard VEG S5	Precommercial thinning projects that reduce snowshoe hare habitat may occur from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat only under certain exceptions, such as daylight thinning of planted rust-resistant white pine where 80% of the winter snowshoe hare habitat is retained. This standard does not apply to fuel treatment projects that use precommercial thinning as a tool within the wildland urban interface (WUI) as defined by HFRA, subject to limitations.*	All pre-commercial thinning in BL-08 and BL-07 would occur within the WUI as allowed under the fuel treatment exemptions in the NRLMD. Complies with Veg S5.

Direction	Northern Rockies Lynx Management Direction	Consistency
Standard VEG S6	Vegetation management projects that reduce snowshoe hare habitat in multi-story mature or late successional forests may occur only: 1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements; 2. For research studies or genetic tree tests evaluating genetically improved reforestation stock; or 3. For incidental removal during salvage harvest (e.g. removal due to location of skid trails). This standard does not apply to fuel treatment projects within the wildland urban interface (WUI) as defined by HFRA, subject to limitations.*	No harvest activities or burning would occur in multistory lynx foraging habitat outside of the WUI. Approximately 100 acres occurring in prescribed burn units outside the WUI would be avoided through ignition patterns. Approximately 496 acres of multi-storied habitat would be treated within the WUI, as allowed under the NRLMD. Complies with VEG S6.
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 should be given to stem-exclusion, closed-canopy structural stage stands for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.	Approximately 75% of treatments would occur in stands that currently do not provide structural conditions necessary for winter hare habitat. Approximately 95% percent BL-08 and 88% of BL-07 would not be treated. Treatment would maintain or increase aspen and whitebark pine, as well as promote the development of understory shrubs and increase the diversity of prey habitat across the landscape. Winter hare habitat would remain close to potential lynx denning habitat. Complies with VEG G1.
Guideline VEG G4	Prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.	Planned prescribed burning activities are not expected to create permanent travel routes or facilitate snow compacting activities. While some burning to ridgelines and saddles would occur, most burning occurs on steeper slopes away from existing snowmobile trails. Burned trees would be left standing; portions of all units will be unburned; and establishment of woody vegetation following treatment will reduce any long-term access. Complies with VEG G4.
Guideline VEG G5	Habitat for alternate prey species, primarily red squirrel, should be provided in each LAU.	Approximately 89% of the existing mature coniferous forest in the LAUs will not be treated providing considerable habitat for alternate prey within the LAUs. Improvement cuts in mature stands will maintain lower levels of red squirrel habitat. Treatments would maintain or promote tree diversity, seed production and red squirrel habitat over the long-term. Complies with VEG G5.

Direction	Northern Rockies Lynx Management Direction	Consistency
Guideline VEG G10	Fuel treatment projects in the WUI, as defined by HFRA, should be designed considering standards VEG S1, S2, S5, and S6 to promote lynx conservation.	These standards were considered by excluding harvest outside the WUI, leaving untreated acres within the WUI for habitat diversity and connectivity and spatially and temporally distributing burn treatments. Lynx foraging habitat and travel cover would continue to be well distributed throughout the project LAUs. Treatment in many units would promote greater habitat diversity and/or retain future lynx foraging habitat. Complies with VEG G10.
Guideline VEG G11	Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.	Over 80% of the existing suitable habitat will be unaffected and den habitat will continue to be widely available in both LAUs. Proposed treatments are designed to retain patches of dead and dying trees which would contribute to coarse woody debris recruitment. A minimum of 5 to 20 tons per acre of downed woody debris would be retained and PDFs require retention of large diameter snags and logs. Burning would be designed to retain pockets of understory vegetation and shrubs and >30% of the burn units would be unburned. Complies with VEG G11.
Objective GRAZ O1	Manage livestock grazing to be compatible with improving or maintaining lynx habitat.	Existing grazing patterns would be largely unchanged. Grazing may be deferred in treatment units where aspen is regenerating and where necessary to establish vegetation. Treatments would increase landscape level forage, maintain riparian areas, promote shrub and understory diversity and maintain or improve aspen. Complies with GRAZ O1.
Guideline GRAZ G1	In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.	Livestock grazing will be maintained at existing levels unless range analysis monitoring indicates that changes in numbers are necessary. Grazing systems will be designed to be compatible with wildlife needs and if necessary improvements for livestock management will be designed in cooperation with a wildlife biologist. Complies with GRAZ G1.
Guideline GRAZ G2	In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.	Grazing will be maintained at existing levels unless monitoring indicates that changes in numbers are necessary. Fencing, temporary herding, or other techniques may be used to protect regeneration and aspen where needed. Complies with GRAZ G2.

Direction	Northern Rockies Lynx Management Direction	Consistency
Guideline GRAZ G3	In riparian areas and willow carrs, livestock grazing 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.	Livestock use is not expected to change and INFISH buffers and monitoring will continue to be implemented to reduce grazing related impacts in riparian areas. Complies with GRAZ G3.
Guideline GRAZ G4	In shrub-steppe habitats, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs, 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.	Livestock grazing will be maintained at existing levels unless range analysis monitoring indicates that changes in numbers are necessary. Grazing systems will be designed to be compatible with wildlife needs and if necessary improvements for livestock management will be designed in cooperation with a wildlife biologist. Complies with GRAZ G4.
Objective HU O1	Maintain the lynx's natural competitive advantage over other predators in deep snow by discouraging the expansion of snow-compacting activities in lynx habitat.	No new permanent roads would be constructed and access management would not change. Cross-country over-snow travel is already allowed on most USFS project lands outside big game winter range. While some increased winter motorized use is likely within low-elevation treatment units it would be limited in time by shrub and conifer regeneration and restrictions to designated routes only in big game winter range. Snowmobile use of burned areas is not expected to increase due to standing dead tree component. Complies with HU O1.
Objective HU O2	Manage recreational activities to maintain lynx habitat and connectivity.	Recreational activities are focused along narrow corridors. These activities are not known to affect lynx connectivity or habitat (Squires et al. 2006 and 2013). Complies with HU O2.
Objective HU O3	Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.	No new recreation sites would be developed. Complies with HU O3.
Objective HU O4	Provide for lynx habitat needs and connectivity when developing new or expanding existing developed recreation sites or ski areas.	(Not applicable)
Objective HU O5	Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.	(Not applicable)
Objective HU O6	Reduce adverse highway effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity, and to reduce the potential of lynx mortality.	(Not applicable)
Guideline HU G1	When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris, so winter snowshoe hare habitat is maintained.	(Not applicable)
Guideline HU G2	When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	(Not applicable)

Direction	Northern Rockies Lynx Management Direction	Consistency
Guideline HU G3	Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat.	(Not applicable)
Guideline HU G4	For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.	(Not applicable)
Guideline HU G5	For mineral and energy development sites and facilities that are closed, a reclamation plan that restores40 lynx habitat should be developed.	(Not applicable)
Guideline HU G6	Methods to avoid or reduce effects on lynx should be used in lynx habitat when upgrading unpaved roads to maintenance levels 4 or 5, if the result would be increased traffic speeds and volumes, or a foreseeable contribution to increases inhuman activity or development.	No unpaved roads would be upgraded to maintenance levels 4 or 5. Complies with G6.
Guideline HU G7	New permanent roads should not be built on ridge-tops and saddles, or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers.	No new permanent (system) roads would be constructed, temp roads would be obliterated within 2 years following harvest, and no changes to access management would occur. Complies with HU G7.
Guideline HU G8	Cutting brush along low-speed, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.	Funding constraints limit this to the minimum necessary for safety. Complies with HU G8.
Guideline HU G9	On new roads built for projects, public motorized use should be restricted. Effective closures should be provided in road designs. When the project is over, these roads should be reclaimed or decommissioned, if not needed for other management objectives.	Public motorized use would be restricted on the 0.9 miles of temp roads. Permanent (system) roads improved for this project would be managed in accordance with current public travel management restrictions. Complies with HU G9.
Guideline HU G10	When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat, if it has been identified as a need.	(Not applicable)
Guideline HU G11	Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs. This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12. Use the same analysis boundaries for all actions subject to this guideline.	(Not applicable)
Guideline HU G12	Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes or designated over-the snow routes.	(Not applicable)
Objective 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.	(Not applicable)
Standard LINK S1	When highway or forest highway construction or reconstruction is proposed in linkage areas, identify potential highway crossings.	(Not applicable)
Guideline LINK G1	NFS lands should be retained in public ownership.	(Not applicable)

Direction	Northern Rockies Lynx Management Direction	Consistency
Guideline 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.	Livestock grazing will be maintained at existing levels unless range analysis monitoring indicates that changes in numbers are necessary. Grazing systems will be designed to be compatible with wildlife needs and if necessary improvements for livestock management will be designed in cooperation with a wildlife biologist. Complies with LINK G2.

This project is also consistent with the terms and conditions from the biological opinion on the effects of the NLRMD on Canada Lynx as shown in Table 13.

Table 13. Terms and conditions from the biological opinion on the effects of the Northern Rocky Mountains Lynx Direction on Canada Lynx applicable to project.

Term and Condition	Compliance
Fuels management projects conducted under the exemptions from standards VEG S1, S2, S5 and S6 in occupied habitat shall not occur in greater than 6% of lynx habitat on any Forest	Yes - This project includes exemptions for Veg S5 and S6 that equal 3.2% of the HNF allowable exemptions. Post-project the HNF would have 96% of allowable exemption acres available.
Fuels management projects conducted under the exemptions from standards VEG S1, S2, S5 and S6 in occupied habitat shall not result in more than 3 adjacent LAUs not meeting the VEG S1 standard of no more than 30 percent of an LAU be in stand initiation structural stage.	Yes – Only one LAU, BL-08 currently exceeds standard VEG S1 due to recent wildfires. Post-project BL-07 would have approximately 10% in the stand initiation structural stage and no other adjacent LAUs exceed 30%.
In occupied lynx habitat, precommercial thinning and vegetation management projects allowed per the exception listed under VEG S5 and S6, shall not occur in any LAU exceeding VEG S1, except for protection of structures.	YES - LAU BL-07 meets VEG-S1 pre- and post-project. BL-08 currently does not meet VEG-S1. In BL-08 all precommercial thinning and harvest treatments within multistory habitat occur as fuel treatments within the WUI near private lands and residential structures.

Effects Determination

The determination for implementation of the proposed Federal Action is "**may affect — likely to adversely affect"** for Canada lynx for the Stonewall Vegetation Management Project. The determination is based on the following rationale:

1) The Canada lynx and its habitat occur in the project area.
2) Snowshoe hares appear to be abundant on the Lincoln Ranger District and potential foraging habitat for lynx appears to be plentiful at that scale.
3) BL-08 currently exceeds Veg S1 with greater than 30% of the LAU in early stand initiation.
4) Approximately 841 acres of lynx foraging habitat would be affected by the project. All of this is within the Wildland Urban Interface. The 841 acres are about 6% of the 13,121 acres of lynx foraging habitat that currently exist in the two project LAUs.

5) Vegetation management and temporary road construction would cause a short-term reduction in cover habitat and a reduction in availability of coarse woody debris for future denning habitat.
6) Landscape-level travel connections would be maintained.
7) About 0.9 miles of temporary road would be built, mostly through "other" (non-foraging) habitat.
8) Human activities during proposed vegetation management, road construction, and other efforts could potentially displace Canada lynx (Interagency Lynx Biology Team 2013).
9) If active lynx denning is discovered, operations within that unit or on that road would cease until the wildlife biologist is notified, and activities are modified if necessary to maintain reproductive efforts.
10) Cumulatively, far less than the Helena National Forest's 26,400 acre (6%) allowance for fuel treatment projects within the WUI would be used (see table 11).
11) New science relevant for conservation of Canada lynx in northwest Montana is consistent with conservation measures in the LCAS (Interagency Lynx Biology Team 2013) and management direction in the NRLMD (USDA FS 2007a). This includes Ausband and Baty 2005, Berg et al. 2012, Bull et al. 2005, Bunnell et al. 2006, Ellsworth 2009, Gilbert and Pierce 2005, Griffin 2004, Griffin and Mills 2004, Griffin and Mills 2007, Kolbe et al. 2007, Lewis et al 2011, Maletzke et al. 2008, Mills et al. 2005, Olson et al. 2011, Squires 2009, Squires et al. 2008, Squires et al. 2010, Squires et al. 2013, and Squires and Ruggiero 2007. The FWS determined (USDI FWS 2013a) that new information made available since 2007 (USDA FS 2013), is consistent with information considered for the NRLMD's 2007 Biological Opinion and thus reinitiation of consultation on the NRLMD is not required for Canada lynx.

The FWS Biological Opinion (BO) on the Northern Rockies Lynx Management Direction (USFWS 2007) concluded that the NRLMD would not jeopardize the continued existence of Canada lynx and would contribute to the conservation of Canada lynx. Furthermore, the BO determined that the NRLMD is compatible with recovery needs for lynx. The BO concluded that the NRLMD addressed, in whole or in part, each of the objectives in the FWS recovery outline for lynx (U. S. Fish and Wildlife Service 2005). The Incidental Take Statement (ITS) provided in the BO anticipated and exempted incidental take of lynx in the form of "harm", based upon a specific level of adverse effects to lynx habitat. To minimize the impact of this incidental take, terms and conditions in the ITS limited the number of acres that could be treated in ways that adversely affect lynx habitat.

Lynx Critical Habitat

The Final Rule for the Revised Critical habitat designation for Canada lynx was published on September 14, 2014 (USDI FWS 2014). The entire project area is within lynx critical habitat. The analysis is separate from that applied to the Northern Rockies Lynx Management Direction therefore, consultation on lynx critical habitat is not tiered to the NRLMD (USDA FS 2007a). The Stonewall Vegetation project analysis considered the Primary Constituent Elements (PCEs) of lynx critical habitat and encompassed the appropriate landscape scale, consistent with the lynx critical habitat rule.

The entire Lincoln Ranger District of the Helena National Forest is within Unit 3 of designated lynx critical habitat and contains physical and biological elements essential for the conservation of the species, including its Primary Constituent Elements (PCEs) and its components (USDI FWS 2014). Unit 3 is 9,783 square miles (approximately 6,261,120 acres). In such areas, the "Primary Constituent Elements" for the Canada lynx is "boreal forest landscapes supporting a mosaic of differing successional forest stages." These landscapes also support snowshoe hares and their preferred habitats, winter snows that are generally deep and fluffy for extended periods of time, sites for denning that have abundant coarse woody debris, and a matrix of habitats that do not support snowshoe hares but that lynx are likely to travel through within a home range (USDI FWS 2014). See Table 14 for a summary of lynx critical habitat

Primary Constituent Elements (PCEs) across the project area. Deep fluffy snow occurs across the entire project area and includes all critical habitat acres therefore is not included in Table 14.

Table 14. Existing Acres and Percent of Lynx Critical Habitat PCEs by LAU for BL-07 and BL-08.

LAU	Total LAU Acres	Mapped Lynx Habitat Acres	Matrix[1] PCE1d (Not mapped lynx Habitat)	Mapped Lynx Habitat				
				Sapling Foraging[2] PCE1a	Denning with Multistory Foraging[3] PCE1a & PCE1c	Other[4] PCE1c	Total of PCE1a (Foraging - Sapling and Multistory)	Total of PCE1c (Denning - Multistory and Other)
BL-07	26,662	17,632	9,030	1,732	8,401	7,499	10,133	15,900
	100%	66%	34%	6%	32%	28%	N/A	N/A
BL-08	27,352	21,422	5,930	10,242	2,953	8,227	13,195	11,180
	100%	78%	22%	37%	11%	30%	N/A	N/A
Total	54,014	39,054	14,960	11,974	11,354	15,726	23,328	27,080
	100%	72%	28%	22%	21%	29%	N/A	N/A

Note: All percentages reflect percent of total LAU acres. Not applicable for total of PCE1a and PCE1c because multi-story habitat is included as both foraging (snowshoe hare habitat) and denning habitat.
[1] Permanent non-lynx habitat including high elevation non-forested habitats, dry forest habitat types, rock outcrops, sites dominated by dry grass/forbs/shrubs, low elevations, and large water bodies if present within the LAU.
[2] Stand initiation structural stages that currently provide snowshoe hare habitat or will develop into snowshoe hare habitat.
[3] Forested multi-storied structural stage with many age classes and vegetation layers that provides denning habitat and winter snowshoe hare habitat.
[4] Mid-Seral and Stem Exclusion Structural Stages – Closed canopy with understory limited; does not provide snowshoe hare habitat but does provide potential denning habitat.

Critical Habitat Direct and Indirect Effects Analysis - Canada Lynx

For lynx critical habitat PCEs, the affected acres under the proposed vegetation management treatments are shown in Table 15.

Table 15. Acres and Percent of Available Lynx Critical Habitat Treated by LAU

LAU	PCE1a (Foraging - Sapling and Multistory)	PCE1c (Denning - Multistory and Other)	PCDE1d (Matrix) (Not mapped lynx Habitat)	Total (by LAU)
BL-07	379 acres	1,755 acres	858 acres	2,654 acres*
	4%	11%	10%	10%
BL-08	0 acres	1,111 acres	659 aces	1,770 acres
	0%	10%	11%	6%
Total (combined LAUs)	379 acres	2,868 acres	1,517 acres	4,424 acres*
	2%	11%	10%	8%

See table 14 for habitat definitions.
Percentages reflect percent of PCE by LAU and combined LAUs respectively.
*Multi-story habitat for BL-07 (as reflected previously in Table 7) is counted for both PCE1a and PCE1c therefore total acres of critical habitat treated for BL-07 and Total (by LAU) is reduced by 338 acres to avoid double counting multi-story acres treated.

Table 16 describes the effects of this project on lynx critical habitat in the perspective of the LAU and across Critical Habitat Unit 3. The effects on lynx critical habitat would occur on a very small portion of Critical Habitat Unit 3. The Stonewall Vegetation Management Project LAUs comprise approximately 0.8% of Critical Habitat Unit 3, which is 9,783 square miles (approximately 6,261,120 acres) whereas, the combined treatment acres within the LAUs represents approximately 0.07% of critical habitat unit 3.

Table 16. Effects to the PCE for Designated Lynx Critical Habitat

PCE: Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:	**Effect**
1a. Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface	The 379 acres of hare habitat (348 acres of stand initiation winter hare habitat and 31 acres of early stand initiation) that would be affected make up about 2% of the available hare habitat in critical habitat in the LAUs, and 0.006% of Critical Habitat Unit 3.
1b. Winter snow conditions that are generally deep and fluffy for extended periods of time	The project would not alter regional snowfall regimes. No winter harvest would occur. Some increase in cross country snowmobile use is anticipated in harvest units outside big game winter range areas. Within designated big game winter range travel is restricted to designated routes only. No additional grooming would occur and no new trails would be developed. The deep, fluffy snow conditions required by hare and lynx would be retained.
1c. Sites for denning that have abundant coarse woody debris, such as downed trees and root wads	The approximately 2,868 acres of denning habitat that would be affected make up less than 11% of the available denning habitat in critical habitat across the LAUs and less than 0.04% of Critical Habitat Unit 3. Denning habitat would remain abundant comprising approximately 45% of the combined LAUs, and well distributed across Lynx critical habitat in the LAUs.
1d. Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range	Boreal forest predominates across project area LAU's and when combined with matrix habitat is well distributed and interconnected. While lynx movements may be altered by treatment, linkage habitat connectivity within and between LAU's and putative dispersal corridors (Squires et al 2013) would be maintained. It is anticipated that matrix habitat would continue to function as matrix following treatment. The approximately 1,517 acres of matrix habitat that would be affected make up 10% of the available matrix habitat in critical habitat across the LAUs and approximately 0.02% of Critical Habitat Unit 3.

Cumulative Effects

For Lynx critical habitat (USDI FWS 2009) across the LAUs, quantification of the cumulative vegetation management upon lynx critical habitat is displayed in Table 17. Other cumulative effects on lynx critical habitat in the LAUs are similar to those described above for lynx and lynx habitat.

Table 17. Pre and Post-Treatment Acres/Percentages of Critical Habitat in the project LAUs.

	Total of PCE1a (Snowshoe Hare Habitat)	Total of PCE1c (Denning Habitat)	Total of PCE1d (Matrix Habitat)
Pre-treatment	23,328	27,080	14,960
Acres treated	379 (2%)	2,868 (11%)	1,517 (10%)
Post-treatment	22,949 acres (98%)	24,212 (89%)	13,443 (0%)

Four short temporary road segments totaling 0.9 miles would be constructed then obliterated within 1 or 2 years of construction. Temp roads would not be open to public use and public access for all existing roads (31.5 miles) used during project implementation would remain unchanged during and upon project completion.

The Primary Constituent Element for snowshoe hares (PCE1a) would continue to be available within Canada lynx critical habitat and proposed actions would not cause a permanent loss or conversion of the boreal forest on a scale proportionate to the large landscapes used by lynx. In western Montana, Griffin and Mills (2004) found the highest snowshoe hare densities in regenerating forest stands with high sapling density and in uncut, mature multistory stands with abundant saplings. Given that hares are a forest stand disturbance dependent species and a mosaic of stands conditions would be maintained within the project LAUs, hare densities would remain sufficient within remaining patches of hare habitat and regenerating forest structure would provide preferred hare habitat into the future (USDI FWS 2009, Interagency Lynx Biology Team 2013).

Similarly, denning habitat (PCE1c) is abundant throughout the project area and in not believed to be a limiting factor in Montana (Squires personal communication in USDI FWS 2007) and habitat elements associated with denning habitat are well distributed across National Forests (USDI FWS 2007).

Treatments within matrix habitat would not result in the loss of foraging or denning opportunities for lynx and the distribution of matrix habitat would allow for continued use by lynx to access suitable patches of habitat for foraging and denning within their home range.

Effects Determination

For Canada lynx critical habitat, the determination for implementation of the proposed Federal Action is "**may affect — likely to adversely affect**" for the following reasons:

1) The Stonewall Project would not result in destruction of critical lynx habitat.
2) All PCEs would remain abundant and well distributed across the project LAUs before, during, and after implementation.
3) The 379 acres providing for PCE 1a (presence of snowshoe hares and their habitats) that would be affected is 0.7% of lynx critical habitat across the two project LAUs and 0.006% of Critical Habitat Unit 3.
4) Other than some anticipated cross-country snowmobile travel within some harvest units outside big game winter range, PCE 1b (deep fluffy snows) would not be affected by this proposal.

5) The 2,868 acres providing for PCE 1c (denning habitat) that would be affected is 5.3% of lynx critical habitat across the Stonewall Project LAUs and less than 0.05% of Critical Habitat Unit 3.
6) The 1,517 acres of PCE 1d (matrix habitat) that would be treated is 2.8% of lynx critical habitat across the Stonewall Project LAUs and less than 0.02% of Critical Habitat Unit 3. The untreated and treated matrix habitat would continue to support the ability of lynx to travel between suitable patches of habitat within their home range.

Recommendations for Removing, Avoiding, or Compensating Adverse Effects

The project design incorporates measures to reduce effects to Canada lynx, lynx habitat, and designated critical habitat for lynx. No additional mitigation is recommended.

Species Assessment - Grizzly Bear (*Ursus arctos*)

Status

The grizzly bear was listed as threatened throughout its range in the lower 48 states on July 28, 1975. The Grizzly Bear Recovery Plan was approved in 1982, updated in 1990 and 1992, and revised in 1993 (USDI 1993). Seven grizzly bear ecosystems were identified in which recovery is to be accomplished. Five of the seven ecosystems are currently occupied. One of these, the Northern Continental Divide Ecosystem (NCDE), occurs in part on the Helena National Forest. The Stonewall project area is located in the southern most extension of the NCDE grizzly bear recovery zone. The overall goal of the Grizzly Bear Recovery Plan is to remove the grizzly bear from threatened status in each of the occupied or reintroduced ecosystems in the 48 conterminous States.

Grizzly bears are considered habitat generalists, using a broad spectrum of habitats. They are opportunistic feeders and will prey or scavenge on almost any available food; grizzly bear movements are determined largely by their search for food. For example, upon emergence from the den in the early spring, grizzlies move to lower elevations and drainage bottoms in search of plants that are greening up. Throughout the late spring and early summer they move towards higher elevations, often following the snow line as food becomes available. Spring habitat tends to be at lower elevations therefore, increased potential exists for conflict between bears and humans in these areas. In addition to being utilized heavily for foraging, riparian zones are also heavily used by grizzlies for travel corridors (Moss and LeFrance 1987 *in* USDA FS 2005).

Coniferous forest cover is very important to grizzly bears. Ninety percent of aerial radio relocations of 46 radio-collared grizzlies were in forest cover too dense to observe the bear. Dense forests are also important for thermal cover, hiding cover, and day beds and most beds are located within six feet of a tree. The importance of open grassy parks with coniferous forest cover has also been documented (USDI FWS 1993).

Grizzly bear habitat is best described in terms of the availability of large tracts of relatively undisturbed land that provides some level of security from humans (USDI FWS 1993). To that end, effective habitat is often described in terms of core habitat or areas free of motorized access during the non-denning period. Open and total road densities are also important measurements in determining core areas and understanding the extent of habitat security for bears (USDI FWS 1993).

The Grizzly Bear Recovery Plan (USDI FWS 1993) indicates that the most important element in grizzly bear recovery is securing adequate effective habitat. This is a reflection of an area's ability to support grizzly bears based on the quality of the habitat and the type/amount of human disturbance imposed on the area. Consequently controlling and directing motorized access is one of the most important tools in achieving habitat effectiveness and managing grizzly bear recovery (USDI FWS 1993).

Resident bears are known to occur within the project area during the non-denning period with some denning known to occur in the upper reaches of the project area. Bears are known to move through the area after emerging from hibernation to reach lower elevation spring habitats and other habitats throughout the summer and fall. Generally bears utilize lower elevations in the project area after emerging from hibernation to forage on herbaceous vegetation in the spring and move to upper elevations following snowmelt. Foraging and use of upper elevation sub-alpine habitat, as well as forested stands containing berry producing shrubs occurs later in the summer and fall. Grizzly bears utilize the Blackfoot River extensively for foraging and seasonal movements, and are known to move through the southern portion of the project area to access the river corridor. Action area lands also provide connectivity for bear movements between the Scapegoat Wilderness and lands south of Hwy 200.

Action Area Description

Grizzly bears are the largest, most wide-ranging forest carnivore in western Montana. The needs of grizzly are met at the Forest level and through management and maintenance of Bear Management Units (BMU's) and their subunits, which help ensure the conservation of this species. The Stonewall project area is within the Landers Fork Bear Management Unit (BMU) and includes portions of the Arrastra and Red Mountain sub-units (See Figure 2). These subunits serve as the action area used to analyze direct, indirect, and cumulative effects to the grizzly bear. Conservation measures for the grizzly bear, including standards and guidelines, have been addressed at the subunit scale (e.g., HNF-Forest Plan direction, Interagency Grizzly Bear Guidelines and, FNF Amendment 19 Access Management Protocol).

Forest Plan Direction and Access Management

The Helena Forest Plan (1986) provides direction and guidelines for the management and conservation of grizzly bear habitat. Applicable direction for this project is described in the Forest-wide Goals (FP-II/1), Forest-wide Objectives (FP II/4), Forest-wide Standards (FP II/17, 19), Individual Management Area direction (FP Chapter III), Forest Plan Monitoring Requirements (FP IV/8) Forest Plan Appendix A (resolution of Issues and Concerns) and D (Guidelines for Management of Grizzly Bear Habitat).
For HNF lands within the recovery zone access management is addressed in accordance with the *North Continental Divide Ecosystem Grizzly Bear Access Management Protocol* and the *Flathead NF Amendment 19* (the accepted Motorized Access Density Analysis & Security Core Area Analysis for Grizzly Bear within the NCDE). The moving windows analysis is used to measure road densities and the amount of secure habitat within the respective subunits of a Bear Management Unit (BMU) based on: 1) Open Motorized Route Density (OMRD), 2) Total Motorized Route Density (TMRD) and 3) Security Core habitat (CORE). BMU subunits are evaluated against these three measures to determine if they meet the guidelines or are in a degraded condition not meeting the guidelines.

Relevant Forest Plan direction for T&E species (II/19) specific to grizzly bear management on the HNF includes:

- In occupied grizzly habitat, to minimize man-caused mortality the open road density will not exceed the 1980 density of 0.55 miles per square mile, which was determined to have little effect on habitat capability.

- Apply the guidelines in Appendix D to the Management Situation 1 and 2 (referred to as essential and occupied prior to 1984) grizzly bear habitat on the Forest.

Appendix D of the Helena FP (1986) identifies FS lands within the recovery zone as either Management Situation (MS) 1 or MS 2 lands in accordance with the Interagency Grizzly Bear Management Guidelines (IGBC 1986). No Management Situation designations were made for HNF lands outside the recovery zone. Only MS 1 and MS 2 lands are identified in Appendix D of the Helena FP. Management Situation 1 lands include the Scapegoat Wilderness, Alice Creek non-motorized area, and the upper reaches of the drainages encompassing headwaters of the Copper creek drainage. The remaining lands within the recovery zone and an area of land outside the recovery zone south of Rogers Pass along the continental divide are classified as MS 2 lands. The following is a description of MS 1 and 2 lands:

- Management Situation 1 –"Grizzly habitat maintenance and improvement and grizzly and human conflict minimization will receive the highest priority. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete."

- Management Situation 2 – "Habitat maintenance and improvement, and grizzly and human conflict minimization may be, in some cases, important but not the most important management considerations. Demonstrated grizzly population and/or grizzly habitat use will be accommodated in the other land use activities, if feasible, but not to the exclusion of other use needs. A feasible accommodation is one that is compatible with (does not make unobtainable) the major goals and/or objectives of other uses."

In addition to the above management situation descriptions, the Helena NF uses the following information for managing grizzly habitat.

- Coordination dates for grizzly habitat use are:
    - Spring habitat (concentrated use areas) – April 1 to June 30.
    - Breeding areas - May 1 to July 15.
    - Alpine feeding areas - July 1 to September 15.
    - Subalpine fir/whitebark pine habitats - August 1 to November 30.
    - Denning habitat – October 15 to March 31.
- Maintain existing seasonal grizzly habitat use in constituent elements and habitat components.
- Coordinate man's activities using the measures listed or discussed in "Rocky Mountain Front Grizzly Bear Monitoring and Investigation" (Aune et al. 1984) as appropriate to the habitats and grizzly use on the Helena NF.

More recently, the NCDE Access Technical Group (unpublished report 2002) suggested that "grizzly bear access management apply during the non-denning period, and include April 1 through November 30 of each year." In turn, the dates of March 31 for the end of the denning period and April 1 for the start of the spring season were discussed and agreed upon (for consistency among Montana National Forests) by an interagency team of U.S. Forest Service and U.S. Fish and Wildlife Service biologists (the "Montana Level 1 Biologist Team, unpublished notes, 12/9/2003). The chronology of these dates is consistent with the best available scientific information such as the work of Mace and Waller (1997) and other grizzly bear denning studies. Therefore, 12/1 to 3/31 is used to define the grizzly bear denning period for project analysis.

Collectively, the Forest Plan guidelines, NCDE Access Management Guidelines, habitat recommendations, coordination dates, seasonal use considerations and human activity guidelines are used to maintain grizzly bear habitat and reduce impacts to bears.

In addition, the Forest Plan identifies forest-wide standards that directly or indirectly benefit grizzly bears and help to minimize effects of roads on grizzly bears across the Helena National Forest. Standards that are directed at maintaining or improving seasonal habitat or security areas for big game species (for example, elk) would indirectly benefit grizzly bears and black bears by improving security and potentially improving the forage base.

Draft NCDE Grizzly Bear Conservation Strategy

The NCDE Grizzly Bear Conservation Strategy, currently in draft form, will provide future management direction for the NCDE population of grizzly bears when the population is delisted. Once the CS is finalized the Forest Plans for those Forests in the NCDE will be amended to incorporate management direction of the CS. Under the Conservation Strategy, the NCDE grizzly bear population and its habitat will be managed using an approach that identifies a Primary Conservation Area (PCA) and three additional management zones (Zone 1, Zone 2, and Zone 3). The PCA is the area currently known as the NCDE Grizzly Bear Recovery Zone where the most conservative habitat protections would remain. The remaining Lincoln Ranger District lands south of Hwy 200 are anticipated to be classified as Zone 1 lands. The CS would set an objective of maintaining a recovered grizzly bear population in the NCDE area sufficient to maintain a healthy grizzly bear population in biologically suitable habitats within the PCA and Zone 1. The goal for the agencies implementing the CS would be to maintain a genetically diverse NCDE grizzly bear population with at least 800 grizzly bears. This would be achieved by incorporating habitat standards and guidelines described in the CS into the respective agency management plans. Upon implementation of the CS, management using the NCDE recovery zone line and grizzly bear Management Situations as described in the Interagency Grizzly Bear Guidelines (1986) would no longer be necessary and no longer apply.

Direct and Indirect Effects

The following issue indicators are used to evaluate effects to grizzly bear:

- Compliance with Forest Plan standards and guidelines
- Amendment 19 compliance and changes in TMRD, OMRD and Security CORE habitat for affected subunits within the NCDE recovery zone.
- Effects to denning bears and den habitat
- Effects to bears outside the denning period and changes in cover and forage.

Proposed action treatments are displayed on project maps and summarized in Table 18, which identifies treatments within the recovery area by sub-unit and are referenced for the effects analysis.

Table 18. Summary of Grizzly Bear Habitat Treated[1]

Treatments	Total Acres Treated in both Subunits	Total Treatment Acres		Den Habitat Treated Acres		Core Habitat Treated Acres	
		Arrastra Mtn	Red Mtn	Arrastra Mtn	Red Mtn	Arrastra Mtn	Red Mtn
Intermediate Harvest	1453	1,406	47	0	0	0	0
Regeneration Harvest	660	660	0	0	0	0	0
Total Harvest[1]	2113	2,066	47	0	0	0	0
Low Severity Fire	549	441	108	18	0	0	0
Mixed Severity Fire <5 acre openings; Jackpot burn	363	0	363	0	0	0	69

Treatments	Total Acres Treated in both Subunits	Total Treatment Acres		Den Habitat Treated Acres		Core Habitat Treated Acres	
		Arrastra Mtn	Red Mtn	Arrastra Mtn	Red Mtn	Arrastra Mtn	Red Mtn
Mixed Severity Fire <30 acre openings	1288	1,151	137	253	28	764	0
Whitebark Pine	555	0	555	0	331	0	80
Total Burning[1]	2755	1592	1,163	271	359	764	149
Total Harvest and Burning Acres	4868	3658	1210	271	359	764	149

1 – Arrastra subunit values include 336 treatment acres outside the recovery zone boundary: 94 acres intermediate harvest; 96 acres regeneration harvest, and 146 acres of low severity burning.

Disturbance

It is anticipated that all timber harvest will be completed within four years and burning of harvest units completed within five-six years. Prescribed fire only treatments and hand thinning of precommercial thin units are anticipated to take up to ten years. Because all treatments will increase human activity during the non-denning period some displacement of bears is expected while treatments are being implemented. In total, treatments would affect <6 % of the Arrastra subunit and 2% of the Red Mountain subunit. Commercial and precommercial harvest treatments account for 3.2 and 0.3% of the Arrastra and Red Mountain subunits respectively whereas prescribed burning accounts for 3.6 and 2.9% of the Arrastra and Red Mountain subunits respectively. The greatest potential for displacement is within the Arrastra subunit which includes 91% of all harvest treatments. The concentration of harvest units in close proximity to existing roads and residences in both subunits may serve to limit use of some treatment acres by bears thus reducing the potential for displacement due to project activities. Also untreated habitat to accommodate any displaced bears is widely available within both sub-units. As a result disturbance related effects would be largely limited to avoidance of the site during treatment activities. Treatments will not be ongoing simultaneously throughout the entire project area further serving to reduce the potential for displacement. Also, due to the seasonal operating restrictions from 12/1-5/31 project activities would not displace bears during much of the spring season when bears seek lower elevation habitats for foraging. Although road access will be unchanged, some long-term disturbance may also occur on sites where harvest creates conditions that facilitate foot access. However because of the proximity to existing human activity, the likelihood that a bear would be displaced is reduced.

A total of 0.9 miles of temporary road would be built then obliterated immediately following timber removal within the Arrastra Mountain sub-unit. These roads would be closed to public access during implementation and permanently closed and obliterated following harvest. Existing public seasonal motorized use restrictions would remain in effect on roads used for project implementation. Road maintenance would be completed to meet Best Management Practices (BMP) on approximately 31.5 miles of roads and the majority of road work would occur in the summer or fall.

Motorized Access Management

Grizzly bear habitat is best described in terms of the availability of large tracts of relatively undisturbed land that provides some level of security from humans (USDI FWS1993). To that end, effective habitat is often described in terms of core habitat or areas free of motorized access during the non-denning period. Open and total road densities are also important measurements in determining core areas and understanding the extent of habitat security for bears (USDI FWS1993).

Within the Landers Fork BMU road densities are managed in accordance with the Flathead National Forest Amendment 19, which considers parameters of open motorized route density (OMRD), total motorized route density (TMRD) and secure core habitat (CORE). The objectives of the programmatic strategy include the following: 1) limit high density (> 1 mile/square mile) open motorized access to no more than 19% of a BMU Subunit; 2) limit high density (> 2 miles/square mile) total motorized access to no more than 19% of a BMU Subunit and; and 3) provide security core areas that equal or exceed 68% of each BMU Subunit (referred to as 19/19/68 objectives). These objectives apply to all grizzly bear subunits that are predominantly (greater than 75 percent) National Forest System (NFS) land. The 19/19/68 objectives address motorized access during the non-denning period to collectively conserve grizzly bears within the NCDE recovery zone.

The process for the moving windows analysis and how routes are categorized based on closure methods etc. are described in the *Protocol Paper - North Continental Divide Ecosystem Grizzly Bear Access Management* and *Flathead National Forest, Amendment 19 - Moving Window Motorized Access Density Analysis & Security Core Area Analysis for Grizzly Bear* (USDA FNF 2008). In general, OMRD includes roads and trails that are open to wheeled motorized use during any portion of the non-denning period. TMRD includes roads and trails open to wheeled motorized use and those with temporary restrictions, such as gates. CORE habitat is defined as those areas more than 500 m (0.3 miles) from a motorized access route during the non-denning period and at least 2,500 acres in size.

Table 19 below summarizes OMRD, TMRD and CORE for the Arrastra and Red Mountain sub-units under the existing condition, during project implementation, and post project implementation. The values in Table 4 do not reflect late season snowmobile use in the 3,230 acre Copper bowls play area since there is no spatial or temporal overlap with project activities. Snowmobile use of Copper bowls and Copper creek road #330 providing access is authorized from 12/1 through 5/31 which coincides with the limited operating period for project activities. The authorized snowmobile season for all other HNF lands north of Hwy 200 is from 12/1 through 3/31 as defined by the 2013 final Record of Decision (ROD) for Blackfoot Winter Travel therefore, there would be no overlap with motorized activities associated with the Stonewall Vegetation project and winter snowmobile use.

Table 19. Route Density and Security Core – Moving Windows Analysis

Subunit	Percent of subunit meeting 19/19/68 guidelines									
	Existing				During			Post-Treatment		
	NFS lands	OMRD	TMRD	CORE	OMRD	TMRD	CORE	OMRD	TMRD	CORE
Arrastra Creek	94%	17	19	74	19	19	74	17	19	74
Red Mountain	84%	24	21	58	24	21	58	24	21	58

[1] Assuming all units active at the same time; all haul routes and temporary roads being used simultaneously
OMRD - Open motorized route density guideline: ≤19% of each subunit with >1.0 mile/mi2
TMRD - Total motorized route density guideline: ≤19% of each subunit with > 2.0 mile/mi2;
CORE - Core area (>2,500 contiguous acres, ≥0.3 mi. from motorized route, no roads or trails receive "high intensity use" and no motorized routes open during non-denning period) guideline: ≥68% of the subunit considered core area.

As shown above, the Arrastra Mountain subunit meets the 19/19/68 guidelines for OMRD, TMRD and CORE before, during, and after project implementation. The majority of harvest units, associated haul routes and all temporary roads occur within the Arrastra subunit. There would be a temporary increase in the OMRD (2%) in the Arrastra subunit when project activities are occurring although ORMD would still

not exceed the 19% guideline. There would also be would be a slight increase in the TMRD in the subunit due to construction of 0.9 miles of temp road however the degree of change within the subunit is not enough to change the TMRD percentage. The values in table 19 assume that all project roads would be active at the same time however, road densities would be changing on a regular basis, both increasing and then decreasing as restricted roads and temporary roads are utilized, then closed or reclaimed. The changes in OMRD and TMRD would be temporary and there would be no increase in open or total motorized road densities upon project completion. The 2% increase in OMRD and slight increase in TMRD during project activities could result in displacement of individual grizzly bears in areas where activity is occurring. Spring timing restrictions to avoid wet soils conditions would reduce displacement from spring habitats. No harvest activities or road use would occur in security core in the Arrastra subunit therefore, there would be no change in security core during or after completion. Similarly, there would be no access management changes associated with implementing prescribed burns in core and displacement during burning activities would be temporary.

For the Red Mountain subunit OMRD, TMRD, and CORE all remain unchanged from the existing condition both during and following project implementation. There would be no temp road construction and the limited harvest activities occurring within the subunit would only utilize existing open roads. Mechanical treatments including precommercial thinning would however, occur off-road and result in some increased potential for disturbance or displacement of bears during implementation. The Red Mountain subunit currently has a degraded baseline and does not meet any of the 19/19/68 guidelines. Although there would be no change in OMRD, TMRD, or CORE during or after project implementation, the Red mountain subunit would still not meet any of the numerical access management objectives therefore, it would continue to have an adverse effect upon bears due to the degraded baseline.

The low miles of temp road to be built (0.9 miles) and the close proximity of existing roads to be used as haul routes serves to minimize the degree of change within the subunit. Closed roads that would be used for project implementation are currently gated therefore would not affect TMRD. The use of closed roads does result in a small increase in OMRD in the Arrastra sub unit during project implementation however road densities would remain within established guidelines. CORE within both subunits would remain unchanged and no long term changes to access management would result from project implementation. Although there would be no change in core habitat, open or total road density in the Red Mountain subunit, it would continue to have an adverse effect upon bears due to the degraded baseline during and post-implementation.

IGBC Guidelines and Management Situation 1 and 2 Lands

The Interagency Grizzly Bear Committee (IGBC) developed The Interagency Grizzly Bear Guidelines (IGBG 1986) in order to promote conservation of the grizzly bear. The Forest has incorporated the guidelines into its Forest Plan (Forest Plan Appendix D pages D/1-D/2). The IGBG established grizzly bear management situations. Under the Decision Alternative all treatments under the Stonewall Vegetation project are entirely within Management Situation (MS) 2 lands.

Management decisions and design criteria for this project favor, and make this project compatible with, the needs of grizzly bear recovery and conservation by:

- Commercial activities would be limited in spring habitats during the spring period;
- There would be no impact to denning bears and denning habitat would remain abundant;
- In the Arrastra subunit there would be a slight increase in open road densities during project implementation but no post-implementation increase in motorized road density;

- There would be no decrease in security core habitat during or post-implementation in either subunit;
- The project would not result in any permanent barriers to bear movements;
- The contract for the Stonewall Vegetation Management Project would include a clause for the temporary suspension or cessation of activities, if needed, to resolve any grizzly bear/human conflict; and
- A Special Order (2005) is in effect that requires all users of NFS lands on the Lincoln Ranger District, to store food, garbage and other bear attractants in a bear-resistant manner. This special order is included in all contracts associated with the project.

Denning Habitat

Three primary studies on grizzly den site selection, entrance, and emergence periods have been conducted in the NCDE. Servheen (1981) studied denning in the Mission and Rattlesnake Mountains; Aune and Kasworm (1989) studied denning along the Rocky Mountain Front and; Mace and Waller (1997) studied denning in the Swan Mountains. These three studies provide the baseline for characterizing and analyzing project effects upon grizzly bear denning.

The selected parameters for characterizing denning habitat are shown in Table 20 below. These parameters represent the elevational band of habitat most commonly used by denning grizzly bears; higher elevation slopes sufficiently steep and shaded to retain snow throughout the denning season with soil types conducive to den excavation and den structural integrity.

Table 20. Grizzly Bear Denning Habitat Parameters for the Blackfoot Landscape

Habitat Type	Elevation (ft)	Slope (%)	Cover	Aspect (Cardinal)
High Potential	>6,200	>35 and <100	All types except rock	N, NE, and NW
Potential	>6,200	>35 and <100	All types except rock	All other aspects

Various bear denning studies found that when available northerly aspects which retain snow longer providing the most consistent micro-climate during hibernation are most often selected for den sites. Therefore, *high potential* denning habitat selects for all northerly aspects while *potential* selects for all other aspects. The amount of *high potential* and *potential* denning habitat within the respective subunits is shown in Table 21 below.

Table 21. Grizzly Bear Denning Habitat on NFS lands by Subunit

Subunit	Subunit NFS Acres	Denning Habitat	Acres	% of Denning Habitat	% of Subunit
Arrastra Mountain	64,936	High Potential	7,358	31	11
		Potential	16,023	69	25
		Total	23,381	100	36
Red Mountain	64,606	High Potential	7,451	40	12
		Potential	11,211	60	17
		Total	18,662	100	29

Combined Subunits	129,542	High Potential	14,809	35	11
		Potential	27,234	65	21
		Total	42,043	100	32

Grizzly bear denning habitat occurs at upper elevations scattered across the project area. Collectively, *high potential* den habitat represents approximately 11% and *potential* den habitat represents approximately 21% of the combined subunits. As shown previously in Table 18, no denning habitat occurs in harvest units, no *high potential* denning habitat occurs within any treatment units, and less than 3% of the *potential* denning habitat for the combined subunits occurs within prescribed burn units. For both the Arrastra and Red Mountain subunits, the majority of denning habitat occurs in the Scapegoat Wilderness.

There are no anticipated adverse effects to grizzly bear denning activity or denning habitat for the following reasons:

- There is no overlap of project activities with the recognized denning period of 12/1 - 3/31 due to seasonal operating restrictions from 12/1 - 5/31.
- No commercial or precommercial harvest treatments would occur within suitable denning habitat.
- No *high potential* denning habitat supporting north slopes that are more frequently selected for denning occur within treatment units.
- Although less than 3% of *potential* denning habitat occurs within prescribed burn units, treatments would not occur during the denning period, treatments would be temporally and spatially distributed, and burning is not anticipated to preclude future denning use. While there would be a reduction or temporary loss of vegetative cover, cover is not a necessary component of denning habitat.
- The amount of available denning habitat would remain abundant with approximately 42,000 acres or 32% of NFS lands in the combined subunits providing denning habitat.

Connectivity

Project related effects to habitat connectivity would be similar to those described for lynx. Project treatments would occur on the western edge of the Lincoln Valley where forested habitats provide continuous cover for grizzly bear access to the Highway 200/Blackfoot river corridor around the open valley bottom and the associated human residences. It is anticipated that some avoidance of treatment areas by individuals would occur during implementation. The reduction or removal of cover following implementation is expected to influence movement patterns of individuals through the project area but the patchiness of habitat retained due to different harvest prescriptions, retention of untreated areas in addition to riparian buffers are anticipated to retain sufficient cover to allow bears to move through the project area. The seasonal restriction of 12/1 to 5/31 would limit disturbance during the spring following den emergence when bears move to lower elevations in search of food and maintain early season access to the river corridor. During this time seasonal road restrictions also limit motorized use in the area further minimizing the potential to disrupt bear movements. There would be some short term reduction in available forage due to harvest and post-harvest burn treatments however short term increases in grasses would occur and shrub production would also increase within 10 years following treatment. Over the longer term conifer regeneration would increase cover within treatment units improving the ability for bears to move through the project area.

Opportunities for bears to move between habitats on either side of the Blackfoot river and Hwy 200 would continue to present within the project area and lands to the west and east of the project area. Between the project area and MT Hwy 141 and east of the Lincoln Valley grizzly bears have been known to cross the highway in numerous locations as confirmed by, observed sightings, FWP radio tracking efforts and grizzly bear highway mortalities. Several areas to the west and east of the project area support contiguous forest cover on either side of the highway capable of facilitating bear movements to the river corridor and adjacent habitats. Considerable cover would remain in untreated habitats north of the project area that would continue to allow bears to move around the northern portion of the valley.

Prescribed burn treatments are anticipated to have minimal effect upon bear movements other than potential short term displacement during implementation. Due to the scattered distribution of prescribed burn units both spatially and temporally, their remote location with minimal road access, and the expectation that unburned habitat will be retained in all burn units bears are anticipated to continue to utilize burn units for foraging, travel and denning post treatment.

Food Storage and Sanitation

People working in the woods provide opportunities for grizzly bears to be attracted to food and garbage and to become food conditioned. The Lincoln Ranger District has been covered under Forest Order H-05-01 for food storage since 2005, which addresses food and garbage storage. A clause is included in all contracts that require the contractor adhere to this order. As a result, it is unlikely that effects associated with inadequate food storage and increased risks to bear or people would occur under the proposed action.

Cover and Forage

Proposed timber harvest, both commercial and precommercial, will affect approximately 3% of NFS lands in the Arrastra subunit and only 0.3% of the Red Mountain sub-unit. Grizzly bear response to logging and logged areas is mixed and complex (Zager et al 1983, Waller and Mace 1997a) and bear use can be affected by changes in the quality and quantity of forage and cover and by changes in human use patterns. Also some studies documented reduced bear use while others found no evidence that logging impacted grizzly bears (MDNRC 2010). Areas most likely to be used are those that produce crops of preferred foods (typically soft mast) and/or those that are relatively free from human disturbance (MDNRC 2010). As a result treatments were evaluated in terms of changes in cover and forage, as well as their proximity to human activity.

All harvest will result in a reduction in cover on the site, with regeneration harvest resulting in a long-term loss of overhead forested cover. As a result bear use of regenerated sites would be reduced and most use within the next 10 years would be expected to occur largely near edges of treatment areas or riparian buffers (i.e. areas that provide cover). Cover will also be reduced on partial or intermediate harvest units, although residual overstory cover will be maintained on 25 to 50 percent of the sites treated. Also riparian buffers would be maintained and interspersed throughout many units, further limiting sight distances. As a result it is expected that overall intermediate harvest prescriptions would provide adequate cover to provide for bear security. The likelihood that a harvest site would be utilized would also be determined by the amount of human activity and access. As reflected by the access management moving windows analysis 74% of the Arrastra subunit provides security core habitat which would remain unchanged during and after implementation even though 87% of harvest activities occur within the subunit. The Red Mountain subunit only has 58% security core but similarly there would be no reduction in core during harvest treatments. No harvest treatments occur within core habitat and harvest activities do not change core values for either subunit due to the close proximity of harvest units to open roads and private land with more concentrated human activity. As a result, existing as well as future use of harvest sites may be lower due to the existing disturbance levels associated with open roads and human activities on private lands. While harvest will serve to increase forage availability within treatment areas grizzly bear utilization of the increased forage may be limited by the tendency of bears to underutilize habitats near

roads and human activities. The more remote treatment areas of improved forage have the greatest likelihood of being utilized by bears.

Overall harvest treatment will result in a long-term reduction in forested cover on the acreage affected. Conversely available forage would increase. For example Nielson et al (2004) found that the occurrence of critical grizzly bear foods, including roots and tubers, herbaceous vegetation and ants were more common in regenerating clearcuts than the surrounding forest. Also shrubs including huckleberry and buffaloberry were found to increase, although this varied by site (Martin 1983, Zager et al 1983).

Bear use also varies over time. Some research indicates that grizzly don't utilize harvest units until 10 years after treatment (MDNRC 2010), whereas other research found that grizzly utilized recent clearcuts (Nielson et al 2004, Wielgus and Vernier 2003). Also intermediate aged clearcuts (approximately 30 years of age) were selected throughout the year, whereas recent and old clearcuts were utilized largely early in the year and again between early August and denning (Nielson et al 2004). While grasses and forbs would be expected to increase on all sites, increases in shrubs (e.g. huckleberries) were found to be greatest on moist sites with northern and easterly aspects (Martin 1980). Consequently cover and forage availability as well as bear use will vary over time and by site.

Prescribed Burning

Prescribed burning includes approximately 2,340 acres of the Arrastra subunit and 1,842 acres of the Red mountain subunit. Of the NFS lands within the subunits this represents approximately 3.6 and 2.9% of the Arrastra and Red Mountain sub-units respectively. Most of this occurs as mixed severity burning which includes high intensity burning that will create openings and result in a long-term loss of forest cover on 25 to 30 percent of the site. These openings will vary in size, will be widely scattered and interspersed with riparian buffers, untreated areas and low severity burn areas, all of which will retain bear security cover. As a result, bears would continue to utilize fire created openings for foraging following treatment. While there will be little change in overstory on areas affected by low severity burning (50 to 55 percent of the site), understory cover will be reduced. However because the overstory will be largely retained and considering riparian buffers, as well as untreated areas (20 percent of the unit), would provide intact cover interspersed throughout the burn unit, bear security will be retained on all areas affected by low severity burning.

Proposed burning would result in a flush of herbaceous vegetation (grasses and forbs) and it is expected that spring forage would increase within a year of the burn and will be maintained at levels above current conditions well into the future (>20 years). Similarly, production of shrubs such as huckleberry and buffaloberry would increase both in the short (5 years) and long-term (>50 years) (Martin 1980). Finally whitebark pine restoration will occur on 555 acres utilizing hand improvement cutting, pile burning and jackpot burning to maintain and enhance whitebark pine. As a result it is expected that proposed burning will maintain security cover, while increasing the diversity and distribution of grizzly bear foraging habitat across the landscape. Like timber harvest, use of burn areas would be greatest in more remote areas. Of the acres identified for prescribed burning the majority occurs within inventoried roadless areas further removed from open roads and private lands than harvest units. Correspondingly, improved forage resulting from prescribed fire is anticipated to be better utilized by bears due to less human disturbance and a more mosaic pattern of cover and forage within units.

Landscape Considerations

Landscape conditions have been shown to influence bear use of managed forests. For example in areas where natural openings or disturbed areas (e.g. fire) were available, bears have been found to avoid clearcuts. However where fire suppression and succession has led to little if any forest openings, grizzly have adapted to utilizing closely related anthropogenic sites such as clearcuts. Also decades of fire

suppression have reduced natural disturbances such as wildfire and resulted in conifer encroachment that has further reduced natural openings and meadows (Nielson et al 2004). This is a consideration for the Stonewall project area because less than 4 percent of the project area occurs in meadow/shrub habitat.

Proposed mixed severity burning will help restore fire to the landscape as well as increase the availability of openings/meadows in remote areas preferred by grizzly. As a result the proposed actions would create landscape level conditions preferred by grizzly (Nielson et al 2004, Herrero 1972) while promoting the sustainability of whitebark pine and maintaining existing core/remote habitat.

Cumulative Effects

As described above, the cumulative effect boundary includes 89,216 acres. Of this 75 percent occurs on National Forest, less than one percent is State owned land and 24 percent is in private ownership. Past, on-going and future activities within the action area include grazing, private land development, dispersed recreational use, timber harvest, wildfires and prescribed burning. It is not a not anticipated that grazing or dispersed recreation (primarily hunting, camping and winter travel) will change in the future. Also while there will be some limited private land development in the future, it is not anticipated that this will affect grizzly or their habitat. Other past activities include hazard tree removal, weed treatment, personal use firewood collection, and placer mining. All of these activities occur in close proximity to open roads where grizzly are less likely to occur. As a result long-term impacts from these activities are not anticipated. Activities that could result in long-term effects to grizzly include those that would reduce cover or increase human activity, particularly into more remote habitat used by bears including wildfire, timber harvest and prescribed burning.

Cumulative effects considered in this biological assessment include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area overlapping in time or place. Future federal actions that are unrelated to the Decision Alternative are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The majority of State and private lands in the cumulative effects area support open forest conditions due to past and recent management activities largely directed at improving forest health, removing dead and dying in response to insect mortality, and to reduce fuels in the wildland urban interface. Consequently, these lands provide limited forest cover and limited known use by grizzly bears. It is anticipated that future forest management on State and private lands will continue to emphasis forest health and fuels reduction activities that minimize use by grizzly bears although the residual forest cover may continue to allow bear movement between more suitable habitat patches. While future harvest activities will further reduce forest cover and the abundance of dead trees, the impact from these activities on state and private lands will be minimal due to the small proportion of the action area involved.

Private lands in and adjacent to the Forest may be developed for residential or commercial use. As more people use private land and adjoining federal land for homes, recreation or business, the challenge to accommodate those uses in ways that continue to protect the grizzly bear population increases. Very little non-federal land occurs within the action area. At present, development in the action area is limited and no significant developments within the action area are anticipated that would contribute appreciably to the proposed federal action. Future development of private land adjacent to or within the action area is unknown but the potential for future developments within the recovery zone portion of the cumulative effects area to significantly impact grizzly bears during the timeframe of the proposed project is limited due to the absence of economic attractants to the area and the limited availability of private lands for development.

One of the most important past and future management activities influencing grizzly bear habitat use has been road construction. Vegetation management projects that construct or improve forest cover can make

bears more susceptible to displacement as roads built to access timber may later be used as public travel routes while timber harvest activities also have the potential to displace bears to less suitable habitats. In the past roads have facilitated human access into grizzly bear habitat, during denning and non-denning seasons, which can be directly associated with bear mortality (Mattson et al. 1987). Within the Monture – Landers Fork BMU motorized route densities are managed in accordance with the *Northern Continental Divide Ecosystem Grizzly Bear Access Management Protocol* and *Flathead National Forest Amendment 19* (USDA FNF 2008) which considers open route density, total route density, and security core habitat to conserve grizzly bears. Although the project will result in some short term increase in open and total road densities during implementation the availability of security core habitat would remain unchanged relative to motorized access. Post-implementation, open and total road densities and core habitat would remain unchanged from the existing condition.

Conversely, vegetation management activities can have positive effects on grizzly bear habitat by regenerating forest habitats resulting in increased forage production and reducing the risk of large scale habitat loss due to wildfire. While some vegetation management projects may temporarily increase fragmentation and edge effects over the short term, they are expected to be beneficial in terms of forage production over the longer term. Associated actions such as reopening previously closed roads, relocating roads, or constructing new roads may serve to increase habitat fragmentation or the short or long term however projects that closing or decommission roads can reduce habitat fragmentation.

The Blackfoot-North Divide Winter Travel Plan was implemented in December 2013 serving to minimize potential winter motorized effects to grizzly bears during the denning period. The Winter Travel Plan designated approximately 88,000 acres as winter non-motorized to protect potential denning habitat and imposed a winter season ending date of 3/31 for the majority of lands north of Hwy 200 to minimize effects to bears during spring emergence. Previously, there were no area restrictions and no season ending date for winter motorized use in the action area. Cumulatively, the Winter Travel Plan and the pending Non-winter Travel Plan serve to maintain or reduce potential recreational impacts upon grizzly bears in the action area.

Highways 200 and 279 currently provide the most significant impediment to wildlife movements within the action area and are responsible for multiple wildlife mortalities throughout the year, including known grizzly bear mortalities both west and east of the project area. It is anticipated that traffic volume on these highways will increase in future years as the human population in surrounding areas continues to grow. Correspondingly, since many of the action areas summer and winter recreationists come from the surrounding areas, it is reasonable to expect some future increase in highway traffic and an increased potential for grizzly bear mortality.

Domestic grazing occurs on much of the action area on private and State lands and as authorized livestock allotments on NFS lands but is not anticipated to cumulatively contribute to project related effects to grizzly bears. The project would not result in any changes to allotment management or stocking levels.

Other ongoing and foreseeable management actions (e.g. tree planting, timber harvest, thinning, gathering forest products, road maintenance and developed recreation activities, etc.) in the cumulative effects analysis area are not expected to have significant cumulative effects to grizzlies.

Activities associated with exploration and development of leasable minerals could affect grizzly bears through loss of native vegetation, displacement, and increased risk of human/bear conflicts. The development of associated roads, powerlines and pipelines to facilitate exploration and development could result in a loss of cover and foraging habitat and contribute to fragmentation of habitat. Currently, several small placer mines occur in the cumulative effects area but there are no proposals for larger scale exploration or development of leasable minerals within the action area.

Based on the above discussion and the direct and indirect effects of the Decision Alternative analyzed in this document, the Decision Alternative is not anticipated to significantly contribute to cumulative adverse effects upon grizzly bears.

Effects Determination

The determination of the analysis is that implementation of the Stonewall Vegetation Management Project **May Affect, Likely to Adversely Affect** grizzly bear.

This determination is due to the current degraded baseline of the Red Mountain subunit for access management. Project activities would neither degrade nor improve the baseline during or after implementation therefore the subunit would continue to have a degraded baseline adversely affecting grizzly bears. Other project activities are not expected to appreciably contribute to adverse effects upon grizzly bears. The selected action would improve landscape level foraging habitat for grizzly bears over time. Whitebark pine and aspen habitats would be maintained or enhanced and harvest and burning activities would increase forage production in forest understories. However, in the short term there would be a reduction in cover and forage, increased potential for displacement of bears and an increased risk of bear/human conflicts. The rationale for the determination is based upon the following:

- Activities associated with the proposed project will result in short-term displacement during project activities.
- Project activities would result in short and long term reductions in cover as well as short and long term increases in forage availability.
- Within the Arrastra Mountain sub-unit, all 19/19/68 access management objectives would be met during and post implementation even though OMRD would increase by 2% during implementation. Although not substantive enough to change the numeric value for TMRD there would be a slight increase in TMRD during implementation due to the construction of 0.9 miles of temp road. There would be no change to CORE during or after project implementation.
- There would be no change in OMRD, TMRD, or CORE in the Red Mountain subunit during or after project implementation. The Red mountain subunit currently has a degraded baseline however, which would not improve during or after implementation, therefore the subunit would continue to adversely impact bears.
- While 0.9 miles of temporary roads will be constructed within the Arrastra Subunit, all roads will be closed to public access during implementation and obliterated immediately following use. There will be no change in public motorized access during or post implementation.
- Approximately 97 percent of modeled den habitat will be maintained. Due to the seasonal operating restrictions from 12/1-5/31 there are no anticipated effects to grizzly bear denning activity.
- Greater than 80% percent of all timber harvest occurs in close proximity to open roads and concentrated human activity, reducing the potential for bears to be to present and negatively affected by project activities. Only short-term disturbance is anticipated during implementation and there are no long-term adverse direct effects to bears anticipated.
- Existing forested cover will be maintained on 96 and 99 percent of the Arrastra and Red Mountain sub-units respectively.
- Proposed treatments would promote the long-term sustainability of whitebark pine, increase stand and landscape level forage, and restore fire to the landscape while reducing the risk of stand replacing wildfire and a further reduction in grizzly bear habitat.
- All treatments are consistent with Forest Plan goals, objectives and standards; comply with Interagency Grizzly Bear Committee guidelines; and consistent with the intent of the Draft Grizzly Bear Conservation Strategy.

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