Hazard Tree Analysis Area

Biological Assessment[1]

Medicine Bow National Forest

Version 06/19/2008

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[1] Meets the standards for both a Biological Evaluation (FSM 2672.42) and Biological Assessment (50 CFR 402.12(f)).

I. INTRODUCTION

The purpose of this biological assessment is to determine the likely effects of the alternatives on federally listed species (endangered, threatened, and proposed). The best available science was used in analysis, including references at the end of this document and in the recent revision of the Forest Plan.

Section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to use their authorities to carry out programs to conserve endangered and threatened species, and to insure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, or result in the destruction or adverse modification of their critical habitats. A Biological Assessment must be prepared for federal actions that are "major construction activities" (defined under NEPA as a project significantly affecting the quality of the human environment) to evaluate the potential effects of the proposal on listed or proposed species. The contents of the BA are at the discretion of the federal agency, and will depend on the nature of the federal action (50 CFR 402.12(f)).

The Forest Service has established direction in Forest Service Manual 2670 to guide habitat management for Proposed, Endangered, Threatened and Sensitive species (PETS). Preparation of a Biological Evaluation as part of the NEPA process ensures that PETS species receive full consideration in the decision-making process.[2] This evaluation includes terrestrial wildlife species. Evaluation of aquatic and plant species is included in other specialists' reports.

II. DESCRIPTION OF THE PROPOSAL

The proposed action description is repeated directly from the Environmental Assessment for the project. The descriptions below are part of the environmental baseline for the analysis area.

The Hazard Tree Analysis Area (AA) includes all of the Medicine Bow National Forest. However, all Wilderness areas and the Medicine Bow's Laramie Peak area will not include any proposed activities. This report addresses Threatened or Endangered Species and critical habitat for the Medicine Bow Forest. The Routt National Forest is proposing similar hazard tree actions at this time and a separate biological assessment is concurrently being prepared to address Threatened or Endangered Species and critical habitat for that Forest. The Medicine Bow Forest analysis area is dominated by lodgepole pine and spruce/fir, 44% and 18%, respectively, of the 1,084,614 acres on the Forest (Table 1).

Standards for preparation and the content of Biological Evaluations are established in the Forest Service Manual (FSM 2672.42). Additional guidance is provided in Region 2 Manual Supplement 2600-94-2.

Table 1. Habitat structure stages by cover type.

	Acres in Habitat Structure Stage									
Cover Type	**0**		**2**	**3a**	**3b**	**3c**	**4a**	**4b**	**4c**	**5**
Aspen	0	3,168	1,896	15,809	17,245	8,003	14,822	13,427	5,009	4,307
Cottonwood	0	0	0	84	25	41	122	128	7	0
Douglas-fir	0	131	0	232	359	1,403	2,407	2,678	1,525	1,561
Gambel oak	0	0	0	0	43	0	0	0	0	0
Limber pine	0	54	270	5,870	759	200	2,896	1,160	177	246
Lodgepole pine	0	13,561	41,645	44,307	64,861	87,408	39,758	86,858	54,329	39,849
Ponderosa pine	0	4,284	446	2,685	2,985	976	43,250	32,197	7,046	2,080
Spruce/fir	0	4,766	8,899	15,260	6,270	3,854	30,579	41,537	28,037	52,493
Juniper	0	0	0	154	0	0	89	0	0	0
Total Forested	**0**	**25,964**	**53,157**	**84,401**	**92,546**	**101,885**	**133,924**	**177,985**	**96,132**	**100,537**
HSS as % of Total Forested	**0**	**3.0%**	**6.1%**	**9.7%**	**10.7%**	**11.8%**	**15.5%**	**20.5%**	**11.1%**	**11.6%**
HSS as % MBNF for Forested		**2.4%**	**4.9%**	**7.8%**	**8.5%**	**9.4%**	**12.3%**	**16.4%**	**8.9%**	**9.3%**
Total Non-forested	**10,593**	**76,551**	**130,537**	**2**	**2**	**72**	**250**	**35**	**36**	**4**
HSS as %MBNF for Non-Forested	**1.0%**	**7.1%**	**12.0%**	**<0.1%**	**<0.1%**	**<0.1%**	**<0.1%**	**<0.1%**	**<0.1%**	**<0.1%**
Total	**10,593**	**102,515**	**183,693**	**84,403**	**92,549**	**101,958**	**134,174**	**178,020**	**96,168**	**100,541**
HSS as % of Total	**1.0%**	**9.4%**	**16.9%**	**7.8%**	**8.5%**	**9.4%**	**12.4%**	**16.4%**	**8.9%**	**9.3%**

0 –non-vegetated, 1-grass-forb, 2-shrub-seedling, 3a-low density sapling-pole, 3b medium density sapling-pole, 3c high density sapling-pole, 4a-low density mature, 4b-medium density mature, 4c high density mature, 5-old forest.

Past Timber Harvest

There has been harvest in some portions of the Medicine Bow National Forest in the past. Vegetation changes caused by these actions and the subsequent regeneration are reflected in the existing condition (Table 1). However, some harvest units from the Ryan Park-Tenmile, Box Canyon, Blackhall/McAnulty, Singer Peak, Silver Run, Cottonwood Rim, Soldier Summit, French Creek, Silver Run, and Devil's Gate projects and the proposed Spruce Gulch project have not yet been treated, so these habitat changes are not reflected in the existing condition (Table 1).

Livestock Grazing

There are numerous cattle allotments across the Forest and several bands of domestic sheep grazing on the Sierra Madre range.

Recreation

Details about recreation across the Forest are included in the Specialist's report for recreation.

PURPOSE & NEED:

The HFRA recognizes healthy forests or forest health as an important part of forest management. This project responds directly to forest health objectives as described in the HFRA. Thus, its purpose is to reduce threats to public safety by **felling and/or removing dead and dying trees** impacted by the MPB epidemic along roads and trails and in and adjacent to Forest Service developed recreation sites and administrative sites.

Given the widespread tree mortality associated with the MPB epidemic, the project is needed to:
1) Ensure public and firefighter safety by: a) reducing the risk of persons or property being struck by falling trees; and b) keeping travel corridors open with adequate clearance for the combination of traditional firefighting equipment (e.g., heavy equipment transport trucks, crew carriers, busses, and fire engines), recreational vehicles, and automobiles. The combination of such vehicles is typical during an emerging fire emergency when fire resources are arriving and the general public is evacuating;
2) Reduce the risk of high intensity/high severity wildfires within treatment areas by reducing hazardous fuel loadings associated with treatments and beetle killed trees;
3) Minimize the effects of tree mortality on the overall health, scenic quality, and condition of forested areas along roads and trails and in and adjacent to developed recreation sites and administrative sites; and
4) Partially offset the cost of treatments by salvaging forest products.

Background Information

Recent years have seen a dramatic increase in mountain pine beetle (MPB) activity and conifer tree mortality in northern Colorado and southern Wyoming. In an attempt to define and track the effects of the infestation, entomologists from the Lakewood Service Center in Lakewood, Colorado analyzed aerial and ground survey data sets of national forests containing lodgepole pine at risk for MPB infestations. The analysis included all or portions of the White River, Arapaho, and Routt NFs in northern Colorado and portions of the Medicine Bow NF in southern Wyoming. Results of the analysis, as documented in Report LSC-07-06, confirmed the following: 1) MPBs are at epidemic levels in northern Colorado and southern Wyoming; and 2) they are not likely to depart from their current course unless a period of prolonged and severe low temperatures (<-30º F) occurs during late fall-winter-early spring months.

Information contained in Report LSC-07-06 provided the technical basis for the Rocky Mountain Regional Office of the USDA Forest Service to issue a Mountain Pine Beetle Epidemic Declaration for northern Colorado and southern Wyoming. The declaration was issued on June 25, 2007 and allows Forest Supervisors of the affected NFs to implement streamlined NEPA authorities offered by HFRA if they determine that ecosystem components are threatened by the beetles.

On October 4, 2007, Mary H. Peterson, Forest Supervisor of the Medicine Bow-Routt National Forests, made the following determinations for the Forest-wide Hazardous Tree Removal and Fuels Reduction Project:
1) Ecosystem components associated with Routt and the Medicine Bow NFs are threatened by the beetle infestation. Between 1996 and 2006, aerial survey data showed that over 223,000 acres on the Routt NF and 75,000 acres on the Medicine Bow NF were impacted by MPBs. By 2007, acres impacted by the beetles had escalated to 350,000 acres on the Routt NF and 178,000 acres on the Medicine Bow NF. This widespread loss of mature lodgepole pine stands has the potential to negatively impact physical and biological resources.
2) Tree mortality from the beetle infestation poses a significant threat to public safety along travel corridors and in and adjacent to developed recreation sites and administrative sites. Dead

and dying trees increase the potential for: a) persons or property being struck by falling trees; and b) trees falling and blocking roadways, thus preventing both emergency and non-emergency ingress and egress.
3) The amount of dead and dying trees poses a significant threat for more catastrophic fire events due to increased fuel loads.
Based on these determinations, the Forest Supervisor concluded that the Forest-wide Hazardous Tree Removal and Fuels Reduction Project is an authorized project under Section 102(a)(4) of the HFRA. Accordingly, the environmental analysis for the project was completed under the HFRA, Title I, Section 104.

ALTERNATIVE 1– NO ACTION

Under the No Action alternative, standing dead and dying trees along state and county roads within the Forest boundary and along NFSRs would not be felled and/or removed. Standing dead and dying trees in and adjacent to Forest Service campgrounds, trailheads, and administrative sites would also not be removed. No attempt would be made to respond to the purpose of and need for the proposal.

Expectations are that emerging pine beetles from the existing epicenters will continue to spread into, and attack green, standing lodgepole pine. The outbreak has the potential to affect thousands of acres of lodgepole-dominated forests across the Forest.

ALTERNATIVE 2 - PROPOSED ACTION:

Modifications from the Initial Proposed Action:
• The felling corridor has been reduced from up to 200 feet from the centerline of roads and trails to 1 ½ tree heights (up to 150 feet) from the centerline of roads and trails.
• The statement, "…standing dead and dying trees would be felled and/or removed adjacent to communities surrounded by National Forest system (NFS) lands and adjacent to Special Use Permit areas including, but not limited to, ski areas, lodges, resorts, and special use cabin groups" has been removed.
• Design criteria to protect mapped and inventoried old growth, late succession forest, and wildlife habitat were added to the alternative description.

Under the Proposed Action - Modified, the Forest Service could **fell and/or remove hazardous trees that are within 1 ½ tree heights (up to 150 feet**) from the centerline of: 1) NFSRs open to public travel (Maintenance levels 2 – 5); and 2) state and county roads that cross the Forest. Hazardous trees in and adjacent to Forest Service campgrounds, administrative sites, and Forest Service trailheads could also be felled and/or removed. Hazardous trees could be felled, but not removed, along Forest Service trails. These activities could occur over a 10-year period. **Healthy, stable, live trees (e.g., spruce-fir, aspen, and lodgepole pine), clumps of regeneration, and dead and dying trees leaning away from the roads and trails and other aforementioned sites would be retained unless they pose a safety hazard in the felling/removal operation.**

The majority of the **salvage treatments (i.e. dead tree removal**) would impact lodgepole pine trees, although small amounts of Engelmann spruce, sub-alpine fir, and aspen could also be felled and/or removed. Depending on the severity of the beetle infestation and the resultant tree mortality, **salvage treatments** could include: removal of individual hazardous trees; removal of overstory trees infested with MPB while leaving the understory vegetation; removal of clumps of hazardous trees; or removing all hazardous trees **up to 150 feet from the centerline of** roads and trails. **In all cases, treated areas would be allowed to regenerate naturally.**

Forest products would be removed (where feasible) from treated areas or fuels would be treated on site. Fuel treatments along road ways and in campgrounds and administrative sites could include chipping, lopping and scattering slash to an 18 or 24 inch depth, roller chopping, machine trampling, and/or broadcast burning. Hand piling, pile burning or mulching may occur in select units to mitigate fuels or visual concerns. Where feasible, fuel treatments along trails would consist of hand piling the felled material and burning it.

Commercial timber sale contracts, non-commercial service contracts, free use permits and contracts, Forest Service "Force Account" projects, and Stewardship contracts could be used to fell and/or remove the hazardous trees.

Design criteria would be applied to protect sensitive areas including, but not limited to, streamside management zones, old growth and late succession forests, wildlife resources, and Special Interest Areas during felling and/or removal operations. Winter logging may also be considered in specific areas, and on a case-by-case basis, to further protect sensitive resource areas.

If approved, the Forest Service would like to begin implementing the Proposed Action – Modified during the summer of 2008 and continue implementation over the next 10 years. Priority for scheduling treatments would be determined annually by: a) the severity of bark beetle infestation, tree mortality, the severity of safety hazard posed; b) maintaining safe access to important public recreation sites and trails; c) maintaining requested ingress/egress to private inholdings; d) public desires for maintaining access into the NFs; e) protection of facilities listed on the National Register of Historic Places; and f) protection of administrative sites, particularly those used to house seasonal employees.

Hazardous Tree Definition

Hazardous Tree: A hazardous tree is defined as any tree that may fail due to a structural defect and, as a result, may cause property damage or personal injury. Tree failure is difficult to predict with certainty due to the complex interaction between a tree and its environment. Every tree will eventually fail; therefore, knowledge of tree species, site characteristics, and local weather conditions and patterns are essential when evaluating tree hazards. A defective tree is hazardous only when its failure could result in damage to something of value. The following tree specific criteria will be used to identify hazardous trees for this project. Any one or more of these criteria will qualify a tree as hazardous.

1. Dead trees of any species
2. Trees with significant defects:

a. Canker rots
b. Root rots
c. Trunk injuries (mechanical damage, stem decay, etc.)
d. Crown defects (broken or damaged branches, forked tops, dead tops, etc.)

3. Dying trees

a. About 1/3 + dead limbs and branches
b. Foliage transparency 40% + (thin crown, off-color or dwarfed foliage)
c. Borer attacks obvious and abundant - the presence of insect activity, such as bark beetles or mountain pine beetles, may indicate that a tree has been weakened by other agents.

Research shows that dead, mature lodgepole pine trees begin to fall after three years and that the majority of trees fall within 14 years (Mitchell and Preisler 1998). It is anticipated that many of the dead trees on the Medicine Bow National Forest will fall across roadways, in administrative

sites, across trails, and in developed recreation sites. This situation will create threats to public safety either directly or indirectly (i.e. access into or out of areas may be blocked by fallen trees) and/or will increase the potential for property damage.

Scheduling Priorities

If approved, the Forest Service would like to begin implementing the Proposed Action – Modified during the summer of 2008 and continue implementation over the next 10 years. See EA pages 15 - 20 for a detailed description of the Proposed Action – Modified. Priority for scheduling treatments would be determined annually by: a) the severity of bark beetle infestation, tree mortality, the severity of safety hazard posed; b) maintaining safe access to important public recreation sites and trails; c) maintaining requested ingress/egress to private inholdings; d) public desires for maintaining access into the NFs; e) protection of facilities listed on the National Register of Historic Places; and f) protection of administrative sites, particularly those used to house seasonal employees.

Design Criteria - PROPOSED ACTION

The Interdisciplinary Team (ID Team) identified design criteria to reduce or prevent undesirable effects resulting from management activities. Design criteria include such measures as Best Management Practices (BMPs), Watershed Conservation Practices (WCPs), Forest Plan standards and guidelines, and other environmental protection required by laws and regulations. They are as follows:

Developed Recreation Sites, Trails, Trailheads, and Administrative Sites

1. Minimize damage to designated infrastructure from tree felling operations.
2. Felled hazard trees and slash shall be removed from the corridor of roads and other mowed or maintained areas within developed recreation sites and scattered outside the developed site in areas designated by the Forest Service. Felled trees will be whole tree skidded to designated landings outside of the developed site.
3. Coordinate closure of heavily used trailheads, administrative sites, campgrounds, and travel corridors with District recreation staffs to minimize impacts to the public. Provide information to the recreating public on the purpose and duration of the closure as well as on alternative recreation opportunities in the vicinity.
4. Where feasible, fresh cut ends of logs that are felled, but not removed, will not be visible from the trail in MA 1.2. When cutting trees that fall naturally across trails in MA 1.2, lop and scatter logs and limbs outside the corridor as to provide and maintain the naturalness of trail corridor and meet Preservation VQO and Very High SIO.

Heritage Resources

5. Heritage resource sites that are discovered within areas identified for mechanical treatment will be evaluated for National Register eligibility. Sites that are eligible for, or listed on, the National Register of Historic Places will not have mechanical treatment occur within the site boundary plus a 50 foot buffer around the site. If treatment is necessary these sites, and the 50 foot buffer, will be hand-treated for hazard trees and accumulated fuel build up.

Invasive Species

6. Off-road equipment shall not be moved onto the sale area without having first taken reasonable measures to make sure each piece of equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold invasive seeds.
7. Revegetation on any area may be required where ground cover is disturbed (e.g. landings, burned slash pile sites, skid trails, etc.). As a general guideline, ground cover should recover to its

normal range of variability for the landtype and geoclimatic area by the end of the third growing season. Native plant species should ultimately dominate the site, although introduction of nonpersistent species may be used to ensure vegetation cover initially.

Inventoried Roadless Areas (IRAs)
8. Hazard trees may be felled but left in place in all IRAs. Lop and scatter slash to a height of 24 inches above the ground.

Old Growth and Late Succession Forest
9. Hazard trees within mapped and inventoried old growth areas and in those polygons identified in the old growth strategy on the MBNF will be hand felled and left in place. If necessary, felled trees may be stabilized to prevent movement onto a roadway. Lop and scatter slash to a height of less than 24 inches above the ground. Do not designate landings in these areas.
10. This design criterion applies to the following Geographic Areas on the Routt National Forest: Arapahoe Creek, Corral Peaks, Encampment River, Owl Mountain, Pinkham Mountain, Willow Creek, Little Snake, Sand Mountain, Slater Creek, Upper Elk River, Gore and Red Dirt. In MA 5.13, dead and dying trees will be hand felled and left in place on 35 percent of the total treatment area of the lodgepole pine and spruce-fir stands with trees of larger diameter (trees mostly > 9" dbh). If necessary, fallen trees may be stabilized to prevent movement onto a roadway. These areas of "hand fall and leave in place" can be located mostly within spruce-fir stands where there will be more residual green timber after hazard tree removal and/or combined with wildlife connectivity needs. Lop and scatter slash to a height of less than 24 inches above ground. Do not designate landings in these areas. Trees will be felled adjacent (or on top of each other) to each other wherever possible to reduce movement impacts to elk.

Public Safety
11. On Level 3 – 5 roads and on county and state highways, warning signs and traffic control shall be in accordance with the "Manual of Uniform Traffic Control Devices."
12. Level 2 roads will be temporarily closed to general public access during felling and/or removal operations.
13. Erect barricades and/or proper signs at any traffic hazards left in or adjacent to the road at the end of each workday. All felled trees and slash shall be removed from the bladed, mowed, or brushed road corridor each day before crews leave the work area for the day.

Riparian Areas/Aquatic Protection
14. Locate staging areas and refueling locations at least 100 feet away from streams and wetlands.
15. The Forest Service will designate heavy equipment crossings for streams that have definable beds and banks.
16. Stream crossings and other instream structures will be designed to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.
17. Any hazard tree and associated debris cut down or lying within 200 feet upstream of a perennial or intermittent stream/road culvert crossing, that has the potential to obstruct a bridge or culvert, will be moved at least 100 feet upslope away from the stream. Ground based equipment can be used up to the edge of, but not within riparian areas, wetlands or hydric soils. This design criterion takes precedence over design criteria 8 and 31.
18. Trees within 100 feet of tie driven streams will not be removed if they provide a potential source of large woody debris to the stream system. Felled hazard trees should be left in place.
19. Ground based equipment will not be permitted within 100 feet of identified riparian areas or within 200 feet of identified wetlands/fens (by GIS or located on ground during implementation); hand felling of hazard trees is permitted in the 100 foot riparian buffer and the 200 foot wetland buffer. Felled trees will either be left in place in riparian areas or may be removed by winching

where there will be no disturbance such that bare ground is exposed. If tree removal (including whole tree yarding) is not possible, slash may be lopped and scattered to a height of less than 24 inches above ground level.
20. Ground based equipment will not be permitted on identified hydric soils (by GIS or located on ground during implementation); hand felling of hazard trees is permitted in the hydric soils. Felled trees will either be left in place on hydric soils or winched as specified by the Forest Service. If tree removal is not possible, slash may be lopped and scattered to a height of less than 24 inches above ground level.

Roads
21. No new specified road or temporary road construction will be authorized. No excavated skid trails will be authorized except where necessary to gain access up the cut slope or down the fill slope of an existing road.
22. Decking and landing areas will be designated by the Forest Service.
23. Minimize damage to drainage structures and road features. Repair any damaged drainage structures and road features and rehabilitate any damage to cut and fill slopes.
24. When operating on or along the road prism, do not skid within or across drainage ditches; limit impacts to road surface. When damage is unavoidable, reconstruct and/or replace surfacing as necessary. Engineering will determine post-operation/haul road maintenance, repair, reconditioning, or resurfacing needs on an individual basis.
25. Honor existing seasonal road closures and other road restrictions during hazard tree removal operations for species or resources that are sensitive to disturbance.
26. Remove felled hazard trees and slash from wing ditches, lead-off ditches, tail ditches, and culvert outlets. Place all slash such that it will not fall, roll, or be blown into these areas.

Slash Disposal/Fuels Treatments
27. The preferred slash treatment method for the majority of the potential project area is to whole tree skid and/or removal of the whole tree where the entire tree, including the top and limbs, is removed. The limbs and tops are to be cut off at designated landings and piled for later burning by the Forest Service or chipped and hauled off-site by the Contractor.
28. Where terrain and topography allow: for road clearing operations and at all trailheads, the limbs may also be chipped on-site with the chips left in place; the depth of the chips cannot exceed three inches above the surface. At administrative sites and developed recreation areas, chips resulting from chipping operations must be hauled off-site for disposal.
29. Remove slash from felled hazard trees from stream channels unless otherwise specified by the Forest Service. Lop and scatter slash to a height of less than 24 inches above the ground.
30. After slash piles are initially burned, plan on follow-up re-piling or scattering3 of the pile remnants by a dozer equipped with a brush rake. Where re-piling occurs, the piles will be reburned.
31. Slash treatment shall include lopping/scattering outside the developed area or cut and piled for rental property firewood. Lop and scatter slash to a height of less than 24 inches above ground level.

Special Interest Areas (SIAs), Research Natural Areas (RNAs), and Wilderness Areas
32. Trees may be hand felled in SIAs and boles must be left in place; ground skidding may not occur. Lop and scatter limbs to a height of less than 24 inches above the ground. This design criterion applies to the following SIAs on the Medicine Bow National Forest: Cinnabar Park, Medicine Bow Peak, White Rock Canyon, Kettle Ponds, Sunken Gardens, Ribbon Forest, Platte Canyon, and Brown's Peak. It also applies to the following SIAs on the Routt National Forest: Black Mountain, Oliphant and Welba Peaks, California Park, Camp Creek, Little Snake, and Kettle Lakes.

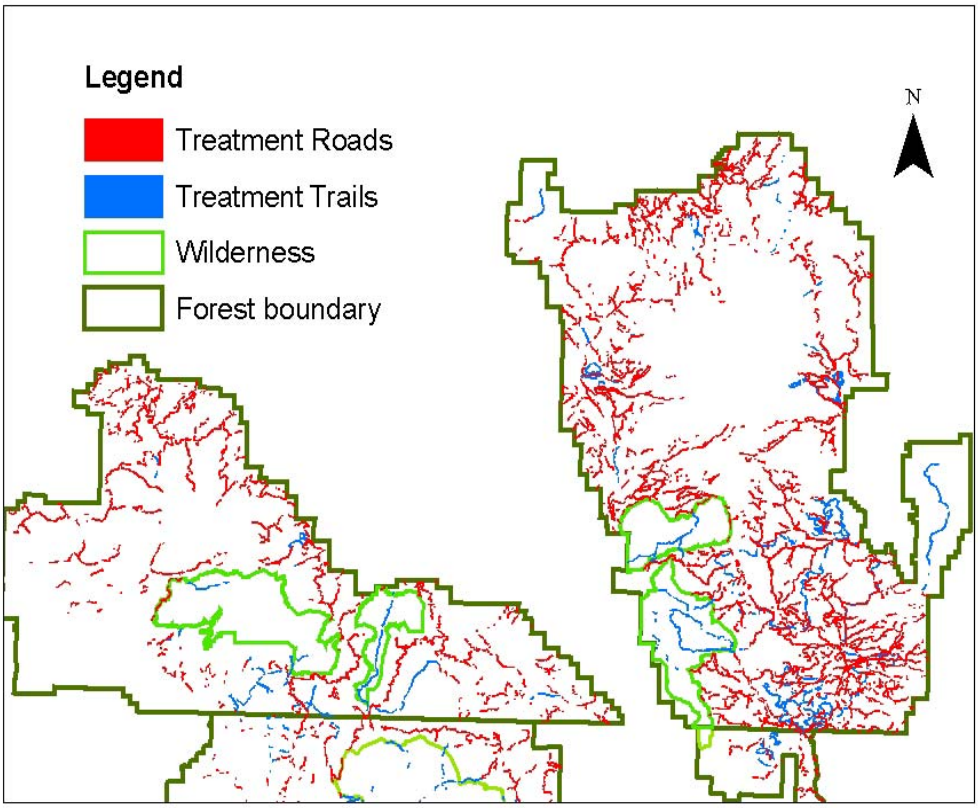
33. Hazard trees will not be felled and/or removed in RNAs.
34. No active treatments will occur along trails in Wilderness Area boundaries; warning signs identifying potential risks associated with hazardous trees will be posted at Wilderness Area trailheads. Fallen trees may be cleared from Wilderness trails during routine trail maintenance activities, per Forest Service Manual direction.

Visuals
35. Minimize damage to natural features such as rock outcrops, young healthy trees, and understories of trees and shrubs; cut stumps as low to the ground as feasible and remove heavy slash within the immediate foreground (approximately 25 to 200 feet from edges of road) roads and trails located in MAs that are assigned Retention and Partial Retention Visual Quality Objectives and High and Moderate Scenic Integrity Objectives.
36. Within developed recreation areas and administrative sites, cut stumps as low to the ground as feasible and remove heavy slash to designated slash piles. Minimize damage to all retaining mature trees that were sprayed, young healthy trees of lodgepole pine and spruce-fir, and the understory of trees and shrubs from ground based equipment within developed campsites and administrative sites for present and future shade and screening, and to maintain high quality recreational setting and desired scenic condition.

Wildlife and Botany
37. Prior to each field season, district wildlife biologists and botanists will be provided with GIS layers and hardcopy maps of potential treatment areas. Proposed Endangered, Threatened, and Sensitive (PETS) species and species of local concern (known or discovered during project layout or implementation) will be individually evaluated as they occur within proposed hazard tree removal projects.
38. District wildlife biologists and botanists will determine consultation and site protection needs on an individual and as needed basis. For any PETS species or species of concern with identified viability concerns, the wildlife biologist and/or botanist will identify activity restrictions (area, timing, retaining felled trees on-site to provide connectivity/linkage of habitats, etc.) such that implementation will not result in a trend toward Federal listing or loss of population viability.

Winter Logging
39. Conduct winter logging operations when the ground is frozen to a depth of six inches or more or when snow cover is adequate to minimize site disturbance.
40. Plow or pack snow in the operating area to minimize the insulation value and facilitate ground freezing; clear enough area to accommodate future snow plowing.
41. When hauling on constructed specified roads, haul only on roads that have been cleared, allowing the ground to freeze and snow to compact on top.
42. Monitor the operating conditions closely after consecutive nights of above freezing temperatures; cease operations on roads and in salvage units if resource damage begins to occur.
43. When daytime temperatures are above freezing, but nighttime temperatures remain below freezing, plan to operate only in the morning; cease operations when ground temperature is above freezing.
44. Return the following summer and build drainage features on any skid trails that are steep enough to erode or over 10 percent.
45. When plowing snow for winter operations, provide breaks in the snow berm to allow road drainage.

Figure 1. Proposed Action on the Medicine Bow National Forest



III. SPECIES CONSIDERED AND THEIR STATUS

Table 2 includes threatened and endangered species located on the Medicine Bow National Forest. Amphibians, fish, and plant species are analyzed in other biological assessments but results are presented here. Candidate species are addressed in the biological evaluations. A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine what field reconnaissance was needed to complete the Biological Assessment. Sources of information included Forest Service files and wildlife observation database (FAUNA), the State Natural Heritage Program database (WyNDD 2007) state wildlife agency information (Cerovski et al. 2004), and published research.

On March 31, 2007 a list of threatened, endangered species and designated critical habitat within the Medicine Bow National Forest was received from the U.S. Fish and Wildlife Service (FWS) (letter from Brian Kelly to Mary Peterson). This list was edited in August 2007 with the delisting of the bald eagle. Review of threatened and endangered species at the February 2008 southern Wyoming Level 1 meeting confirmed that the edited list is currently valid.

Species identified for possible analysis are included in Table 2. The reason any species was eliminated from analysis includes one of the following:

1. The project proposal is outside of the known range of the species and/or habitat for the species does not occur in the analysis area.
2. Habitat used by the species is different than that being disturbed by the project proposal.
3. Species is associated with Platte River water depletions and the project proposal does not affect Platte River water supply.
4. Timing of the project proposal is such that it will not affect species.

Table 2. Threatened, endangered, or proposed species

Species	Status	Distribution	Habitat and Presence	Proposed Action
Canada lynx *Lynx canadensis*	Threatened	Resident in forested types. Most likely to occur within established Lynx Analysis Units (LAUs).	Analysis area includes all of the Green Mtn. LAU and small portions of the Battle Creek, Little Snake River, and Encampment River LAUs. All proposed actions are within Green Mountain LAU. Lynx known to occur in Green Mountain LAU (Shenk 2005).	May Affect, Not Likely to Adversely Affect (See analysis and determination later in this document)
Black-footed ferret (Mustela nigripes)	Endangered	Prairie dog towns	Suitable habitat not present near proposed actions.	No Effect
Preble's meadow jumping mouse (Zapus husonius preblei)	Threatened	Riparian habitats east of Laramie Mts and south of the N. Platte River	Proposed actions on the Pole Mtn Unit occur west of and at higher elevations than any suitable Preble's habitat.	No Effect

Preble's critical habitat	Designated	360 ft. of streams in Lodgepole, Cottonwood and Horse Creek	No proposed actions occur within or adjacent to critical habitat.	No Effect
Wyoming toad (Bufo baxteri)	Endangered	Laramie River valley	Suitable habitat not present near proposed actions.	No Effect. In Fisheries BA
Ute ladies' tresses (*Spiranthes diluvialis)*	Threatened	Suitable habitat below 7000 feet	Suitable habitat not present near proposed actions.	Excluded from further consideration (no effect) in botanist BA.
Species and critical habitat dependant upon Platte River Water	Endangered/ Threatened	Lower Platte River Drainage.	Project activities will have no impact or depletion to Platte River water supply. Species not present in project area.	No Effect. No water depletion in Fisheries BA. Western prairie fringed orchid excluded from further consideration (no effect) in botanist BA.
Species and critical habitat dependant upon Colorado River Water	Endangered	Yampa, Green, and Colorado River systems	Project activities will have no impact or depletion to Colorado River water supply. Species not present in project area.	No Effect. No water depletion. In Fisheries BA.

IV. CONSULTATION HISTORY

On March 31, 2007 a list of threatened, endangered species and designated critical habitat within the Medicine Bow National Forest was received from the U.S. Fish and Wildlife Service (FWS) (letter from Brian Kelly to Mary Peterson). This list was edited in August 2007 with the delisting of the bald eagle. Review of threatened and endangered species at the February 2008 southern Wyoming Level 1 meeting confirmed that the edited list is currently valid.

During 2006, the Medicine Bow and Routt National Forests were developing revisions to definitions of lynx habitat. These revisions were based on actual field mapping and verification of previously (2001) generated GIS modeling and from results in a MS Thesis on habitat use by snowshoe hares on the Routt National Forest. These revisions were discussed at the February 2006 southern Wyoming Level 1 meeting. The largest change for this revision is that much lodgepole pine identified as "denning and winter foraging" habitat would be identified as "other" habitat due to the lack of an understory, or multiple stories, or coarse woody debris. This would affect thousands of acres within each LAU. Related questions from the Level 1 team included addressing changes from beetle-kill and would this lodgepole become denning habitat as the stand matures. The Forests discussed these revisions, Level 1 questions, and other suggestions throughout 2006 and much of 2007. Final decisions of the Forests were to adopt these habitat definition changes based on the recent ground truthing, consider beetle-killed lodgepole in dry areas as "currently unsuitable" – until sufficient regeneration occurs, and revise lynx habitat categorization on a regular basis as forest conditions change. One such change would be that maturing and succession of lodgepole stands identified as "other" habitat could cause these stands to be identified as denning or winter foraging when the change occurs. Usually lodgepole

succeeds to spruce-fir denning and winter foraging habitat over many decades. These changed LAU habitat definitions were adopted by the Forests by summer 2007.

This Hazard Tree project was discussed with the northwest Wyoming Level 1 team at the June 2007 meeting, and with the southern Wyoming Level 1 team at the August and November meetings as the proposed action was changed from including aspen, spruce-fir, and lodgepole stands to including just lodgepole stands. The November discussion also included a discussion of considering beetle-killed lodgepole as "currently unsuitable" lynx habitat. Some aspects of the project including how to approach having a BA for each Forest, appropriateness of programmatic vs. project specific BAs and consultation, possibly considering beetle-killed lodgepole as "currently unsuitable" lynx habitat, documentation of Forest Service Region 2 direction to consider beetle-killed lodgepole as "currently unsuitable" habitat, and evaluating the project against the LCAS vs. the Southern Rockies Lynx Amendment were discussed over the phone or through email with USFWS representative Trish Sweanor on 07/25/2007, 08/27/2007, 01/22/2008, and 01/23/2008. Based on the information presented at the Level 1 meetings, the Level 1 team gave agreement to a preliminary determination of may affect, not likely to adversely affect to Canada lynx.

Forest representatives met with USFWS Colorado Field Office representative Kurt Broderdorp on May 14, 2008 in Walden, CO. The intent of the meeting was to clarify details of the proposed action, provide suggestions to more effectively address maintaining connectivity among LAUs, and discuss how to represent lodgepole stands in lynx habitat that are infected with pine beetles. Mr. Broderdorp recommended and the Forest agreed that all lodgepole pine stands within LAUs that have been or could possibly be infected by pine beetles will be considered as dead lodgepole stands for this analysis and future analyses. Almost all dead lodgepole stands will be considered currently unsuitable habitat, unless the remaining spruce, fir, or aspen overstory or the understory still provides some lynx habitat.

This project was discussed with USFWS Wyoming Field Office representative Ann Belleman on June 9, 2008 to discuss direction given by K. Broderdorp that should be included in the revised BA submitted to the Wyoming Field Office. This direction pertained to including research from the northern Rockies on horizontal cover needed by snowshoe hares. K. Broderdorp provided this information on June 18, 2008.

This report includes 2 LAUs, the Little Snake River and the Encampment River, both of which predominantly occur in Colorado on the Routt National Forest. Approximately 5% of each of these LAUs occurs in Wyoming on the Medicine Bow National Forest. Projects that have occurred on either Forest will be included in calculations for these LAUs. These LAUs are included in the BA for the Medicine Bow Forest and in the BA for the Routt Forest.

V. EFFECTS TO FEDERALLY LISTED AND PROPOSED SPECIES

CANADA LYNX

Status and distribution of species

The boreal forests of Canada and Alaska are the primary habitat of lynx in North America. Populations occurring in the western mountains of the conterminous United States occupy peninsular extensions of this distribution (Koehler and Aubry 1994). The lynx's historic range included the northern portions of the conterminous United Stated in the Cascade Range of Washington and Oregon, south in the Rocky Mountains to Utah and Colorado, and east along the

Canadian border to the Lake States (McCord and Cardoza 1982 and Quinn and Parker 1987 cited in Koehler and Aubry 1994). Except for the southern boundary of its range, the distribution of lynx in North America probably has not changed much during historical times.

Lynx distribution at southern latitudes represents the occupation of marginally suitable habitat that decreases in quality and availability as one moves southward (Koehler and Aubry 1994). Because boreal habitat is found at higher and higher elevations as one moves southward in the western mountains, suitable habitat for lynx eventually becomes scattered on isolated mountain peaks (Findley and Anderson 1956 cited in Koehler and Aubry 1994). This pattern of decreasing habitat suitability with decreasing latitude is evident in the Rocky Mountains.

Existing records clearly show that lynx are rare at the southernmost extensions of its range in Wyoming, Utah, and Colorado, both historically and at present, and that any populations that occur in this area are disjunct and isolated in distribution (Koehler and Aubry 1994). It is possible that existing records represent short-term residents or individuals wandering and dispersing, rather than reproductively stable populations. Viable lynx populations may never have occurred in historic times in the southern Rocky Mountains. Koehler and Aubry (1994) also suggest that lynx conservation efforts may best be directed at populations occurring in northeastern Washington, northern Idaho, and western Montana.

In 1998, a cooperative effort between the Colorado Division of Wildlife (CDOW), the Forest Service, the U.S. Fish and Wildlife Service, the BLM, and the National Park Service developed a draft reintroduction conservation strategy for the Canada lynx. During 1999 and 2000, 96 lynx were introduced in Colorado. Thirty-three more lynx were released in 2003. Another 37 were released in 2004. All lynx were introduced into southwestern Colorado.

Status and distribution on the Medicine Bow NF

Prior to 2003, only a few lynx had been sighted in recent years on the Medicine Bow NF. It is not known whether these were naturally-dispersing animals or releases of domesticated animals held in captivity as pets or at fur farms. There are five possible records of lynx prior to 2003, all in the Medicine Bow Range of the Forest (WyNDD 2007): Bow River GA (1856, specimen), Snowy Range East GA (1856, specimen), Pole Mountain GA (1963, trapped), Sheep Mountain (2002, sighting by public, track measured and photographed by Brad Rogers (USFWS) and Greg Eaglin (USFS). The fifth is an unverified record of a lynx walking in lodgepole pine forest (1987).

Surveys were conducted according to National Lynx Detection Protocol on the Laramie and Brush Creek Districts in 2000, 2001, and 2002. “Hair snare” transects were conducted for three consecutive years (2000-2002) on the Brush Creek/Hayden and Laramie Ranger Districts, using the National Survey Protocol. Each year, 25 transects, each containing 5 hair-collecting pads, were left at baited stations for 4 weeks. No lynx hairs were collected. Results revealed that samples from 2 mountain lions and 1 black bear were collected in 2000 and 1 coyote, 1 bobcat, and 1 ungulate in 2001. Samples collected in 2002 included 1 bobcat, 2 coyotes, and 1 domestic cow.

In 2003, four radio-collared lynx were north of I-70 in Colorado. Some of these crossed the Wyoming-Colorado border and were on the Routt and Medicine Bow National Forests. These animals were still making long-distance movements.

In spring 2004, a lynx established a den in the French Creek LAU in the Snowy Range of the Forest. This female had 3 kittens. The female was found dead on 7/28/2004. The kittens are assumed to be dead also.

Since 1999, 9 lynx have been confirmed on the Medicine Bow from locations obtained from both aerial searches for VHF radio signals and from transmissions to satellites from the satellite transmitters (Shenk 2005). Other information on the lynx introduction is available from the Colorado Division of Wildlife website.

Habitat

The distribution and abundance of the lynx appears to be tied to that of the snowshoe hare. Both species are confined to northern forest environments (Hall 1981 cited in Koehler and Aubry 1994). Hares seek dense conifer thickets to feed on woody seedlings and saplings, and to escape predators and extreme cold. Lynx frequent these habitats in search of prey. When foraging, lynx select forested habitats where hares are plentiful and use this cover to stalk or wait for hares to appear.

Lynx habitat in the western mountains consists primarily of two structurally different forest types occurring at opposite ends of the stand age gradient. Lynx require early successional forests that contain high numbers of prey (especially snowshoe hares) for foraging, and forests that contain cover for kittens and for denning (several citations in Koehler and Aubry 1994). Intermediate successional stages may serve as travel cover for lynx but function primarily to provide connectivity within a forest landscape. Although such habitats are not required by lynx, they "fill in the gaps" between foraging and denning habitat within a landscape mosaic of forest successional stages.

Foraging habitat consists of early successional forests where snowshoe hares are plentiful, especially at northern latitudes. These are the habitats that lynx favor for hunting. Such forests may result from fires, timber harvesting, or windthrow and disease (numerous citations in Koehler and Aubry 1994). Late successional conifer stands also provide important foraging habitat for lynx. An important characteristic of both is dense branching of conifer species where tree crowns touch the ground, and the persistence of the canopy above winter snow levels. Regenerating lodgepole pine (or Douglas fir) provides short to moderate term cover and forage for lynx, but primarily provides high-density food for snowshoe hare (Koehler 1990). Mature, dense Engelmann spruce/fir forest provides long-term cover and forage opportunities for both lynx and snowshoe hare.

Conifer stands provide greater concealment from predators, lighter snowpacks, and warmer temperatures during winter than hardwood stands. Dense stands of aspen in the Rocky Mountains represented marginal foraging habitat for lynx because such stands do not provide adequate cover for hares, suggesting that conifer cover is critical for hares during winter. In Colorado and Utah, dense stands of subalpine fir and Engelmann spruce and Douglas-fir were used most frequently by hares (Dolbeer and Clark 1975). Stem height is also an important component of winter foraging habitat. In the Rocky Mountains, where snow depths may exceed 1.5 m, Dolbeer and Clark (1975) found that sparsely stocked stands provided little food or cover for hares, and Wolfe et al. (1982) reported that 85% of habitats used by hares had a horizontal cover density of 40% at a height of 1.0 - 2.5 m above the ground.

Clarification for the northern Rockies lynx amendment (Bertram and Claar 2008) indicated that "mature multistoried forests provide important winter snowshoe hare habitat and are more important than younger stands. Corresponding research results from Squires and DeCesare (2008) indicates that snowshoe hares were most abundant in these stands with >35% horizontal cover in winter or >48% horizontal cover in summer.

Denning habitat consists of mature forest habitats that contain large woody debris, such as fallen trees or upturned stumps, to provide security and thermal cover for kittens (several citations in Koehler and Aubry 1994). In northcentral Washington, lynx denned in spruce/fir/lodgepole stands having N-NE aspects and a high density of downed trees. The availability of alternate den sites may be an important determinant of habitat quality. In low quality habitat, the inability of females to move kittens to alternate dens when danger threatens may increase mortality rates for kittens (Koehler and Aubry 1994). Travel corridors between den sites are important to permit females to move kittens to areas where prey is more abundant or to avoid disturbance (Koehler and Brittell 1990). Den sites are also selected based on their proximity to foraging habitats. Den sites consisting of mature forest habitat are also important for lynx as refugia from inclement winter weather or drought.

In general, travel cover consists of coniferous or deciduous vegetation at least 2 m in height with a closed canopy that is adjacent to foraging habitats. Lynx are known to move long distances but open areas, whether man-made or natural, will discourage use by lynx and disrupt their movements. Lynx will cross openings up to 100 m in width; however, they do not hunt in these areas (Koehler and Brittell 1990). Travel cover provides linkages between denning sites, and between denning sites and foraging areas. Travel cover should also be maintained between populations to allow demographic and genetic interaction.

Threats from human activity

Loss of habitat suitable for the lynx or its primary prey, the snowshoe hare, is the primary threat to lynx (Federal Register Volume 65, Number 58, p. 16074 and 16082). Development of ski areas, resorts, and residences reduces habitat locally.

Lynx have a high reproductive potential, as evidenced by their rapid recovery from population crashes in the far northern part of their range once prey is abundant. However, in the absence of superabundant prey, survival of young can be very low. Starvation of kittens is one of the two most commonly reported causes of death, along with human caused mortality. Prey abundance appears to be a limiting factor in reproductive success (USDA 2003, App. I).

Grazing of livestock and increase in elk populations creates competition for forage with lynx prey, especially hares and rabbits. Competition with other predators (especially coyotes) may be increased at high elevation in winter by compaction of snow by human activities, though this is conjectural. Coyote numbers have probably increased with elimination of the gray wolf from much of its range (USDA 2003, App. I).

Lynx may be killed by human activity like vehicular traffic, shooting, poaching, and (as a non-target species) by predator control activity and commercial fur trapping. Lynx are also killed by other predators including coyotes, bobcats, mountain lions, and wolverine (USDA 2003, App. I).

Development of residential areas, ski areas, and highways further fragments the naturally patchy habitat of the Southern Rockies. Effects of loss of connectivity include restricted gene flow and increased mortality risks to animals moving between patches. Lynx readily move through landscapes altered by intensive commercial timber harvest (USDA 2003, App. I).

Snow compaction by winter recreation may allow other predators to access the deep snow habitat historically used only by the lynx.

Trapping may have been a factor in the initial decline of lynx in the Southern Rockies. Trapping of lynx has been illegal in Wyoming since 1973, but some lynx may be caught in traps set for

other species, especially bobcat. In Montana, lynx caught in leg hold traps and released wearing radio collars had lower survival than those trapped in other ways.

Actions that may affect lynx populations and habitat include timber management, fire management, recreation, livestock grazing, utility corridors, and residential, commercial and agricultural developments, such as housing, ski areas and large resorts. These actions may affect one or more of the primary habitat needs of the species.

Environmental Baseline

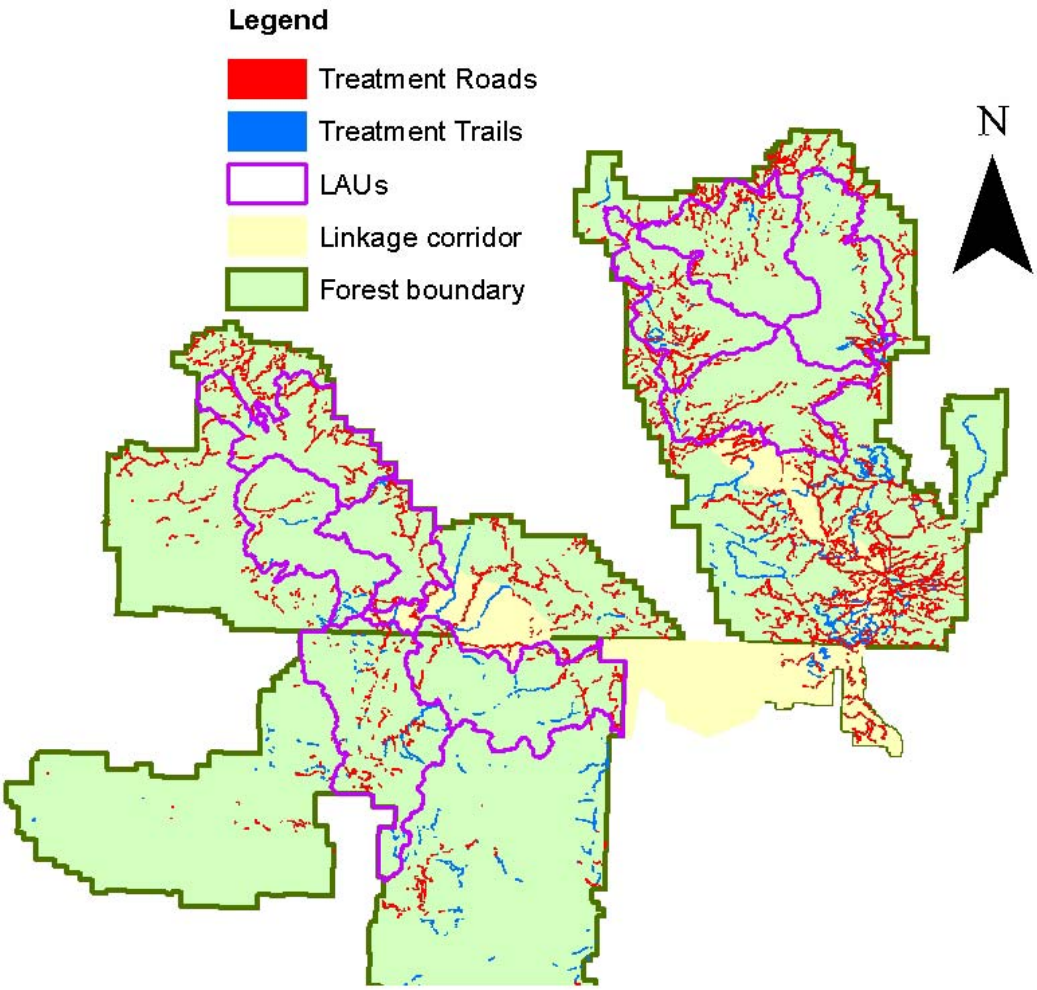
A model for mapping lynx habitat was developed using habitat definitions and descriptions contained in the Lynx Conservation Assessment and Strategy (LCAS, Ruediger et al. 2000) and the Forest's RIS vegetation database. This effort was completed in 2001. Since that time, field verification of modeled lynx habitat, a MS Thesis on snowshoe hare habitat use on the Routt National Forest (Miller 2004), and updated and more detailed vegetation data in the Forest's R2Veg database led to changes to lynx habitat characterization across LAUs as described in "Consultation History". Recent projects completed since the listing of the Canada lynx as threatened in 2000 are included in the in the calculations of changes to lynx habitat. These calculations also include the recent Prospector timber sale and Big Creek Fuels project on the Routt National Forest which affects the Little Snake River and Encampment River LAUs in Wyoming, respectively.

The Routt National Forest completed the Bark Beetle EIS in 2002. This project authorized several thousand acres of pine and spruce beetle treatment in high value areas including campgrounds, scenic corridors, ski area, urban interface, and some wood production areas. Treatment includes preventative thinning and spraying. Much of the actions would not change lynx habitat, few of the actions have been implemented, and current Forest priorities to address effects of the expanding pine beetle outbreak have precluded greater implementation of this project.

There are approximately 440 miles of designated groomed and ungroomed snowmobile trails and crosscountry ski trails across the Medicine Bow Forest. These existed before the lynx was listed as threatened in 2000, before LAUs were established, and before lynx habitat was identified. There has been no increase in designated trails since the lynx was listed as threatened.

The Medicine Bow National Forest (Forest) includes all of the Battle Creek, Green Mountain, and Upper Sierra Madre LAUs, and a small portion of the Little Snake River and Encampment River LAUs on the Sierra Madre Range. The majority of the Little Snake River and Encampment River LAUs occur on the Routt National Forest. The Medicine Bow National Forest includes all of the Bow River/Pass Creek, Cedar/Brush, French/Upper Douglas, and Northeast Snowy Range LAUs on the Snowy Range (Figure 2). Proposed actions occur in all LAUs and in the Sierra Madre and Snowy Range linkage corridors.

Figure 2. Lynx LAUs on the Medicine Bow NF, including all of the shared Encampment River and Little Snake River LAUs with the Routt NF.



Proposed Action

Direct Effects and Indirect Effects

Lynx habitat for each LAU on the Forest is summarized in Table 3. This summary includes considering all lodgepole pine stands potentially affected by pine beetles as dead in 2008, according to direction from K. Broderdorp identified in "Consultation History", and includes the results of the Hazard Tree project analyzed in this document. Medium-sized and larger lodgepole pine trees (≥ 5" dbh) will be affected by pine beetles. There have been no projects in a few of the LAUs since lynx was listed as threatened until this Hazard Tree project.

In several LAUs, timber harvest or fuels treatments have already occurred in stands that would have been attacked by pine beetles. In these LAUs, lynx habitat could be changed to currently unsuitable by either activity (forest management or beetles) but not by each individually. Table 3 displays this situation. For example, harvest has converted 1492 acres of "other" habitat to currently unsuitable in the Battle Creek LAU. Beetle-kill would have also converted these acres to currently unsuitable. This is displayed in Table 3 where the "Changes from beetle-kill" and "Cumulative changes" columns both indicate that 10,327 acres of currently unsuitable habitat exist in the LAU.

In a few LAUs, timber harvest or fuels treatment converted lynx habitat to currently unsuitable habitat. However, these stands would not have been also converted to currently unsuitable by pine beetles. Therefore, harvest and beetle-kill changes are sometimes additive. This is displayed, for example, in the Green Mountain LAU where previous projects and beetle-kill additively determined the cumulative amount of currently unsuitable habitat.

Proposed actions that can affect lynx include harvest of beetle-killed lodgepole stands within 150 ft. of open roads, trails, trailheads, parking lots, and administrative features (collectively admin sites) that are also within LAUs or linkage corridors (see Proposed Action earlier). All stands proposed for harvest are lodgepole stands that were originally characterized as lynx other (summer) habitat due to the low amount of understory vegetation, limited coarse woody debris, and lack of multiple tree layers. None of these stands have sufficient horizontal cover to provide habitat for snowshoe hares in winter. Following direction from K. Broderdorp, all medium or larger sized lodgepole pine trees within these stands will be considered dead for this and future analyses due to the beetle outbreak killing the lodgepole overstory. Assuming this much lodgepole pine mortality will cause these stands to convert to nonhabitat, currently unsuitable habitat, or will retain the stands as other habitat before hazard trees are removed. Table 3, Column 5 displays the amount of each type of beetle-killed habitat that will be affected by hazard tree removal.

Beetle mortality converts "other" lynx habitat to non habitat when the understory is a rock outcrop, for example. Beetle mortality converts "other" lynx habitat to currently unsuitable when there is not sufficient understory to provide even summer foraging habitat (see Figure 3). Beetle mortality retains "other" lynx habitat (summer foraging) when there is a small amount understory spruce, fir, or lodgepole trees, for example (see Figure 4). None of the stands proposed for harvest have sufficient horizontal cover to support snowshoe hares during winter, either before or after pine beetles kill the overstory. Figures 3 and 4 display that lodgepole stands proposed for harvest do not have >35% horizontal cover (if measured in winter) or >48% horizontal cover (if measured in summer (Bertram and Claar 2008) needed to provide snowshoe hare habitat in winter.

Removing the dead or dying hazard trees from within stands will not change the category of lynx habitat for which the stand is identified. For example, a stand categorized as lynx "other" habitat after beetle-kill will remain "other" habitat after hazard trees are removed. Only the dead and dying hazard trees will be removed by management actions; these were already considered dead relative to lynx habitat following Broderdorp's direction. The proposed action states that *Healthy, stable, live trees (e.g., spruce-fir, aspen, and lodgepole pine), clumps of regeneration…would be retained unless they pose a safety hazard in the felling/removal operation*. So, the understory that remains and categorizes the lynx habitat following Broderdorp's direction is the understory that will also remain after hazard tree removal. This is displayed in Table 3 with the Battle Creek LAU, for example. Hazard tree removal will occur in 20 acres of other habitat and 269 acres of currently unsuitable habitat. There are still 20,929 acres of other habitat and 10,327 acres of currently unsuitable habitat after hazard tree removal, the same amounts in these habitat categories before hazard tree removal.

Proposed actions also include more than 1400 miles of non-motorized trails (i.e. hiking and horseback) across the Forest. Many of these are in roadless areas, Special Interest Areas, Research Natural Areas, and Wilderness Areas. For non-motorized trails, only the existing trail path will continue to be cleared of falling trees. There would be no change from the environmental baseline or existing condition of lynx habitat at these trails.

Table 3. Lynx Habitat after Forest management activities and beetle-kill (acres)

Lynx Habitat	Environmental Baseline	Previous Projects	Changes from Beetle-killed lodgepole	Hazard Tree Project	Cumulative Changes
SIERRA MADRE RANGE					
BATTLE CREEK LAU					
Den/W. forage	2746		1490		1490
NonHabitat	12,908		13,856		13,856
Other (summer)	30,397	-1492	20,929	20	20,929
C. Unsuitable	225	+1512	10,327	269	10,327
Addt'l W. forage	1971	-20	1650		1650
ENCAMPMENT RIVER LAU					
Den/W. forage	3523		1994		1994
NonHabitat	13,843		14,593		14,593
Other (summer)	37,231	-3061	21,209	153.5	21,125
C. Unsuitable	2064	+3065	22,808	690.1	22,892
Addt'l W. forage	10,601		6657		6657
** Includes proposed harvest in the Routt Forest portion of the LAU*					
GREEN MOUNTAIN LAU					
Den/W. forage	1019		649		649
NonHabitat	6687	+1	7135	22	7136
Other (summer)	21,872	-1676	12,235	202	10,559
C. Unsuitable	1469	+1746	11,367	493	13,113
Addt'l W. forage	2983	-70	2645		2575
LITTLE SNAKE RIVER LAU					
Den/W. forage	7802	-17	5995		5995
NonHabitat	14,877	-16	14,268	13	14,252
Other (summer)	51,002	-103	41,120	454	41,120
C. Unsuitable	1495	+242	13,011	441	13,131

Addt'l W. forage	2040	-104	2861		2757
					** Includes proposed harvest in the Routt Forest portion of the LAU*
UPPER SIERRA MADRE LAU					
Den/W. forage	2412		1331		1331
NonHabitat	8642		9167	20	9167
Other (summer)	28,439		24,474	762	24,474
C. Unsuitable	3238		10,624	394	10,624
Addt'l W. forage	5348		2483		2483
			SNOWY RANGE		
BOW RIVER/PASS CK. LAU					
Den/W. forage	10,789		7494		7494
NonHabitat	7802		8920	75	8920
Other (summer)	25,109		22,101	605	22,101
C. Unsuitable	4794		10,066	554	10,066
Addt'l W. forage	8746		8659		8659
CEDAR/BRUSH LAU					
Den/W. forage	5788	-4	4031		4031
NonHabitat	4992		6255	68	6255
Other (summer)	25,894	-57	20,018	567	20,018
C. Unsuitable	3463	+134	10,708	759	10,708
Addt'l W. forage	7526	-73	6650		6650
FRENCH/UPPER DOUGLAS LAU					
Den/W. forage	6680	-278	5150		4872
NonHabitat	6643		8143	53	8143
Other (summer)	28,742	-27	26,009	887	25,982
C. Unsuitable	7144	+616	11,391	432	12,007
Addt'l W. forage	8650	-311	7168		6857
NORTHEAST SNOWY RANGE LAU					
Den/W. forage	9595		7087		7087
NonHabitat	11,212		12,340	68	12,340
Other (summer)	21,612	-138	21,270	686	21,132
C. Unsuitable	2829	+145	6145	148	6290
Addt'l W. forage	9547	-7	7953		7946

Table 4 summarizes the amount of habitat made currently unsuitable by beetle-kill and management actions. While the amount of currently unsuitable habitat is high in several LAUs, only a small amount in any LAU is the result of management actions in the last 10 years. Almost all currently unsuitable habitat is the result of pine beetles killing stands of medium or larger sized lodgepole pines.

Table 4. Beetle-killed and management action caused currently unsuitable habitat (acres).

LAU	% currently unsuitable after cumulative changes	% currently unsuitable from pre-existing conditions and beetle-kill	% currently unsuitable by mgt. actions in 10 years
Battle Creek	30.0	25.6	4.4
Encampment River	43.4	38.0	5.7
Green Mountain	48.8	42.3	6.5

Little Snake River	20.8	20.7	0.1
Upper Sierra Madre	27.3	27.3	0.0
Bow River/Pass Ck.	26.3	26.3	0.0
Cedar/Brush	25.9	25.6	0.3
French/Upper Douglas	24.1	22.9	1.2
Northeast Snowy Range	14.8	14.5	0.3

The revised Medicine Bow Forest Plan (USDA 2003a) contains standards and guidelines that will provide habitat features for lynx in the future (Appendix A). These represent management direction in the LCAS (Ruediger et al. 2000). The Plan also **requires** that snags and live recruitment trees and coarse woody debris be retained in harvest units for wildlife needs (Tables 5, 6). These requirements will be met easily since removal targets only hazard trees. The Plan also requires that following a disturbance, such as blowdown, fires, insects, or pathogen mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres. No hazard tree removal is scheduled in denning habitat. These standards will aid connectivity among stands and will provide future foraging and denning structure for lynx.

Table 5. Minimum requirements for snags and recruitment trees.

Cover Type	Snags/acre within harvest units	Size	Snag recruits*/acre Within harvest units
Spruce/Fir	6-10	At least 3/acre over 25”, or largest available	8-12, at least 3/acre over 15” if available
Lodgepole pine Lodgepole pine pole stands	1-2	Over 10” if available Retain 3-4 small clumps of trees per acre	8-12
Ponderosa pine	1-2	Snags over 10” if available. Retain largest available	2-4
Aspen	1		0

*a) Preferred recruits are live trees with nest holes, broken tops, dead branches, or decay, and in lodgepole, generally free from dwarf mistletoe (Hawksworth Class 2 or lower). Retain the largest snags that are present, and a range of all degrees of decay that are present on the site.
b) When using prescribed fire, and in treatments to reduce fuel in urban interface areas, it will be acceptable that snag retention and snag recruitment standards may not be met.
c) If insufficient snags are available to meet the minimum diameter level in this table, retain the largest snags available. If insufficient snags are available, retain the higher number in the range of recruits/acre (above) to compensate. Not applicable to lodgepole pole sized stands.
d) Maintain snag components and snag recruits well distributed across harvested units. If high-quality snags occur scattered across a stand, they should be left in this pattern. Snags or snag recruits may be left in clumps if this distribution occurs naturally, if mistletoe in remaining lodgepole trees threatens regeneration success or long-term stand development, or if retention in an island of live trees will help prevent blowdown.

Table 6. Minimum requirements for coarse woody debris.

Downed Wood (tons/acre) Diameter> 3” and >25 feet in length)		
Spruce/fir	10-15 tons/acre	80% over 10”, 50% over 25” if available
Lodgepole pine (Sawtimber Stands)	5-10 tons/acre	80% over 6”
Lodgepole pine (Pole stands)	1 ton/acre	
Ponderosa pine	5-10 ton/acre	100% over 10”, 50% over 25”

		if available
When using prescribed fire, and in treatments to reduce fuel in urban interface areas, it will be acceptable that coarse woody debris standards may not be met.		

The proposed action states that healthy trees and regeneration will not be removed unless they create a safety hazard. The proposed action also includes a series of Design Criteria (see Proposed Action) that limit the extent of treatment and tree removal near wetlands, riparian areas, hydric soils, and within old growth, SIAs (Special Interest Areas), and RNAs (Research Natural Areas). In these areas, individual hazard trees can be felled but not removed. From discussions with K. Broderdorp on May 14 2008, the tree boles, limbs, coarse woody debris and healthy trees will provide substrate and cover for lynx movement. These features will aid connectivity among stands and will provide future foraging and denning habitat structure for lynx.

Ruediger et al. (2000) includes conservation measures for lynx that are standards and guidelines in the revised Forest Plan. These include no further reduction of suitable habitat conditions by vegetation management actions if there is > 30% currently unsuitable habitat in an LAU, ≤ 15% lynx habitat changed to currently unsuitable by management actions in a 10 year period, and retaining ≥ 10% denning habitat in LAUs or deferring management actions that would delay development of denning if there is <10% denning habitat in a LAU.

These conditions would be achieved in the proposed action (Tables 3, 4). Proposed hazard tree removal will not change any habitat to currently unsuitable. Cumulatively, projects have not converted more than 15% of lynx habitat to currently unsuitable condition in the last 10 years.

Most LAUs have <10% denning habitat as a result of beetle-kill. Few past actions have and no proposed actions are removing denning habitat. Proposed hazard tree removal is not delaying the development of denning habitat. Some information indicates that even stands regenerating (>20 years old) from disturbance can provide denning habitat (Ruediger et al p. 1-4). Despite removal of individual hazard trees, Proposed Action description of retaining healthy trees and regeneration, Forest Plan standards for retaining snags, recruitment trees, and coarse woody debris, and Design Criteria to cut but not remove trees near wetlands, riparian areas, hydric soils, and within old growth, SIAs (Special Interest Areas), and RNAs (Research Natural Areas) will provide vegetation and coarse woody debris for the potential development of denning habitat. Secondly, the large volume of beetle-killed trees near harvest units and throughout the Forest will provide some younger live trees, snags, and coarse woody debris for future denning habitat. The distribution and configuration of logs and root wads will determine where denning habitat will be created over time.

Prey density is expected to change slightly in local areas as a result of hazard tree removal. Main prey animals for lynx introduced into Colorado and traveling into Wyoming are snowshoe hares and red squirrels (Shenk 2007). For medium or larger sized trees that will be affected by pine beetles, only medium sized trees have limbs within 3m of the ground to provide snowshoe hare habitat. After medium sized trees die from beetles, they lose their limbs and needles within a few years and are not very useful as snowshoe hare habitat features. So, removing these dead and dying medium sized trees along open roads and admin sites will only remove one feature of snowshoe hare habitat a few years before this feature would have been lost naturally. Snowshoe hares will continue to use beetle-killed stands where sufficient understory vegetation exists to provide other habitat features, regardless of whether the medium sized or larger dead trees are removed. The Proposed Action states that healthy trees and regeneration will not be removed. In > 95% of the stands of beetle-killed medium or larger sized trees across the Forest, no hazard tree removal will occur. Finally, spruce-fir, younger lodgepole pine, and some aspen will continue to

provide snowshoe hare habitat across the Forest. So, snowshoe hare habitat will be retained across the Forest. Any noticeable change in snowshoe availability as prey will be determined overwhelmingly by where habitat exists after the pine beetle outbreak and only insignificantly by where hazard trees are removed at specific sites. Hazard tree removal is not expected to noticeably affect survival or reproduction for lynx or snowshoe hares.

Medium sized or larger lodgepole pine trees provide habitat for red squirrels for shelter or cones for food. Dead and dying beetle affected trees no longer produce cones. Within a few years, falling limbs and needles no longer provide cover for shelters. So, removing these dead and dying medium sized trees along open roads and admin sites will only remove these habitat features a few years before these features would have been lost naturally. Red squirrels are not expected to use stands medium or larger sized lodgepole trees after beetle-kill. Red squirrels will not use these stands for several decades until the existing understory matures enough to produce cones abundantly and provide the cover for shelter protection. Spruce-fir and, to a limited extent, younger lodgepole (cone production) will continue to provide red squirrel habitat across the Forest. Declines in red squirrel availability as prey will be determined overwhelmingly by where habitat exists after the pine beetle outbreak and only insignificantly by where hazard trees are removed at specific sites. Hazard tree removal is not expected to noticeably affect survival or reproduction for red squirrels.

None of the stands proposed for harvest provide winter habitat for snowshoe hares before or after harvest. For the northern Rockies lynx amendment, Bertram and Claar (2008) clarified that stands providing winter habitat for snowshoe hares have >35% horizontal cover in winter or >48% horizontal cover in summer. Figures 3 and 4 exemplify stands proposed for harvest and display that snowshoe hare habitat will not be affected by this project. Proposed hazard tree removal areas are not the “mature multistoried forests” that “provide important winter snowshoe hare habitat”. Removal of hazard trees will not change winter habitat available to snowshoe hares; so, will not affect prey density for lynx during winter.

There is a very small potential for displacement effect during project implementation. Lynx are rare and at a very low density across the Forest. Since September 1999, 27 lynx have been documented to occur at least once in Wyoming with concentrations of occurrence in the Snowy Range of this Forest and northwest Wyoming. The proposed actions occur on existing open roads, are distributed widely across the Forest and will occur over approximately 10 years. Activity in any particular location will vary from less than an hour to a few weeks. Human use in these scattered areas will increase noticeably for a short time only where many hazard trees must be removed through commercial harvest due to harvest equipment and log trucks. In other areas of more selective tree removal, human use will essentially stay the same. In total, the potential for displacement by these activities is very small. The likelihood of a lynx being struck by any of this traffic is too slight to be a logical concern since the activities are of short duration and confined to small areas and any lynx that exist on the Forest are at a very low density.

Figure 3. Future lynx currently unsuitable habitat after beetle-kill.

Figure 4. Future lynx “other” habitat after beetle-kill.

Connectivity
Connectivity within LAUs and among LAUs will be maintained. Proposed activity will occur on <3.2% of the forested habitat on the Medicine Bow Forest over 10 years. Proposed activity includes only hazard trees (see definition in Proposed Action) within stands of medium or larger sized lodgepole pine trees adjacent to open roads (not closed, decommissioned, or administrative use only roads) trails, and admin sites. Hazard tree removal is limited to the area within 150 ft. of admin sites or the center line of roads. Healthy trees and understory vegetation will not be removed (see Proposed Action); so, few salvaged areas will have the appearance of large, regenerating openings. The project is expected to require 10 years to be implemented across the Forest; so, regeneration will be occurring in the earliest treated areas before treatment has occurred in the last remaining treatment areas. Treated areas will not be maintained over time as open areas; so, regeneration will be allowed to proceed. Forest Plan standards for leaving green trees, snags, and coarse woody debris will be implemented in all treated areas, providing additional vegetation and structure for lynx movement.

Design Criteria (see Proposed Action) will limit the amount of vegetation and coarse woody debris removed in many areas, providing cover and structure for lynx movement. These areas are identified in the large attached map. The map depicts that few hazard tree treatment areas in any LAU or linkage appear white. White treatment areas indicate sites where trees will be felled and removed. These Design Criteria that limit tree removal include:

8. Hazard trees may be felled but left in place in all IRAs (Inventoried Roadless Areas). Lop and scatter slash to a height of 24 inches above the ground.
9. Hazard trees within mapped and inventoried old growth areas and in those polygons identified in the old growth strategy on the MBNF will be hand felled and left in place. If necessary, felled trees may be stabilized to prevent movement onto a roadway. Lop and scatter slash to a height of less than 24 inches above the ground. Do not designate landings in these areas.
18. Trees within 100 feet of tie driven streams will not be removed if they provide a potential source of large woody debris to the stream system. Felled hazard trees should be left in place.
19. Ground based equipment will not be permitted within 100 feet of identified riparian areas or within 200 feet of identified wetlands/fens (by GIS or located on ground during implementation); hand felling of hazard trees is permitted in the 100 foot riparian buffer and the 200 foot wetland buffer. Felled trees will either be left in place in riparian areas or may be removed by winching where there will be no disturbance such that bare ground is exposed. If tree removal (including whole tree yarding) is not possible, slash may be lopped and scattered to a height of less than 24 inches above ground level.
20. Ground based equipment will not be permitted on identified hydric soils (by GIS or located on ground during implementation); hand felling of hazard trees is permitted in the hydric soils. Felled trees will either be left in place on hydric soils or winched as specified by the Forest Service. If tree removal is not possible, slash may be lopped and scattered to a height of less than 24 inches above ground level.
32. Trees may be hand felled in SIAs (Special Interest Areas) and boles must be left in place; ground skidding may not occur. Lop and scatter limbs to a height of less than 24 inches above the ground. This design criterion applies to the following SIAs on the Medicine Bow National Forest: Cinnabar Park, Medicine Bow Peak, White Rock Canyon, Kettle Ponds, Sunken Gardens, Ribbon Forest, Platte Canyon, and Brown's Peak.
33. Hazard trees will not be felled and/or removed in RNAs (Research Natural Areas).
34. No active treatments will occur along trails in Wilderness Area boundaries; warning signs identifying potential risks associated with hazardous trees will be posted at Wilderness Area trailheads. Fallen trees may be cleared from Wilderness trails during routine trail maintenance activities, per Forest Service Manual direction.

The length of proposed treatment areas will not be sufficient to prohibit lynx movement. The French/Upper Douglas LAU includes the most proposed treatment of any of the LAUs, 1319 acres of "other" and currently unsuitable lynx habitat. This is <2.7% of the lynx habitat in the LAU and almost all of these 1319 acres occur in riparian areas or other areas addressed by the Design Criteria where hazard trees can be felled but not removed (see attached large map).

The sum of all harvest units will still retain natural connectivity across the landscape. Only open roads were considered for treatment; not gated roads only open for administrative use or closed roads. No new roads are required for this project. Only open roads through stands of medium size or larger lodgepole (susceptible to pine beetles) are proposed for treatment. Stands of small lodgepole, and stands of aspen, spruce-fir, ponderosa pine, limber pine, and Douglas-fir of any size class were not considered. Administrative sites (campgrounds, bunkhouses, trailheads) are widely distributed across LAUs and immediately adjacent to existing open roads. Only those open roads and administrative sites where pine beetle-killed trees pose a health and safety risk will be treated. Felled trees will not be removed from riparian areas or hydric soils, roadless areas, RNAs, SIAs, old growth areas, or Wilderness boundaries (see large attached map). Treatment will vary from removal of individual trees to salvage depending on the completeness of beetle-kill in a stand. To analyze the proposed action, however, it was assumed that all proposed treatment sites would be salvaged. The habitat changes identified in Tables 3 and 4 show that a small percentage of lynx habitat within the LAUs will change to currently unsuitable from proposed actions. Habitat changes will still allow lynx to move easily across LAUs as depicted in the large attached map.

Almost all (70%) of the Sierra Madre linkage corridor occurs on the Medicine Bow Forest. The remainder occurs on the Routt Forest. Proposed harvest would affect 1868 acres (5.7%) along open roads within the 32,698-acre Sierra Madre linkage corridor on the Medicine Bow Forest. More than 1300 acres of proposed harvest in the corridor will occur in areas affected by design criteria where trees can be felled but not removed. Recent actions have also regenerated 139 acres (0.4%) across the linkage corridor. This recent and proposed amount of harvest will not change habitat use by lynx. There is still cover in sufficient quantity and arrangement to allow lynx movement (see large enclosed map). Connectivity should not change. The proposed actions are not of sufficient scale (such as highway construction or private land developments) in the Sierra Madre linkage corridor to place connectivity at risk. Therefore, landscape connectivity among LAUs will be maintained.

The entire Snowy Range linkage corridor occurs on the Medicine Bow Forest. Proposed harvest would affect 1090 acres (3.3%) along open roads and motorized trails within the 33,441 acre linkage corridor. More than 400 acres of proposed harvest in the corridor will occur in areas affected by design criteria where trees can be felled but not removed. Recent actions have regenerated <10 acres across the corridor. This recent and proposed amount of harvest will not change habitat use by lynx. There is still cover in sufficient quantity and arrangement to allow lynx movement (see large enclosed map). Connectivity should not change. The proposed actions are not of sufficient scale (such as highway construction or private land developments) in the Snowy Range linkage corridor to place connectivity at risk. Therefore, landscape connectivity among LAUs will be maintained.

The combination of specifications on where treatment occurs, which trees will be removed, where trees and coarse woody debris can/cannot be removed, the Forest Plan standards for retaining green trees, snags, and coarse woody debris in treated areas, the 10 year time period for implementation, and the retention of regeneration in treated areas will provide vegetation and

structure for lynx movement. Areas within LAUs and across linkage corridors that will accommodate lynx movement after hazard tree harvest are displayed on the large enclosed map. There are very few hazard tree treatment areas within LAUs or linkage corridors where there are openings large enough to possibly inhibit lynx movement (see large enclosed map). This map displays that connectivity for lynx habitat is not compromised by the project.

Indirect effects (including interrelated and interdependent)

Interrelated and interdependent activities would include human and vehicle activity associated with harvest. No new road construction will occur for this project. Any skid trails will not be maintained after harvest, some slash will be scattered across these trails as a result of harvest, and trails will revegetate naturally. These activities will not have any additional effects on lynx. All changes in lynx habitat that were previously addressed account for vegetation disturbance by skid trails. These activities will cause no substantial or permanent habitat changes that would affect lynx, lynx prey, other predators, or human presence. Traffic is discussed under Incidental Take.

Harvested areas will provide some additional opportunities for snowmobilers to use cleared stands. However, design criteria for retaining felled trees and Proposed Action retention of healthy trees and regeneration will prohibit much snowmobile use off existing trails. Still, many harvest units would be adjacent snowmobile trails. Some roads on the Forest, approximately 425 miles, are also groomed or ungroomed snowmobile trails in winter. So, snowmobilers will have some additional riding opportunity within 150ft. of roads where openings were created under this project once the snow covers any remaining vegetation and coarse woody debris adequately. Snow cover should some stands accessible from about December 15 through March 15. These harvested stands will be currently unsuitable habitat, so it is unlikely lynx prey will occur in these areas. Snowmobile use in these harvested stands could disturb or displace individual lynx in adjacent forested stands. However, almost all of the proposed harvest stands are already adjacent to snowmobile trails, so the increased disturbance to adjacent forested stands would be small.

These harvested stands will see increased snow compaction if snowmobilers leave the trails to explore these "new" areas within 150 ft of the trail. This snow compaction will be adjacent to the existing compaction on the snowmobile trails. Coyotes and foxes could use these trails to search for prey. It is generally believed that these predators could compete for prey with lynx. This competition will be limited since these newly compacted areas would be currently unsuitable habitat and are a very small portion of the foraging habitat available to lynx.

Short-term Effects

Most effects discussed above are considered short-term regarding their impacts to lynx, their prey, and their habitat. Since a small amount of habitat is being disturbed by the proposed action compared to the overall available habitat within each LAU, effects to Canada lynx are most likely limited to the temporary displacement of an individual from a small portion of it's habitat during and immediately following treatment. Timber salvage units could be avoided temporarily by an individual lynx because of human presence and heavy equipment use during operations, decreased presence of snowshoe hare or other prey, or reduced travel cover for several years immediately following timber harvest.

Long-term Effects

Harvested lodgepole stands that become currently unsuitable could regenerate to other habitat (summer foraging) within 15 to 20 years as dense young trees dominate the sites. Where coarse woody debris accumulates, remains, and doesn't burn in a wildfire, denning habitat might be created within another 20 years. Some denning sites have been found in older regenerating stands (> 20 years) (Ruediger et al. 2000, p. 1-4). However, it is not typical for most of these lodgepole

stands to retain coarse woody debris over time and not have another disturbance event. Most often, coarse woody debris deteriorates as the stand grows and these stands remain as other habitat similar to Figure 3.

Overall, hazard tree removal will cause no substantial or permanent habitat changes that would affect lynx, lynx prey, other predators, or human presence. The amount of change caused by hazard tree removal is small enough that there should not be a noticeable effect to the lynx population, prey population, or habitat connectivity.

Cumulative Effects

When the lynx was listed as threatened in 2000, the Forest completed programmatic screening on all on-going projects. These 102 projects across the Forest and Table 1 represent accumulation of past federal actions for the environmental baseline. Projects in the Colorado portion of the Little Snake River and Encampment River LAUs are included in Table 3 identifying all habitat changes in these LAUs. Cumulative effects include all future state, tribal, or private actions that are reasonably certain to occur on the Forest. There are more than 288,000 acres of private land and more than 15,000 acres of state land across the Forest (white polygons on large enclosed map). The vast majority of private land occurs around the Laramie Peak unit which does not contain a LAU or travel corridor and does not include any proposed actions. Most of the private land on the forest is used for summer cabins or livestock grazing. Little timber harvest has occurred on this ownership. State of Wyoming lands are used predominantly for livestock grazing but also for timber harvest where products occur. No harvest has occurred on state land since the Damfino Creek project was initiated immediately after lynx was listed. These uses are part of the environmental baseline. There are no other known activities planned for state or private land.

Incidental Take

The potential for incidental take with the project is extremely small. Historic records, current wildlife surveys, and lynx tracking by Colorado Division of Wildlife suggest that lynx are rare and at low density where they occur on the Forest. Direct effects to reproduction are unlikely based on the time, duration and extent of proposed activities. Potential for other direct mortality such as vehicle collisions is very low. Road characteristics, topography, and size of logging and other heavy equipment limit traffic speed. Connectivity of habitat within LAUS and among LAUs will be maintained. Therefore, it appears that there are no reasonable and prudent measures necessary because no incidental take is anticipated. No conservation measures are identified. The proposed actions comply with the revised Forest Plan (USDA 2003a) and LCAS (Ruediger et al. 2000).

Determination of Effect and Rationale for the Proposed Action

For **Canada lynx**, based on the following:

Lynx hair surveys, tracking results from CDOW, and other wildlife surveys indicate lynx exist at a very low density on the Forest.

Proposed actions follow recommendations in the LCAS (Ruediger et al. 2000), including those for percent denning habitat retained, prohibiting management actions in suitable habitat when there is >30% currently unsuitable habitat in an LAU, and percent changed to currently unsuitable by management actions in the last 10 years.

Habitat connectivity within LAUs and among LAUs will be maintained (see large enclosed map).

The proposed activities are consistent with the revised Forest Plan (USDA 2003a and see Appendix A here). Standards and guidelines in the Forest Plan pertaining to lynx were incorporated almost verbatim from the LCAS. The analysis for the Medicine Bow Forest Plan revision determined that Forest activities were not likely to adversely affect the Canada lynx. The

Fish and Wildlife Service, Cheyenne Field Office determined that the revised Medicine Bow Forest Plan "is not likely to jeopardize the continued existence of the Canada lynx" on December 23, 2003.

A **may affect, not likely to adversely affect** determination is made for Canada lynx.

Alternative 1 –No Action

In many cases, no action concerning lynx reflects the existing conditions and forest succession within the LAUs and linkage corridors. However, in this case, it is expected that the spread of pine beetles is causing dramatic changes to lynx habitat (see Table 3). Observations on the Forest so far indicate that almost all trees of medium size or larger within a stand are killed when the beetles hit. Surveys in 2006 indicated that more than 75,000 acres on the Forest were hit by pine beetles. Surveys in 2007 indicated that more than 177,000 acres on the Forest were hit by pine beetles. Wide spread tree die-offs have occurred recently on other nearby western Forests such as the Arapahoe-Roosevelt in Colorado and the Dixie National Forest in Utah.

Expectations are that emerging pine beetles from the existing epicenters will continue to spread into, and attack green, standing lodgepole pine. The likely epidemic has the potential to affect thousands of acres of lodgepole-dominated forests across the lower and middle elevations of the Forest.
The widespread outbreak has the same likelihood of occurring on the Forest despite the proposed action. The proposed action only improves human health and safety. It will not change the course of the outbreak. So, results from the proposed action and no action will be similar except that the proposed action will remove some dead and dying hazard trees from roads and administrative sites. Comparatively, the proposed action is changing <4% of lynx habitat in any LAU. This is a minute change for lynx or lynx habitat relative to the thousands of acres of lynx habitat that will be changed by the beetle outbreak.

VI. DESIGN CRITERIA

No additional design criteria for lynx are necessary for this project. Forest Plan standards and guidelines (Appendix A) include management direction from Ruediger et al. (2000) and include retention of green trees, snags, and coarse woody debris in harvest units (Tables 5 and 6). The proposed action also includes design criteria (see Proposed Action) that will retain live and dead material for lynx habitat features.

VII. CONSERVATION OR MITIGATION MEASURES

No conservation or mitigation measures are necessary. Forest Plan standards and guidelines and the Lynx Conservation Assessment and Strategy recommendations will be followed.

VIII. RESPONSIBILITY FOR A REVISED BIOLOGICAL EVALUATION

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

IX. CONTACTS

On March 31, 2007 a list of threatened, endangered species and designated critical habitat within the Medicine Bow National Forest was received from the U.S. Fish and Wildlife Service (FWS) (letter from Brian Kelly to Mary Peterson). This list was edited in August 2007 with the delisting of the bald eagle. Review of threatened and endangered species at the February 2008 southern Wyoming Level 1 meeting confirmed that the edited list is currently valid. See consultation history for the remaining description of contacts regarding this project.

Most of the Encampment River LAU occurs on the Routt Forest south of the Wyoming-Colorado state line. Consultation was recently completed on the Sierra Madre timber sale in the Encampment River LAU in Colorado. USFS Parks District wildlife biologist discussed the Sierra Madre project with USFWS biologist Kurt Broderdorp on June 2, 2005 and they agreed the project was a may affect, not likely to adversely determination for Canada lynx. Changes to lynx habitat caused by the Sierra Madre timber sale are reflected in this report (Tables 3, 4).

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Appendix A. Forest Plan Standards and Guidelines for Canada Lynx applicable to the proposed action.

Canada Lynx [Based on Lynx Conservation Assessment and Strategy]

Applicable to All Programs and Activities:

Standard 1. New or expanded permanent developments and vegetation management activities and practices must maintain habitat connectivity.

Guideline 1. Techniques to avoid or reduce effects on lynx should be used in proposals to construct and/or reconstruct highways across federal land. Techniques such as wildlife fencing and associated underpasses or overpasses should be considered to reduce mortality risk.

Applicable to Specific Programs and Activities:

The following apply to lynx habitat inside Lynx Analysis Units (LAUs) that are within National Forest System lands. Standards applicable to LAU Boundaries:

Standard 1. LAU boundaries will not be adjusted except through agreement with the U.S. Fish and Wildlife Service, based on new lynx habitat information.

Standards Applicable to Vegetative Management Activities

Standards

1. Unless a broad scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each LAU as follows: if more than 30% of lynx habitat within an LAU on NFS lands is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities or practices. Wildland Fire Use practices and activities that restore ecological processes are excepted.
2. Timber management practices, such as timber harvest and salvage sales, shall not change more than 15% of lynx habitat within an LAU to an unsuitable condition within a 10-year period.
3. Maintain denning habitat within an LAU in patches generally larger than 5 acres, comprising at least 10% of the lynx habitat. Where less than 10% denning habitat is present within an LAU, defer vegetation management activities and practices that alter vegetation in stands that have the highest potential for developing denning-habitat structure in the future. Wildland Fire Use practices and activities that restore ecological processes are excepted.
4. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres. Exceptions to this include:
   a. Developed recreation sites, administrative sites, or authorized special use structures or improvements.
   b. Designated roads and trails corridors where public safety or access has been or may be compromised.
   c. LAUs where denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed.
5. Pre-commercial thinning may be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes have eliminated snowshoe hare cover and forage availability during winter conditions with average snow pack). Pre-commercial thinning within the home ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings) may occur prior to the stands no longer providing snowshoe hare habitat.

Guidelines

1. Where little or no habitat for snowshoe hares is currently available, vegetation management practices in lynx habitat should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Preference should be given to mid-seral stage stands. Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.
2. Where recruitment of additional denning habitat is desired, or to extend the production of snowshoe hare foraging habitat where forage quality and quantity is declining due to plant succession, vegetation management practices should retain sufficient vertical diversity, standing dead trees and coarse woody debris. The juxtaposition of denning and foraging habitat should be maintained or improved.
3. Vegetation management should provide for the retention or restoration of denning habitat on landscape settings with a low probability of loss from stand replacing fire events.
4. Fire management activities should not create permanent travel routes that would facilitate snow compacting activities. Construction of permanent firebreaks on ridges or saddles should be avoided.
5. Habitat for alternate prey species (primarily red squirrel) should be provided in each LAU.

Standards and Guidelines Applicable to Human Uses (HU)

Standards

1. Allow no net increase in groomed or designated over-the-snow routes, outside of baseline areas of consistent snow compaction within the lynx habitat matrix, by LAU unless the grooming or designation serves to consolidate use and improve lynx habitat. This does not apply within permitted ski area boundaries, to winter logging, access to private inholdings and other access regulated by HU Standard 3.
2. If diurnal security habitat is identified as a need, then in the development or expansion of ski areas, locate the trails, access roads and lift termini, to maintain and provide lynx diurnal security habitat.
3. Restrict motorized winter access to designated routes and designated over-the-snow routes for non-recreation special uses, mineral and energy exploration and development sites and facilities.
4. Manage recreational activities to protect the integrity of lynx habitat.

Guidelines

1. In the development or expansion of ski areas, provide adequately sized inter-trail islands, including the retention of coarse woody debris, to maintain snowshoe hare habitat.
2. In the development or expansion of ski areas, provide nocturnal foraging opportunities for lynx while being consistent with operational needs, especially in landscapes where lynx habitat occurs as narrow bands of coniferous forest across the mountain slopes.
3. Plan recreational development and recreational operational uses to provide for lynx movement and to maintain effectiveness of lynx habitat.
4. Remote monitoring of mineral and energy development sites and facilities should be encouraged to reduce snow compaction.
5. A reclamation plan should be developed (e.g. road reclamation and vegetation rehabilitation) for closed mineral and energy development sites and facilities that promote the restoration of lynx habitat.
6. Upgrading unpaved roads that would result in increased speeds and traffic volume or that would foreseeably contribute to development or increases in human activity in lynx habitat should be avoided. This applies to upgrading roads to higher maintenance levels (to Levels 4 or 5) that result in substantially increased speeds, traffic volumes or potential future use.
7. New permanent roads should not be built on ridge tops and saddles and in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers.

8. Roadside brushing on low speed and low volume roads should be done at the minimum level necessary, while providing for public safety.
9. Public motorized use should be restricted on new roads constructed for project specific activities. Provide for an effective closure in the initial design of the road. Upon project completion, these roads should be reclaimed or decommissioned, if not needed for other management objectives.