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FINAL Environmental Impact Statement

National Forests in
Colorado & southern Wyoming
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Southern Rockies Lynx Management Direction

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ABSTRACT

The Southern Rockies Canada Lynx Amendment Final Environmental Impact Statement (FEIS) documents the results of an analysis of five alternative ways to manage for Canada lynx habitat in the Southern Rockies Geographic Area. This proposed amendment would incorporate management direction for Canada lynx habitat by amending the Land and Resource Management Plans (forest plans) for the Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, San Juan, Rio Grande, Medicine Bow-Routt National Forests and the White River National Forest. The White River and Medicine Bow National Forests released their Records of Decision for their Revised Land and Resource Management Plan in the spring of 2002 and fall of 2004, respectively. These plans will be amended with the Southern Rockies Lynx Amendment to provide consistent management direction across the forests in the Southern Rockies Geographic Area.

The Draft Environmental Impact Statement was previously issued in January of 2004, and a supplemental draft Environmental Impact Statement was issued November 2006 to respond to the Deputy Under Secretary for Natural Resources and Environment, U.S. Department of Agriculture David Tenny's decision (Dec. 3, 2004) on a discretionary review of the Chief's decisions on appeals of the White River National Forest Revised Land and Resource Management

Plan. The SDEIS added information and analysis for the White River National Forest to the material already provided for the other six national forest units.

The No Action alternative (Alternative A) was developed as a baseline for comparing the effects of Alternatives B, C and D. The purpose and need for action is to establish direction that conserves and promotes recovery of Canada lynx, and reduces or eliminates potential adverse effects from land management activities and practices on national forests in the Southern Rockies, while preserving the overall multiple-use direction in existing plans.

Alternatives B, C and D were designed to address the purpose and need for the project. Alternative B reflects the proposed action described in scoping and would adopt the recommendations of the Lynx Conservation Assessment and Strategy (LCAS), edited for clarity. Alternatives C and D would add direction similar to LCAS, but partially responds to concerns about restrictions on new snowmobile trails, providing for lynx foraging habitat in multistory forests, and precommercial thinning restrictions. Alternative D included standards and guidelines that may be more flexible to address local situations and new information.

Alternative F was developed for the Final Environmental Statement (FEIS) based on comments received from people and agencies who reviewed the DEIS. They suggested different objectives, standards, and guidelines, or different combinations of them, or they had concerns about the impacts the standards or guidelines might have. The Forest Service used these comments to revise and rearrange the standards and guidelines to create Alternative F. Alternative F also meets the purpose and need for this amendment. Along with the other alternatives, the effects of Alternative F are analyzed in full in Chapter 3 of the FEIS.

Alternative F is the Forest Service Selected Alternative and would allow reduction of lynx foraging habitat if needed to reduce fuels. The Forest Service has concluded that this alternative overall contributes to lynx conservation and recovery while also addressing other resource issues.

List of Acronyms

ALIVE	A Landscape Level Inventory of Valuable Ecosystem components
ANILCA	Alaska National Interests Lands Conservation Act
APHIS	Animal and Plant Health Inspection Service
ATV	All terrain vehicle
BEHAVE	Fire Modeling System
BA	Biological Assessment
BLM	Bureau of Land Management
BO	Biological Opinion
DJ	Denver-Jules Basin
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CFR	Code of Federal Regulations
CWPP	Community Wildfire Protection Plan
DEIS	Draft Environmental Impact Statement
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FERC	Federal Energy Regulatory Commission
FS	Forest Service
FSM	Forest Service Manual
FWS	United States Fish and Wildlife Service
GIS	Geographical information system
GMUG	Grand Mesa-Uncompahgre-Gunnison NF
GPS	Global positioning system
HFRA	Healthy Forest Restoration Act
HUC	Hydrologic Unit Codes
IDT	Interdisciplinary Team
LAU	Lynx analysis units
LCAS	Lynx Conservation Assessment and Strategy
LOP	Limited operating period
LRMP	Land and Resources Management Plan
LWM	Large woody material
MIS	Management Indicator Species
NEPA	National Environmental Policy Act
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOI	Notice of Intent
NVUM	National Visitors Use Monitoring

OHV	Off-highway vehicles
ORV	Off-road vehicles
PA	Proposed Action
PNV	Present Net Value
SDEIS	Supplemental Draft Environmental Impact Statement
SRI	Soils Resource Inventory
SRLA	Southern Rockies Lynx Area
SRMGA	Southern Rocky Mountains Geographic Area
SUA	Special Use Areas
TES	Threatened, Endangered and Sensitive
US	United States
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WOGRA	Wyoming Oil and Gas Resource Assessment
WRNF	White River National Forest
WUI	Wildland Urban Interface

SUMMARY

INTRODUCTION

The Final Environmental Impact Statement (FEIS) is intended to foster informed decision making and public participation on a proposal to amend forest plans in the Southern Rockies Geographic Area to incorporate consistent management direction for the Canada lynx.

This summary of the FEIS provides an overview of the major conclusions of the environmental analysis, areas of controversy, and the issues to be resolved relative to the choice among alternatives.

The areas addressed in this analysis include the Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, San Juan, Rio Grande, Medicine Bow-Routt and White River National Forests (see Figure 1). The White River and Medicine Bow National Forests released their Records of Decision for their Revised Land and Resource Management Plans in the spring of 2002 and fall of 2004, respectively. Although these plans incorporated management direction to provide habitat for Canada lynx, this proposes to amend the current plans to assure consistent management direction across the Southern Rockies Geographic Area. The FEIS discloses the direct, indirect, and cumulative environmental impacts of implementing the proposed action and the alternatives.

PURPOSE AND NEED (Chapter 1)

The purpose and need for the amendment is to establish management direction that conserves and promotes the recovery of lynx, and reduces or eliminates potential adverse effects from land management activities and practices on national forests in the Southern Rockies, while preserving the overall multiple-use direction in existing Forest Plans.

This management direction is needed to comply with the provisions of the 1982 National Forest Management Act (NFMA) regulations, to provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species. This action is also needed to assure that Forest Plans provide adequate management direction to conserve the lynx and its habitat, as required by the Endangered Species Act.

To provide consistency, management direction is considered for all identified forests, rather than addressing each plan individually. Future adjustments to individual plans may occur as they are subsequently amended or revised in accordance with the requirements of the NFMA.

PROPOSED ACTION (Chapter 1)

The Forest Service proposes to amend eight Forest Plans in Colorado and Wyoming to provide conservation and recovery of the lynx, a threatened species.

The proposed amendment would add or modify management direction consisting of one or more of the following components:

- ♦ Goals - general descriptions of desired end results;

- ♦ Objectives - descriptions of desired resource conditions;
- ♦ Standards - management requirements designed to achieve objectives;
- ♦ Guidelines - management actions that would normally be used to achieve objectives; and
- ♦ Monitoring plan.

The proposed action presented during scoping is incorporated into Alternative B and is described in detail in Table S-1 below. The initial proposed action was modified slightly from that presented in the initial scoping document to improve clarity and remove redundancy. See Appendix E of the FEIS for a crosswalk between the initial proposed action and the proposed action clarified. The proposed action, as referenced throughout the FEIS, refers to the proposed action clarified, which is Alternative B.

The proposed action is based on conservation measures in the *Canada Lynx Conservation Assessment and Strategy* (LCAS). The measures from the LCAS were reorganized and described in forest planning language to facilitate incorporation into the forest plans. During the transformation, the original intent of the measures in the LCAS was preserved.

The amendment applies only to National Forest System (NFS) lands identified as lynx habitat or linkage areas. See Appendix F of the FEIS for a description of lynx habitat mapping procedures. This amendment would not include a site-specific decision that determines linkage-area boundaries, which is better suited to project level planning.

ISSUES (Chapter 2)

In determining the relevant issues relating to the proposed action and the range of alternatives, the interdisciplinary team reviewed public and agency comments generated during the scoping process. Relevant comments from these sources were used to develop the Key Issues to be studied in detail. Three Key Issues were identified and two Other Issues were identified. The Key Issues drove the formulation of alternatives and the subsequent environmental analysis of the alternatives.

The Other Issues did not drive the formulation of alternatives, but were considered in alternative development and the subsequent environmental analysis of the alternatives.

Key Issues

1. **Lynx Productivity, Mortality and Movements**—brought forward from the purpose and need discussion in Chapter 1:
 - a. How can forest management activities such as timber harvest, precommercial thinning, grazing, fire, salvage harvest be harmonized with lynx denning and foraging habitat needs.
 - b. How can human use activities resulting in snow compaction be harmonized with the need to maintain the competitive advantage of lynx productivity in deep snow areas during the winter.
 - c. How can landscape connectivity be maintained to allow lynx movements and minimize risk of mortality.

2. **Public Safety** - How can vegetation treatments to create defensible fuels profiles in the proximity of human communities be harmonized with creating and maintaining desired lynx habitat conditions.

3. **Human Uses** - How can winter recreation (i.e. snowmobiling, cross country skiing, ski area expansion), minerals, timber harvest, land adjustments, and lands special use activities and practices be harmonized with creating and maintaining desired lynx habitat conditions.

Other Issues

1. **Management Indicator Species (MIS)** - Will the proposed action or the alternatives affect the ability to achieve existing Forest Plan goals, objectives, or standard and guidelines for MIS.

2. **Other Threatened, Endangered, and Proposed Species** - Will the proposed action or the alternatives change the expected effects of the Forest Plans on federally listed species (plant and animal), other than the lynx.

ALTERNATIVES CONSIDERED IN DETAIL (Chapter 2)

This section summarizes the alternatives considered in detail. The descriptions of the management direction by alternatives are summarized in Table S-1 below.

Alternative A (No Action)

Analyzing a No Action alternative is a requirement of NEPA and Forest Service planning procedures. In this case, it means no change in current management (i.e., no amendment to current Forest Plans). However, this alternative may not provide for lynx persistence and recovery in the Southern Rocky Mountains Geographic Area (SRMGA), nor comply with the ESA requirements.

The No Action alternative is based on the management areas, standards, and guidelines in the current forest plans.

The No Action alternative is also based on policies and analysis requirements in the current Code of Federal Regulations and Forest Service Manual and Handbook direction including the roads analysis requirements.

Except for the White River and the Medicine Bow Forest Plans, the No Action alternative does not include the conservation measures in the LCAS. While the Forest Service has been using the LCAS to evaluate projects in accordance with their Conservation Agreement with the US Fish and Wildlife Service, the measures have not been adopted as plan direction for the Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, San Juan, Rio Grande and Routt National Forests. The White River and Medicine-Bow National Forests released their Records of Decision for their Revised Land and Resource Management Plans in the spring of 2002 and fall of 2004, respectively.

Alternative B - Proposed Action

Alternative B provides for the conservation and recovery of the Canada Lynx. Alternative B is based on the *Canada Lynx Conservation Assessment and Strategy* (LCAS) and

includes management direction for vegetation and human use management activities and practices in lynx habitat and linkage areas. Alternative B is designed to address activities on NFS lands that can affect lynx and their habitat.

Alternative C

Alternative C provides for the conservation and recovery of the Canada lynx by adding direction similar to LCAS, and was designed to respond to Key Issues concerns about restrictions on new snowmobile trails, providing for lynx foraging habitat in multistory forests, and precommercial thinning restrictions.

Alternative D

Alternative D was designed to go further in responding to the Key Issues than Alternative C while still contributing to the conservation of Canada lynx. It was developed to provide a broader range of alternatives and provides greater flexibility for multiple use management. This alternative adds direction similar to LCAS, but partially responds to concerns about restrictions on new snowmobile trails, precommercial thinning, fuel reduction projects associated with communities at risk of wildfires, and modifies standards so that they may be more flexible so as to address local situations and new information. Alternative D was identified as the preferred alternative in the DEIS and SDEIS.

Alternative F - FEIS Preferred Alternative

Alternative F was developed for the Final Environmental Statement (FEIS) based on comments received from people and agencies who reviewed the DEIS and the SDEIS. They suggested different objectives, standards, and guidelines, or different combinations of them, or they had concerns about the impacts the standards or guidelines might have (see Appendix I, Response to Comments). The Forest Service considered these comments on the alternatives. These comments were used to revise and rearrange the standards and guidelines to create Alternative F. Along with the other alternatives, the effects of Alternative F are analyzed in full in Chapter 3 of the FEIS. Alternative F provides for the conservation and recovery of the Canada lynx by adding direction similar to LCAS. Alternative F has been identified as the preferred alternative in the FEIS.

Environmental Consequences (Chapter 3)

This section summarizes the information from Chapter 3. A comparative summary of the environmental effects on the issues of concern associated with each of the alternatives is presented in Table S-2 below. The FEIS presents the comparison of alternatives by Key Issues in the FEIS Table 2- 3 and provides an additional comparison of alternatives by standards and guideline in the FEIS Table 2-4.

Decision Framework

The FEIS has been prepared to evaluate the effects of the Proposed Action, and to look at alternative ways of achieving the Purpose and Need, while responding to the key issues and management concerns.

The responsible official will decide whether or not to amend Southern Rockies Forest Service Land and Resource Management Plans for the Southern Rockies Geographic Area to incorporate direction on lynx conservation and recovery.

Responsible Official

Rick D. Cables, Regional Forester, USDA-Forest Service, Rocky Mountain Region, 740 Simms St., Golden CO, 80225.

Southern Rockies Lynx Amendment FEIS Descriptions of the Alternatives

Bold words are defined in the glossary.
Differences between the alternatives are *italicized*.
O=objective; S=standard; G=guideline

Features common to all Alternatives

1. The following goals, objectives, standards, and guidelines would be incorporated into existing Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, Sand Juan, Rio Grande and Routt Forest Plans and would supercede the management direction for lynx incorporated in the White River and the Medicine Bow Revised Forest Plans.

2. The following goals, objectives, standards, and guidelines apply only to National Forest system lands.

Goals describe desired end results and are expressed in broad general terms;

Objectives are concise statements of measurable desired results intended to promote achievement of goals;

Standards are limitations on management activities that are within the authority and Ability of the agency to meet or enforce. Standards are mandatory. Deviation from standards requires a Plan amendment and;

Guidelines are preferred or advisable courses of action. Deviations from guidelines are permissible if the responsible official documents the reasons for the deviation.

NA indicates not applicable.

Note for the White River National Forest, the existing Forest Plan direction pertaining to lynx is noted in the WRNF No Action column. Note for the Medicine Bow National Forest, the existing Forest Plan direction (e.g. no action) pertaining to lynx is similar to Alternative B. For the remaining Forests management direction for lynx habitat management does not exist under no action.

Table S-1 – Description of Management Direction by Alternative

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
GOAL: Conserve the Canada lynx.				
ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL) - The following objectives, standards, and guidelines apply to all management practices and activities in lynx habitat in lynx analysis units (LAUs) and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use.				
	ALL O1. Maintain or restore lynx habitat connectivity.	(Same as Alternative B)	(Same as Alternative B)	ALL O1. Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.
GL 1 Within key landscape linkage areas maintain or improve conditions that allow for lynx movement.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity. This standard does not apply to: 1. Fuel treatments identified through a process such as that described in <u>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan</u> . 2. Fossil fuel exploration and development practices and activities. 3. Energy transmission facilities associated practices and activities.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity in an LAU and/or linkage area.
NA	NA	NA	ALL S2. A project proposal that deviates from one or more lynx standards may proceed without amending the Plan, subject to ESA requirements, either: 1. If a written determination is made that the project is not likely to adversely affect lynx;	NA

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
			or 2. If it may result in short-term adverse effects to lynx but if long-term benefits to lynx and its habitat would result.	
Goal & Objective 1 c. 8 Within 2 years of plan approval, map, identify, and prioritize site-specific locations where highway crossings are needed to reduce highway impacts on lynx. Work cooperatively with the Federal Highway Administration and Colorado Department of Transportation in the creation of the map and to continuously address lynx movement and habitat connectivity and to reduce the potential for lynx mortality related to highways.	ALL G1. Techniques to avoid or reduce effects on lynx should be used when constructing or reconstructing highways . Techniques could include underpasses or overpasses.	(Same as Alternative B)	(Same as Alternative B)	ALL G1. Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses or overpasses.
Note: Standards and guidelines in the "Canada Lynx" section apply only to lands within the lynx habitat matrix. Lynx analysis unit (LAU) boundaries will not be adjusted for individual projects. Forestwide LAU changes will only be completed in coordination and concurrence with the US Fish and Wildlife Service.	LAU S1. LAU boundaries would not be adjusted except through agreement with the US Fish and Wildlife Service, based on new lynx habitat information.	(Same as Alternative B)	(Same as Alternative B)	LAU S1. Changes in LAU boundaries shall be based on site specific habitat information and after review by the Forest Service Regional Office.
VEGETATION MANAGEMENT ACTIVITIES AND PRACTICES (VEG) - The following objectives, standards, and guidelines apply to vegetation management practices and activities in lynx habitat within lynx analysis units (LAUs). With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards, and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, roads, and the like. None of the objectives, standards, or guidelines apply to linkage areas.				
Goal & Objective 1.c.5, 1.c. 6	VEG O1. Manage vegetation to be consistent with historical	(Same as Alternative B)	(Same as Alternative B)	VEG O1. Manage vegetation to mimic or

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	succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.			approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.
Goal & Objective 1.c.5, 1.c. 6, Standard 6. In aspen stands, apply harvest prescriptions that favor regeneration of aspen.	VEG O2. Maintain or improve lynx habitat, with an emphasis on continued availability of high-quality foraging habitat in juxtaposition to denning habitat .	(Same as Alternative B)	(Same as Alternative B)	VEG O2. Provide a mosaic of habitat conditions through time that support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe hare habitat in both the stand initiation structural stage and in mature, multi-story conifer vegetation.
Goal & Objective 1.c.5, 1.c. 6	VEG O3. Conduct fire use activities to restore ecological processes and maintain or improve lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 6. In aspen stands, apply harvest prescriptions that favor regeneration of aspen.	VEG O4. Design regeneration harvest , reforestation, and thinning to develop characteristics suitable for lynx and snowshoe hare habitat .	(Same as Alternative B)	(Same as Alternative B)	VEG O4. Focus vegetation management in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover.
Goal & Objective 1.c.5, 1.c. 6, Standard 1: Limit disturbance within each lynx analysis unit (LAU) as follow: if more than 30 percent of lynx habitat within an LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management by federal	VEG S1. 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 percent of lynx habitat within a LAU on NFS lands is currently in unsuitable condition, no further reduction	VEG S1. Unless a broad scale assessment has been completed that substantiates different historical levels of unsuitable habitat , limit disturbance within each LAU or <i>in combination with immediately adjacent LAUs on NFS lands</i> as follows: if more than 30 percent of lynx habitat within a LAU or	VEG S1. Unless a broad scale assessment has been completed that substantiates different historical levels of unsuitable habitat , limit disturbance within each LAU or <i>in combination with immediately adjacent LAUs on NFS lands</i> as follows: if more than 30 percent of lynx habitat within a LAU or	VEG S1. <i>Where and what this applies:</i> Standard VEG S1 applies to all vegetation management practices and activities that regenerate forested stands, except for fuel treatment projects within the wildland urban interface (WUI) as defined by HFRA, subject to the

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
agencies.	<p>of suitable conditions shall occur as a result of vegetation management activities or practices.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> Wildland Fire Use practices and activities that restore ecological processes, or maintain or improve lynx habitat. Wildfire suppression. 	<p><i>combination of LAUs</i> is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities or practices.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> Fire Use practices and activities that restore ecological processes, or maintain or improve lynx habitat. Wildfire suppression. Use the same analysis boundaries for all future vegetation management projects subject to this standard. 	<p><i>combination of LAUs</i> is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities or practices.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> Fire Use practices and activities that restore ecological processes, or maintain or improve lynx habitat. Wildfire suppression. <i>Fuel treatments identified through a process such as that described in <u>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan.</u></i> <p>Use the same analysis boundaries for all future vegetation management projects subject to this standard.</p>	<p>following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10.</p> <p>The Standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages limit disturbance in each LAU as follows: If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.</p> <p>Note: Fuel treatment projects that create stand initiation structural stage will be included in the 30 percent calculation – meaning that if a fuel treatment project w/in the WUI creates more than 30 percent, then other</p>

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				management practices and activities designed to regenerate more acres would have to be modified or deferred until the standard can be met.)
Standard 3. Management actions such as timber sales, salvage sales, and prescribed fires will not change more than 15 percent of lynx habitat within a LAU to unsuitable condition within a 10-year period. To determine whether the 15% criterion over a 10-year period standard is met, base activities on the 1-year period immediately prior to the initiation of the project in question.	VEG S2. Timber management practices, such as timber harvest and salvage sales, shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.	(See VEG G7.)	(See VEG G7.)	<p>VEG S2 Where and to what this applies: Standard VEG S2 applies to all timber management practices and activities that regenerate forested stands, except for fuel treatment projects within the WUI as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10.</p> <p>The Standard: VEG S2. Timber management practices and activities shall not regenerate more than 15 percent of lynx habitat on NFS lands in an LAU in a ten-year period.</p>
Standard 2. Within a LAU, maintain denning habitat in patches larger than 5 acres,	VEG S3. Maintain denning habitat within a LAU in patches generally larger than	(Same as Alternative B)	VEG S3. Maintain denning habitat within a LAU in patches generally larger than	(See Guideline VEG G11)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
comprising at least 10 percent of lynx habitat. Where less than 10 percent denning habitat is currently present within a LAU, defer management actions in stands that have the highest potential for developing denning habitat structure in the future.	<p>5 acres comprising at least 10 percent of the lynx habitat. Where less than 10 percent denning habitat is present in a LAU, defer vegetation management practices and activities in stands that have the highest potential to develop denning-habitat.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildland Fire Use practices and activities that restore ecological processes. 2. Wildfire suppression. 		<p>5 acres comprising at least 10 percent of the lynx habitat. Where less than 10 percent denning habitat is present in a LAU, defer vegetation management practices and activities in stands that have the highest potential to develop denning-habitat.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildland Fire Use practices and activities that restore ecological processes. 2. Wildfire suppression. 3. <i>Fuel treatments identified through a process such as that described in <u>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan.</u></i> 	
Standard 4. Following a disturbance such as blowdown, fire, insect or pathogen 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: (1) developed areas such as campgrounds, and (2) in LAUs where denning habitat has been mapped and field validated, salvage harvests may occur provided that at least 10 percent denning	VEG S4. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat, salvage harvest may only occur when the affected area is smaller than 5 acres in the following situations: <ol style="list-style-type: none"> 1. Developed recreation sites, administrative sites, or authorized special use structures or improvements; 2. Designated road and trail corridors where public safety 	VEG S4. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat, salvage harvest may only occur when the affected area is smaller than 5 acres in the following situations: <ol style="list-style-type: none"> 1. Developed recreation sites, administrative sites, or authorized special use structures or improvements; 2. Designated road and trail corridors where public safety 	(See VEG G8)	(See Guideline VEG G11)

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<p>habitat is retained and is well distributed.</p> <p>Guideline 11. Use field verification to document denning habitat suitability, quantity, quality, and juxtaposition with other important habitat components, such as water and foraging habitats; design projects to avoid impacts at times suitable site may be occupied as natal or maternity dens.</p>	<p>or access has been or may be compromised; and</p> <p>3. LAUs where denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed.</p> <p>4. <i>Within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings).</i></p> <p>5. Wildfire suppression.</p> <p>6. Removal of dead or down trees for personal use (i.e., firewood collection).</p>	<p>or access has been or may be compromised;</p> <p>3. LAUs where denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed.</p> <p>4. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); <i>landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat.</i></p> <p>5. Wildfire suppression.</p> <p>6. Removal of dead or down trees for personal use (i.e., firewood collection).</p>		

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<p>Standard 5. Allow silvicultural thinning treatments (such as pre-commercial thinning or weed-and- release treatments designed to reduce stocking in order to concentrate growth on the more desirable trees) only when stands no longer provide snowshoe hare habitat.</p>	<p>VEG S5. Precommercial thinning may be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes or stand composition and/or stand structure do not provide snowshoe hare cover and forage availability during winter conditions with average snow pack).</p> <p>The following precommercial thinning activities may occur prior to the stands no longer providing snowshoe hare habitat:</p> <ol style="list-style-type: none"> 1. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings). <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildfire suppression. 2. Wildland Fire Use. 3. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 	<p>VEG S5. Precommercial thinning may be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes or stand composition and/or stand structure do not provide snowshoe hare cover and forage availability during winter conditions with average snow pack).</p> <p>The following precommercial thinning activities may occur prior to the stands no longer providing snow hare habitat:</p> <ol style="list-style-type: none"> 1. Research studies and genetic tests (i.e., performance tests) necessary to evaluate genetically improved reforestation stock. 2. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx 	<p>VEG S5. Vegetation management practices and activities that reduce snowshoe hare habitat may occur in forest stands with a structure and species composition that provides snowshoe hare cover and forage during winter only in the following situations:</p> <ol style="list-style-type: none"> 1. Associated with research studies and genetic tests (i.e., performance tests, long-term field tests and realized gain trials) necessary to evaluate genetically improved reforestation stock. 2. Conifer removal within aspen clones and/or daylight thinning around individual aspen trees. 3. Stands identified as “replacement” or “future” lodgepole old growth in the Forest Plan to provide structural and species diversity. 4. When a broad scale assessment has determined that early seral stages of forested habitat exceed what would be expected under the normal range of historic conditions. 5. Pruning, transplants, and Christmas tree and ornamental tree harvest if done so as to not measurably reduce lynx forage habitat. 6. Salvage and regeneration harvests. 	<p>VEG S5</p> <p>Where and to what this applies:</p> <p>Standard VEG S5 applies to precommercial thinning practices and activities, except for fuel treatment projects that use precommercial thinning as a tool within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10.</p> <p>The Standard:</p> <p>Precommercial thinning practices and activities that reduce snowshoe hare habitat, may occur from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat only:</p> <ol style="list-style-type: none"> 1. Within 200 feet of administrative sites, dwellings, or outbuildings; or 2. For research studies or genetic tree tests evaluating genetically improved

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		<p><i>habitat.</i></p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildfire suppression. 2. Wildland Fire Use. 3. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 	<p>7. Precommercial thinning conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings).</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildfire suppression. 2. <i>Fire use practices and activities that restore ecological processes.</i> 3. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 4. <i>Fuel treatments identified through a process such as that described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan.</i> 	<p>reforestation stock; or</p> <p>3. Based on new information that is peer reviewed and accepted by the regional/state levels of the Forest Service and FWS, where a written determination states:</p> <ol style="list-style-type: none"> a. that a project is not likely to adversely affect lynx; or b. that a project is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat; or <p>4. For conifer removal in aspen, or daylight thinning around individual aspen trees, where aspen is in decline.</p>
~NA	VEG S6. Management practices and activities in mature and late successional, multi-layered Engelmann spruce-subalpine fir stands shall provide for winter snowshoe hare habitat.	VEG S6. Management practices and activities in mature and late successional, multi-layered Engelmann spruce-subalpine fir stands shall provide for winter snowshoe hare habitat.	(See VEG G6)	<p>VEG S6</p> <p>Where and to what this applies:</p> <p>Standard VEG S6 applies to all vegetation management practices and activities that regenerate forested stands, except for fuel treatment projects within the wildland urban interface (WUI) as</p>

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	<p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Designated road and trail corridors where public safety or access has been or may be compromised; 2. Practices and activities conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings). 3. Wildfire suppression. 4. Wildland Fire Use. 5. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 	<p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Designated road and trail corridors where public safety or access has been or may be compromised; 2. Practices and activities conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); <i>landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat.</i> 3. Wildfire suppression. 4. Wildland Fire Use. 5. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 		<p>defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5 and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI, see guideline VEG G10.</p> <p>The Standard: Vegetation management practices and activities that reduce snowshoe hare habitat in multi-story mature or late successional forests may occur only:</p> <ol style="list-style-type: none"> 1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or 2. For research studies or genetic tree tests evaluating genetically improved reforestation stock; or 3. For incidental removal during salvage harvest (e.g. removal due to location of skid trails). <p>(NOTE: Timber harvest is allowed in areas that have potential to improve winter</p>

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				snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover [e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow].
Guideline 2. Vegetation management activities to improve lynx foraging habitat should primarily provide for recruitment of a high density of small diameter conifers, hardwoods, and shrubs preferred by snowshoe hares.	VEG G1. Where little or no habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Preference should be given to mesic sites and mid-seral stage stands. Provide for continuing availability of lynx foraging habitat in proximity to denning habitat .	(Same as Alternative B)	(Same as Alternative B)	VEG G1 Vegetation management practices and activities should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority should be given to stem-exclusion, closed-canopy structural stage stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.
Guideline 3. Retain standing dead trees and coarse woody debris during vegetation management activities to provide for adequate future denning habitat.	VEG G2. Where recruitment of additional denning habitat is desired, vegetation management practices should retain sufficient standing dead trees and coarse woody debris , consistent with the likely availability of such material under natural disturbance regimes. The juxtaposition of denning and foraging habitat should be maintained or improved.	(Same as Alternative B)	(Same as Alternative B)	NA. (See Guideline VEG G11)

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Standard 2. Within a LAU, maintain denning habitat in patches larger than 5 acres, comprising at least 10 percent of lynx habitat. Where less than 10 percent denning habitat is currently present within a LAU, defer management actions in stands that have the highest potential for developing denning habitat structure in the future.	VEG G3. 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.	(Same as Alternative B)	(Same as Alternative B)	NA. (See Guideline VEG G11)
Guideline 9. When managing wildland fire, minimize creation of permanent travelways. Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities. (The WRNF does not create permanent fire breaks.)	VEG G4. 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.	(Same as Alternative B)	(Same as Alternative B)	VEG G4 Prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.
Goal & Objective 1.c.5	VEG G5. Habitat for alternate prey species (primarily red squirrel) should be provided in each LAU.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
~NA	(NA See VEG S6)	(NA See VEG S6)	VEG G6. <i>Mature and late successional, multi-layered Engelmann spruce-subalpine fir stands should be managed to provide for winter snowshoe hare habitat.</i>	(See Standard VEG S6)
Standard 3	(NA - See VEG S2.)	VEG G7. <i>Timber management practices should not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year</i>	(Same as Alternative C)	(See Standard VEG S2)

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		<i>period.</i>		
Standard 4	(NA - See VEG S4.)	(NA - See VEG S4.)	VEG G8. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat , salvage harvest should not occur when the affected area is smaller than 5 acres, unless denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed.	(See Guideline VEG G11.)
				VEG G10 Fuel treatment projects within the WUI as defined by HFRA should be designed considering standards VEG S1, S2, S5 and S6 to promote lynx conservation.
				VEG G11 - Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.
LIVESTOCK GRAZING MANAGEMENT ACTIVITIES AND PRACTICES (GRAZ) - Applies to grazing practices and activities in lynx habitat in Lynx Analysis Units (LAUs). They do not apply to linkage areas.				

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Goal & Objective 1.c. 6, Standard 7	GRAZ O1. Manage livestock grazing to be compatible with the improvement or maintenance of lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 8. Manage livestock use in post-fire and post-harvest created openings to assure successful regeneration of the shrub and tree components.	GRAZ S1. In fire- and harvest-created openings, manage livestock grazing to ensure impacts do not prevent successful regeneration of shrubs and trees.	(Same as Alternative B)	(See GRAZ G1)	(See GRAZ G1)
Guideline 4. Manage livestock grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.	GRAZ S2. In aspen stands, manage livestock grazing to ensure impacts do not prevent or inhibit sprout survival sufficient to perpetuate the long-term viability of the clones.	(Same as Alternative B)	(See GRAZ G2)	(See GRAZ G2)
Standard 7. . Manage livestock grazing to maintain or achieve mid-seral or later conditions in shrub-steppe habitats, riparian areas, and willow carrs.	GRAZ S3. Manage livestock grazing in riparian areas, and willow carrs , to contribute to maintaining or achieving a preponderance of mid- or later-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	(Same as Alternative B)	(See GRAZ G3)	(See GRAZ G3)
Goal & Objective 1.c. 6	GRAZ S4. Manage livestock grazing in shrub steppe habitats, in the elevational ranges that encompass forested lynx habitat (within LAUs) to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar the conditions that would have occurred under historic disturbance regimes.	(Same as Alternative B)	(See GRAZ G4)	(See GRAZ G4)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Standard 8	(NA – See GRAZ S1)	(NA – See GRAZ S1)	GRAZ G1. In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.	GRAZ G1. In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.
Guideline 4	(NA – See GRAZ S2)	(NA – See GRAZ S2)	GRAZ G2. In aspen stands, livestock grazing should be managed to contribute to long-term viability of the clones.	GRAZ G2. In aspen stands, livestock grazing should be managed to contribute to the long-term viability of the aspen.
Standard 7	(NA – See GRAZ S3)	(NA – See GRAZ S3)	GRAZ G3. In riparian areas and willow carrs , livestock grazing would be managed to contribute to maintaining or achieving a preponderance of mid- or later-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	GRAZ G3 In riparian areas and willow carrs, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.
Goal & Objective 1.c.6	(NA – See GRAZ S4)	(NA – See GRAZ S4)	GRAZ G4. Livestock grazing in shrub steppe habitats, in the elevational ranges that encompass forested lynx habitat (within LAUs) should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar the conditions that would have occurred under historic disturbance regimes.	GRAZ G4 In shrub-steppe habitats, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs, to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.
HUMAN USES MANAGEMENT ACTIVITIES AND PRACTICES (HU) - The following objectives and guidelines apply to human use projects, such as special uses (other than grazing), recreation management, roads, highways, and mineral and energy development, in lynx habitat in lynx analysis units (LAUs), subject to valid existing rights. They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.				
Goal & Objective 1.c. 6, 1.c.7, Guideline 12	HU O1. Maintain the lynx's natural competitive advantage over other predators in deep-snow by discouraging the	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)

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	expansion of snow compaction activities in lynx habitat.			
Goal & Objective 1.c. 5, 1.c. 6, Guideline 1. Within key landscape linkage areas maintain or improve conditions that allow for lynx movement.	HU O2. Manage recreational activities to maintain lynx habitat and connectivity.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU O3. Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU O4. Provide for lynx habitat needs and connectivity when developing or expanding developed recreation sites or ski areas.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU O5. Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c.8	HU O6. Reduce adverse highway effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity, and to reduce the potential for lynx mortality.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Guideline 12. On federal lands, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU, unless additional designations result in the	HU S1. 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	HU S1. 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 , <i>by LAU or in</i>	(See Guideline HU G10)	(See Guideline HU G10)

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consolidation of unregulated use, and improves lynx habitat through the net reduction of compacted snow areas within higher quality lynx habitat, and landscape linkages. This does not apply to permitted ski areas, winter logging, oil and gas exploration and development, access to private inholdings, and trail re-routes for public safety.	<p>unless the grooming or designation serves to consolidate use and improve lynx habitat.</p> <p>This does not apply within permitted ski area boundaries, to winter logging, reroutes that reduce public risks from avalanches, access to private in-holdings, roads and trails designed and managed for non-winter use, and to other access regulated by HU S3.</p> <p>Special Use Permits, authorizations, or agreements could be allowed to expand inside baseline routes and baseline areas of consistent snow compaction.</p> <p>Grooming could be allowed to expand in side baseline areas of consistent snow compaction, and on routes that have been designated but not groomed in the past.</p>	<p><i>a combination of immediately adjacent LAUs</i> unless the grooming or designation serves to consolidate use and improve lynx habitat.</p> <p>This standard does not apply inside permitted ski area boundaries, to winter logging, reroutes that reduce public risks from avalanches, access to private inholdings, roads and trails designed and managed for non-winter use, and to other access regulated by HU S3.</p> <p>Special Use Permits, authorizations, or agreements could be allowed to expand inside baseline routes and baseline areas of consistent snow compaction.</p> <p>Grooming could be allowed to expand inside baseline areas of consistent snow compaction, and on routes that have been designated but not groomed in the past.</p>		
MA 8.25 Standard 1. When developing large winter recreation facilities, design new trails, roads and lift termini to protect lynx diurnal security habitats in and around proposed developments or expansions.	HU S2. When developing or expanding ski areas, locate trails, access roads and lift termini to maintain and provide lynx diurnal security habitat if it is identified as a need.	(See HU G11)	(See HU G11)	(See HU G11)
Standard 9. Where over-snow access is required for	HU S3. Winter access for non-recreation special uses,	(Same as Alternative B)	HU S3. Winter access for non-recreation special uses	(See Guideline HU G12)

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activities such as non-recreation special use permits, oil and gas exploration and development, access to private in-holdings, or timber sales, restrict use to routes designated by the Forest Service.	and mineral and energy exploration and development, shall be limited to designated routes or designated over-the-snow routes.		shall be limited to designated routes or designated over-the-snow routes.	
MA 8.25 Guideline 1 When designing ski area expansions, provide adequate sized coniferous inter-trail islands, including the retention of coarse woody material, to maintain snowshoe hare habitat.	HU G1. When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris to maintain lynx foraging habitat.	(Same as Alternative B)	(Same as Alternative B)	HU G1. When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris, so winter snowshoe hare habitat is maintained.
MA 8.25 Guideline 2. Evaluate and adjust as necessary, ski operations in expanded to newly developed areas to provide nocturnal foraging opportunities for lynx in a manner consistent with operational needs, especially in landscapes where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	HU G2. When developing or expanding ski areas, nocturnal foraging opportunities should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	(Same as Alternative B)	(Same as Alternative B)	HU G2. When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.
Goal & Objective 1.c. 6, Guideline 1 Within key landscape linkage areas maintain or improve conditions that allow for lynx movement.	HU G3. Recreational development and recreational operational uses should be planned to provide for lynx movement and to maintain effectiveness of lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Guideline 10. Remote sensing of oil and gas drill sites and facilities should be required as the primary method of monitoring.	HU G4. Remote monitoring of mineral and energy development sites and facilities should be encouraged to reduce snow compaction.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
NA - Regulations in Minerals CFR Part 228 Subpart A and Subpart B	HU G5. 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.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU G6. 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 maintenance levels 4 or 5) that would result in substantially increased speeds, traffic volume or potential future use.	HU G6. <i>Methods to avoid or reduce effects to lynx habitat connectivity should be used when upgrading unpaved roads to maintenance levels 4 or 5 where the result would be increased traffic speeds and volumes, or contribute to development or increases in human activity.</i>	(Same as Alternative C)	(Same as Alternative C)
Guideline 6 New trails and roads should be located away from forested stringers. & Guideline 8 Roads should not be built on ridgetops, saddles, and other areas identified as important for lynx habitat connectivity.	HU G7. New permanent roads should not be built on ridge tops and saddles or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers .	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Guideline 5 In order to provide snowshoe hare habitat, roadside brushing should be minimized while providing for public safety on low speed and low volume roads.	HU G8. Cutting brush along low-speed, low-volume roads should be done to the minimum level necessary to provide for public safety.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 10 Close newly constructed roads built for	HU G9. On new roads built for project-specific activities,	(Same as Alternative B)	(Same as Alternative B)	HU G9 If project level analysis determines that

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
project specific activities such as mineral exploration and development or timber sales to public motorized access during project activities. Upon project completion, reclaim or obliterate these roads if not needed for other objectives as documented in the appropriate NEPA document.	public motorized use should be restricted. 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.			new roads adversely affect lynx, then public motorized use should be restricted. Upon project completion, these roads should be reclaimed or decommissioned, if not needed for other management objectives.
Term and Condition #2 from the Biological Opinion	NA	HU G10. Where projects result in a permanent conversion of winter foraging habitat , a project component should be included to treat, through stand regeneration activities and practices, “other lynx foraging habitat” equal to or greater than the number of acres being affected, within the same or adjacent LAU. Focus of these activities should be within mature mesic and mid-seral lodgepole pine stands.	NA	NA
Guideline 12 On federal lands, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU, unless additional designations result in the consolidation of unregulated use, and improves lynx habitat through the net reduction of compacted snow areas within higher quality lynx habitat, and landscape linkages. This does not apply to permitted ski areas, winter	NA (See HU S1)	NA (See HU S1)	HU G10. Designated over-the-snow reroutes or play areas should not expand outside baseline areas of consistent snow compaction by LAU or in a combination of immediately adjacent LAUs, unless designation serves to consolidate use and improve lynx habitat. This does not apply inside permitted ski area boundaries, to winter logging, or rerouting trails for public safety, to accessing private	HU G10 Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs. This does not apply inside permitted ski area

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logging, oil and gas exploration and development, access to private inholdings, and trail re-routes for public safety.			inholdings or to access regulated by HU S3.	boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings or to access regulated by Guideline HU G12. Use the same analysis boundaries for all actions subject to this guideline.
MA 8.25 Standard 1. . When developing large winter recreation facilities, design new trails, roads and lift termini to protect lynx diurnal security habitats in and around proposed developments or expansions.	NA (See HU S2.)	HU G11 When developing or expanding a ski area and trails, access roads and lift termini should be located to maintain and provide lynx diurnal security habitat .	(Same as Alternative C)	HU G11 When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat .
	NA	NA	NA	HU G12 Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes or designated over-the-snow routes.
LINKAGE AREAS (LINK) - The following objective, standard and guidelines apply to all practices and activities within linkage areas, subject to valid existing rights.				
Goal & Objective 1c.9	LINK O1. In areas of intermixed land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Goal & Objective 1c.8	LINK S1. When highway construction or reconstruction is proposed in linkage areas , identify potential highway crossings	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 7	LINK S2. Manage livestock grazing in shrub steppe habitats to contribute to maintaining or achieving a preponderance of mid- or late-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	(Same as Alternative B)	(See LINK G2)	(See LINK G2)
Goal & Objective 1c.9, SRNF FP under Real Estate p. 2-38 Standard 1 and p. 2-40 Guideline 4	LINK G1. National Forest System lands should be retained in public ownership.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 7	NA - See LINK S2.	NA - See LINK S2.	LINK G2. Livestock grazing in shrub steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	(Same as Alternative D)
Guideline 13. Design new winter use activities to minimize effects on habitat needs for Canada lynx. Options include, but are not limited to: <ul style="list-style-type: none"> • Move the activity • Place seasonal or daily restrictions on the activity. Modify the activity				

Table S-2 – Monitoring

MONITORING				
WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
Goal & Objective 1c.7 Term and Condition #3 from Biological Opinion Mapping of snow compaction (B1/C2/D4)	1. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998-2000 within one year and monitor every five years.	1. Monitor and evaluate annually under what conditions and extent fuels treatment projects occur in lynx habitat. 2. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998-2000 within one year and monitor every five years.	1. Monitor and evaluate annually under what conditions and extent fuels treatment projects occur in lynx habitat. 2. Monitor and evaluate annually under what conditions and extent fossil fuel exploration and development practices and activities occurs in linkage areas. 3. Monitor and evaluate annually under what conditions and extent standard ALL S2 is applied. 4. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998-2000 within one year and monitor every five years.	1. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998 to 2000. The mapping is to be completed within one year of this decision, and changes in activities and routes are to be monitored every five years after the decision. 2. Annually report the number of acres where any of the exemptions 1 through 4 listed in Standard VEG S5 were applied. Report the type of activity, the number of acres, and the location (by unit, and LAU). 3. Report the acres of fuel treatment in lynx habitat within the wildland urban interface as defined by HFRA when the project decision is approved. Report whether or not the fuel treatment met the vegetation standard. If standard(s) are not met, report which standard(s) were not met, why they were not met, and how many acres were affected.

Table S-3 Comparison of Alternatives by Key Issue Considering All National Forest Units in the Southern Rockies Amendment Area

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
Lynx Productivity, Mortality and Movements					
a. Forest management activities such as timber harvest, precommercial thinning, grazing, fire, salvage harvest may impact lynx productivity by affecting denning and foraging habitat.	Leads to “Likely to adversely affect” determination in 1999 Biological Assessment on existing Forest Plans. The White River and Medicine Bow NFs completed subsequent consultations, and the Revised Plans no action effects are similar to Alternative B.	Adds regulatory direction to protect important components of lynx habitat.	Effects similar to Alternative B, but allows for combination of LAUs to address unsuitable habitat standard.	Effects similar to Alternative B. Exceptions in standard VEG S5 and the ALL S2 standard may lead to adverse effects.	Effects similar to Alternative B, but allows for combination of LAUs to address unsuitable habitat standard.
b. Activities resulting in snow compaction may affect lynx productivity by a reduction in the prey resource as a result of allowing competing predators into lynx habitat areas during the winter on the compacted routes and areas.	Contributes to “Likely to adversely affect” determination in 1999 BA on existing Forest Plans The White River and Medicine Bow NFs completed subsequent consultations, and the Revised Plans no action effects are similar to Alternative B.	Adds regulatory direction that limits new snow compaction areas.	Effects similar to Alternative B, but allows for combination of LAUs to address snow compaction standard.	Effects similar to Alternative B. The exceptions to standards in VEG S5 and the ALL S2 may lead to adverse effects.	Effects similar to Alternative B, but allows for combination of LAUs to address unsuitable habitat standard.
c. Landscape connectivity can be affected by Forest Service	Important factor contributing to the “Likely to adversely affect” in the 1999 BA	Adds provisions for the maintenance of connectivity between patches of lynx habitat	Effects similar to Alternative B.	Effects similar to Alternative B. The exceptions to standards in VEG S5 and the ALL S2 may lead to adverse	Effects similar to Alternative B.

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
management activities, which can negatively impact lynx movements (and therefore productivity), and can increase mortality.	for existing Forest Plans. The White River and Medicine Bow NFs completed subsequent consultations, and the Revised Plans no action effects are similar to Alternative B..	and within lynx linkage areas.		effects.	
Probability of Lynx Persistence	Substantial decreases in probability of lynx persistence, as compared to Alternative B. The White River and Medicine Bow NFs completed subsequent consultations, and the Revised Plans no action effects are similar to Alternative B.	Adds management direction that would be likely to maintain lynx productivity and movements in the SRMGA.	Slightly decreases probability of lynx persistence, as compared to Alternative B, but provides management direction that maintains sufficient habitat quality/quantity, with some gaps in habitat distributions.	Decreases probability of lynx persistence, as compared to Alternative B, but greater than Alternative A. Management direction may not ensure sufficient habitat quantity, quality, distribution, and other conditions to provide for lynx productivity.	Slightly decreases probability of lynx persistence, as compared to Alternative B, but provides management direction that maintains sufficient habitat quality/quantity, with some gaps in habitat distributions.
Public Safety					
The proposed amendment may limit construction of defensible fuel profiles around dwellings and structures, and may limit vegetation treatments to create defensible fuels profiles in support of the	Current management emphasis and direction are maintained under current Forest Plan direction.	Fire hazard thinning prohibited unless stands no longer provide snowshoe hare habitat, thereby may impact ability to create defensible space or defensible fuels profiles.	Fire hazard thinning allowed within 200 feet of dwellings or other structures and landscape settings critical for the creation of defensible fuels profiles. Allows fire use practices and activities to restore ecological processes that maintain or improve lynx habitat.	Does not limit fire hazard thinning to within 200 feet of structures, thereby allowing the creation of defensible fuels profiles.	Does not limit fire hazard thinning to within 200 feet of structures, thereby allowing the creation of defensible fuels profiles.

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
Fire Use Program.					
Human Uses					
The proposed amendment may negatively impact human uses of the forest by limiting winter recreation opportunities (i.e. snowmobiling, cross country skiing, ski area expansion).	<ul style="list-style-type: none"> - Expansion of groomed and ungroomed trails would continue to grow by about 20%. Except on the White River and Medicine Bow NFs. - Quality winter recreation would continue to expand as increase use expands. - Winter recreation use for both motorized and non-motorized visitors would increase by an additional 4.4 million forest visits. -Growth in the number of outfitter and special uses would continue to slow as capacities are reached. -Existing and potential ski areas would continue to be managed according to the direction in existing Forest Plans. 	<ul style="list-style-type: none"> - Expansion of total groomed and ungroomed trails would be limited to existing snow compacted areas. Some existing ungroomed trails could be converted into groomed trails, allowing the groom trail system to expand by about 20%. - Winter recreation would experience additional crowding and conflict, as opportunities to expand are restricted. - Winter recreation use for both motorized and non-motorized visitors would increase by an additional 4.4 million forest visits. -Growth in the number of outfitter and special uses would continue to slow as capacities are reached and expansions under permits or authorizations would be limited to existing groomed or designated routes but able to expand into areas of consistent snow compaction. -Ski area expansions would incorporate design strategies to provide diurnal lynx security habitat. 			
The proposed amendment may impact human uses of the forest by limiting timber	Average Annual Acres of Accomplished Precommercial Thinning in a 5-year	Average Annual Acres of Precommercial Thinning: 3,040 acres. Regeneration harvest acreage remains	Average Annual Acres of Precommercial Thinning: 3,040 acres. Regeneration harvest acreage remains	Average Annual Acres of Precommercial Thinning: 3,750 acres. Regeneration harvest acreage remains	Average Annual Acres of Precommercial Thinning: 3,750 acres. Regeneration harvest acreage remains

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
harvest opportunities.	period: 4,700 acres. Regeneration harvest average of 4,000 acres annually	approximately 4,000 acres annually.	approximately 4,000 acres annually.	approximately 4,000 acres annually.	approximately 4,000 acres annually.
The proposed amendment may impact human uses of the forest by limiting land adjustment opportunities.	Possible loss of lynx habitat through conveyance, or the acquisition of lynx habitat through purchase or exchange. The White River includes specific direction and management area direction.	Requirement to retain NFS lands in linkage areas could affect future exchanges or limit federal parcels available for exchange			
The proposed amendment may impact human uses of the forest by limiting lands special use proposal options.	Current management emphasis and direction are maintained under current Forest Plan direction.	There may be some limitations or constraints on options for location of facilities (communication sites, etc).			

How the Final Environmental Impact Statement is Organized

FEIS Volume 1

Chapter 1

Chapter 1 discusses the purpose and need for the proposed amendment, describes the proposed action, as well as the scope of the decision.

Chapter 2

Chapter 2 presents the key issues, and then describes alternatives to the proposed action that respond to the issues brought up during scoping.

Chapter 3

Chapter 3 describes the affected environment and discloses the environmental consequences of the alternatives.

Appendices

A – Interdisciplinary Team Members

B – Literature Cited and References

C – Glossary

D – Linkage Zone Descriptions

E – Proposed Action and Original Proposed Action Crosswalk

F – Canada Lynx Habitat Mapping Process

G – Management Indicator Species

H - Management Direction Applicable to Alternative F

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Chapter 1- Purpose and Need

Purpose and Need

The purpose and need for the amendment is to establish management direction that conserves and promotes the recovery of lynx, and reduces or eliminates potential adverse effects from land management activities and practices on national forests in the Southern Rockies, while preserving the overall multiple-use direction in existing Forest Plans.

This management direction is needed to comply with provisions of the 1982 National Forest Management Act (NFMA) regulations, to provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species. This action is also needed to assure that forest plans provide adequate management direction to conserve the lynx and its habitat, as required by the Endangered Species Act.

To provide consistency, management direction is considered for all identified forests, rather than addressing each plan individually. Future adjustments to individual plans may occur as they are subsequently amended or revised in accordance with the requirements of the NFMA.

Background

Canada lynx (*Lynx canadensis*) inhabit moist coniferous forests that are subject to cold, snowy winters and provide a prey base of snowshoe hare.

In the United States, Canada lynx or lynx occur mostly on federal lands, especially in the west. The lynx occupies habitat on National Forest System lands in Regions 1, 2, 4, 6 and 9. It also occurs in Region 10 (Alaska) but is not listed there as a threatened species.

On July 8, 1998, the U.S. Fish and Wildlife Service (FWS) proposed to list the lynx as a threatened species. The Forest Service and Bureau of Land Management (BLM) responded to the declining status of lynx in 1998 by establishing a science team of international experts in lynx ecology to collect and summarize scientific data. This effort resulted in the publication of *Ecology and Conservation of Lynx in the United States* (USDA FS 1999).

A team of agency biologists developed the *Canada Lynx Conservation Assessment and Strategy* (LCAS) (Ruediger et al. 2000) based on information compiled by the science team. The LCAS recommended conservation measures to be applied to lynx habitat on all federal lands in the contiguous United States. These conservation measures focus on managing vegetation consistent with succession and disturbance patterns, maintaining dense understory conditions for prey, reducing snow compaction, and identifying and maintaining connectivity within and between habitat areas.

In December 1999, the Forest Service and BLM prepared a *Biological Assessment* of 57 Forest Service and 56 BLM land management plans. The assessment found the land management plans were likely to adversely affect lynx because they allowed activities that may not conserve lynx habitat.

In February 2000, five Regional Foresters and four FWS Regional Directors signed a *Lynx Conservation Agreement*, to promote the conservation of lynx and its habitat. The agreement provides that the agency review and consider recommendations in the LCAS before making any new decision to undertake actions in lynx habitat, and changes in Forest Service management direction will be made through amendment or revision of Land and Resource Management Plans (Forest Plans).

The FWS listed the lynx as threatened, effective April 24, 2000. The FWS concluded the chief threat to the lynx in the contiguous United States was the lack of guidance to conserve the species in federal land management plans.

Formal consultation, as required by the Endangered Species Act (ESA), was completed on October 25, 2000, when the FWS issued its *Biological Opinion* on the plans. In the opinion, the FWS concluded that the plans as implemented in conjunction with the conservation agreement are not likely to jeopardize the continued existence of the lynx. The FWS no jeopardy conclusion for National Forest System lands is based upon continued consideration of the LCAS and science report until such time that Forest Plans are amended or revised to consider the needs of lynx.

In July 2003, the FWS issued a Notice of Remanded Determination of Status for the contiguous United States population of lynx (USDI FWS 2003). In it, the FWS reaffirmed its decision to list the lynx as threatened, rather than endangered.

The desired condition for the analysis area is to provide for the conservation and promote the recovery of lynx by maintaining or creating additional lynx foraging, denning, and linkage habitat while preserving the overall multiple-use direction in existing plans.

The State of Colorado, Department of Natural Resources, is a Cooperating Agency as defined in the Code of Federal Regulations (CFR) 40 part 1508.5 in the development of this Environmental Impact Statement (EIS) due to their special expertise in respect to lynx in Colorado.

Administrative Units included in the Amendment

The LCAS identifies five geographic areas that provide habitat for lynx in the United States. According to the schedule agreed upon in the conservation agreement signed with the FWS in 2000, the Forest Service initiated planning for seven national forests in the Southern Rockies Geographic Area in the Rocky Mountain Region in the states of Colorado and Wyoming. *The number of Forest Plans affected by this amendment differs from the number of units involved because of unit consolidation.* The amendment applies only to National Forest System (NFS) lands identified as lynx habitat or linkage areas. The area covered by this amendment is comprised of 14.6 million acres of NFS lands, with about 7.5 million acres (51 percent) mapped as lynx habitat within Lynx Analysis Units (LAU). National Forest units and Forest Plans affected by this amendment are listed in Table 1-1.

Table 1- 1 - National Forest Units and Forest Plans Affected by This Amendment

National Forest	Affected Forest Plan	State
Arapaho-Roosevelt	1997 Revision Arapaho-Roosevelt Forest Plan	Colorado
Pike-San Isabel	Pike-San Isabel Forest Plan, 1984	Colorado
Grand Mesa-Uncompahgre-Gunnison	1983 Grand Mesa-Uncompahgre-Gunnison Forest Plan	Colorado
San Juan	San Juan Forest Plan, 1983	Colorado
Rio Grande	Revised Rio Grande Forest Plan, 1996	Colorado
Medicine Bow-Routt	Medicine Bow Revised Forest Plan, Dec. 2003 Routt Forest Plan, 1997 Revision	Wyoming Colorado
White River	White River Forest Plan 2002 Revision	Colorado

The Arapaho-Roosevelt, Rio Grande, Routt, Medicine Bow and White River National Forests have completed revisions to their forest plans. The decision to be issued for the Southern Rockies Canada Lynx Amendment will amend the revised management direction for these national forests. The forest plans for the Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison and San Juan National Forests are currently being revised. The decision to be issued for the Southern Rockies Canada Lynx Amendment would amend the direction provided in the existing forest plans.

The Forest Plans of four National Forests in the Rocky Mountain Region are not included in this proposed amendment, as noted below.

- ♦ The Nebraska and Black Hills National Forests do not support lynx or lynx habitat.
- ♦ The Bighorn and Shoshone National Forests were included as part of the Northern Rockies Geographic Area Lynx Management Direction.

Figure 1 shows a map of the analysis area for the Southern Rockies Geographic Area, the proposed amendment area. Linkage zone descriptions are found in Appendix D.

Lynx Conservation and Assessment Strategy - Risk Factors

The LCAS and the *Biological Assessment* identified management activities and practices that may degrade lynx habitat and described these as “risk factors.” The analysis of the risk factors provided the framework for conservation recommendations in the LCAS, which in turn provides the substance of the proposed action. Reducing or eliminating these risk factors is part of the purpose and need. Chapter 2, Comparison of Alternatives discusses how the alternatives address them. The following is a summary of the risk factors identified in the LCAS. See the LCAS Chapter 2 for a detailed discussion of each factor.

Risk factors affecting lynx productivity

- ♦ Timber management
- ♦ Wildland fire management
- ♦ Livestock grazing
- ♦ Recreational uses
- ♦ Forest backcountry roads and trails
- ♦ Other human developments

Lynx require certain habitat elements in order to exist. Generally, these elements include denning and foraging habitat. Denning habitat is found in areas that provide large woody debris, either down logs or root wads. Foraging habitat is found on sites that contain a high number of young trees or shrubs that are tall enough to protrude above the snow. These conditions may occur in early successional stands following some type of disturbance, or in older forests with a substantial understory of shrubs and young conifer trees. Activities, such as timber management, fire suppression and livestock grazing, can affect the amount, distribution and condition of lynx denning and foraging habitat.

Predators may also affect lynx productivity. Lynx have developed a competitive advantage in places where the deep, soft snow tends to exclude other predators in mid-winter, a time when prey is most limiting. Activities that result in providing access to predators are a potential risk factor. These activities include winter recreation, winter use of forest roads and trails and other human developments.

Risk factors affecting mortality

- ♦ Trapping
- ♦ Predator control
- ♦ Shooting
- ♦ Highways
- ♦ Predation by other species

Several factors can directly affect lynx mortality. However, leghold trapping is no longer allowed in Colorado; shooting can occur but is regulated by State agencies; and predator control activities are conducted by APHIS-Wildlife Services. These activities are not under the jurisdiction of the Forest Service, and therefore these risk factors are not addressed in this EIS.

Highways are a known source of direct mortality. Activities that increase the presence of competing predators also can be a factor in lynx mortality by reducing the amount of prey available, resulting in starvation of the lynx.

Risk factors affecting movement

- ♦ Highways and associated developments
- ♦ Private land development

Lynx have large home ranges and may move long distances. Activities such as highways and associated developments may impede lynx movements. The Forest Service has jurisdiction only on National Forest System lands. These factors are addressed to the extent that the Forest Service can coordinate with agencies responsible for state and federal highways and work cooperatively with adjoining private landowners.

The FWS decision to list lynx as threatened was based on a five-factor analysis, to determine what factors threaten the lynx population as a whole. Threats to lynx populations influenced by national forests and BLM land management include timber harvest regimes and fire suppression, as well as the lack of guidance to address these threats in existing land use plans. Lynx conservation and recovery requires that land use plans address these threats.

Southern Rockies Lynx Habitat

September 2006

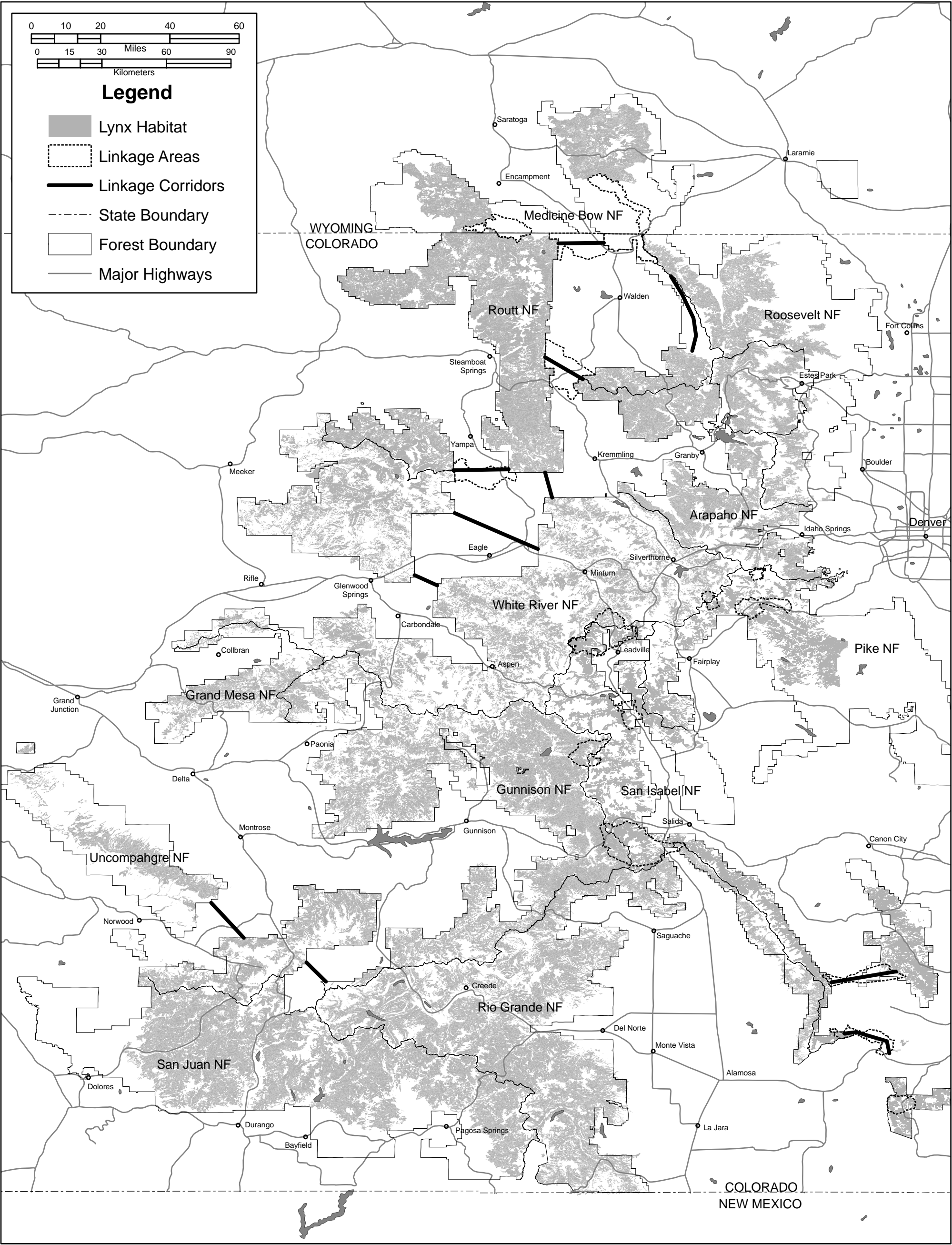


Figure 1 - Map of Analysis Area

Proposed Action

The Forest Service proposes to amend eight Forest Plans in Colorado and Wyoming to provide conservation and recovery of the lynx, a threatened species.

The proposed amendment would add or modify management direction consisting of one or more of the following components:

- ♦ Goals: general descriptions of desired end results;
- ♦ Objectives: measurable statements of desired resource conditions;
- ♦ Standards: management requirements designed to achieve objectives;
- ♦ Guidelines: management actions that would normally be used to achieve objectives; and
- ♦ Monitoring requirements.

The proposed action from scoping, Alternative B, is described in detail in Table 2-1 along with the other alternatives considered in detail. The initial proposed action was re-worded from that presented in the initial scoping document to improve clarity and remove redundancy. See Appendix E for a crosswalk between the initial proposed action and the proposed action clarified. The proposed action, as referenced throughout this document, refers to the proposed action clarified, which is Alternative B.

The proposed action is based on conservation measures in the LCAS. The measures from the LCAS were reorganized and described in forest planning language to facilitate incorporation into the Forest Plans. During the transformation, the original intent of the measures in the LCAS was preserved.

The amendment applies only to National Forest System (NFS) lands identified as lynx habitat or linkage areas. See Appendix F for a description of the lynx habitat mapping procedures to be used by forest biologists during project level planning.

Decision Framework

Planning for units of the National Forest System involves making two levels of decisions. The first stage is the development of a Forest Plan and any subsequent amendments that provide programmatic direction. The second level of planning involves the analysis and implementation of management practices designed to achieve the goals and objectives of the Forest Plan. This second stage involves a site-specific analysis to meet the National Environmental Policy Act (NEPA) requirements of project decision-making.

This is a programmatic EIS prepared to evaluate the effects of the proposed action, and to look at alternate ways of achieving the purpose and need in response to the key issues as described in Chapter 2. This amendment is being completed using the provisions of the 1982 planning regulations.

The responsible official will decide whether or not to amend Southern Rockies Forest Service Land and Resource Management Plans for the Southern Rockies Geographic Area to incorporate direction on lynx conservation and recovery.

Responsible Official

Rick D. Cables, Regional Forester, USDA-Forest Service, Rocky Mountain Region, 740 Simms St., Golden, CO, 80401.

Scope

“Scope” is defined in 40 CFR 1508.25 as the range of actions, alternatives and impacts to be considered in an environmental analysis. The proposed action and alternatives consists of the goals, objectives, standards, and guidelines. The EIS addresses their reasonably foreseeable effects.

To determine the scope of an EIS, the agency shall consider three types of actions, three types of alternatives, and three types of impacts.

1. **Connected actions** - Connected actions are closely related actions that:

- ♦ Automatically trigger other actions;
- ♦ Cannot or will not proceed unless other actions are taken previously or simultaneously; or
- ♦ Are interdependent parts of a larger action and depend on that larger action for their justification.

The proposed action and alternatives include management direction needed to fulfill the identified purpose and need.

There are other planning efforts underway to address lynx management, such as a proposed amendment for forests in the Northern Rockies geographic area. These actions are not considered connected because:

- ♦ The plans will not automatically trigger other actions because the planning areas have different ecological conditions and management histories; and
- ♦ Each plan can stand on its own and, there are no actions that need to occur previous to or simultaneously with the implementation of each plan; and
- ♦ The two plans are not interdependent parts of a larger action and are not dependent on a larger action for their justification. The decisions can be made independently under NFMA.

2. **Cumulative actions** - Cumulative actions are those which, when viewed with past, other present and reasonably foreseeable actions, may have cumulatively significant impacts and therefore should be discussed in the same environmental analysis.

Other relevant actions on Forest Service, other federal, tribal, state and private lands have been evaluated where information is available to determine the cumulative effects on various resources. This analysis is described in Chapter 3.

3. **Similar actions** - Similar actions are those that coincide in timing or geographic proximity with the proposed action. These actions may be considered in the same environmental analysis as the proposed action and its alternatives.

Alternatives analyzed - The analysis evaluates three types of alternatives including:

1. No Action alternative (Alternative A),

2. The Proposed Action (Alternative B)
3. Other courses of action (Alternatives C, D and F).

Alternatives C, D and F were developed to address issues raised by public comments..

Impacts Considered - The analysis evaluates direct, indirect and cumulative effects of the proposed action, and alternatives, including the No Action alternative.

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Chapter 2 – Issues and Alternatives

Introduction

Chapter 2 describes the proposed action developed in response to the purpose and need identified in Chapter 1. It includes descriptions of alternatives to the proposed action, identifying options for resolving issues raised during scoping. It also describes a no action alternative, defined as no change from the direction already provided in existing plans.

The proposed action and its alternatives are programmatic in nature – they do not prescribe any site-specific activities on the ground. They are not irreversible decisions; they may be amended again or revised as needed, subject to Endangered Species Act (ESA) consultation with the USDI Fish and Wildlife Service (FWS).

After an alternative selection has been made, any site-specific activity would be subject to separate National Environmental Policy Act (NEPA) review and decision. Separate ESA consultation with the FWS would take place, as appropriate, if analysis showed a proposed project may affect lynx or its habitat.

Scoping

The Notice of Intent to prepare an Environmental Impact Statement for the proposed amendment was published on March 28, 2000 in the *Federal Register* (USDA Forest Service 2000a). On June 30, 2000 a notice was published in the *Federal Register* (USDA Forest Service 2000b) that replaced the March notice. On December 30, 2004 a revised notice was published in the *Federal Register* (USDA Forest Service 2004a) to inform the public of the intent to supplement the Southern Rockies Canada Lynx Amendment Draft Environmental Impact Statement (USDA Forest Service 2004b).

An official website can be viewed at www.fs.fed.us/r2/projects/lynx/.

Comments were solicited from individuals and organizations, and from federal, state and local agencies interested in or affected by the proposed action.

Issues

The National Environmental Policy Act directs that federal agencies shall “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflict concerning alternative uses of available resources.” Three Key Issues were identified that reflect conflicts that may be resolved by developing alternatives that meet the purpose and need.

The following describes the Key Issues and Other Issues identified for this analysis and factors used to describe the effects of the alternatives.

Key Issues

Three Key Issues were identified. These issues drove the formulation of alternatives and the subsequent environmental analysis of the alternatives.

1. Lynx Productivity, Mortality and Movements - brought forward from the purpose and need discussion in Chapter 1:
 - a. How can forest management activities such as timber harvest, precommercial thinning, grazing, fire, salvage harvest be harmonized with lynx denning and foraging habitat needs.
 - b. How can human use activities resulting in snow compaction be harmonized with the need to maintain the competitive advantage of lynx productivity in deep snow areas during the winter.
 - c. How can landscape connectivity be maintained to allow lynx movements and minimize risk of mortality?
2. Public Safety - How can vegetation treatments to create defensible fuels profiles in the proximity of human communities be harmonized with creating and maintaining desired lynx habitat conditions.
3. Human Uses - How can winter recreation (i.e. snowmobiling, cross country skiing, ski area expansion), minerals, timber harvest, land adjustments, and lands special use activities and practices be harmonized with creating and maintaining desired lynx habitat conditions.

Other Issues

Two Other Issues were identified. These issues did not drive the formulation of alternatives, but were considered in alternative development and the subsequent environmental analysis of the alternatives.

1. Management Indicator Species (MIS) - Will the proposed action or the alternatives affect the ability to achieve existing Forest Plan goals, objectives, or standard and guidelines for MIS.
2. Other Threatened, Endangered, and Proposed Species - Will the proposed action or the alternatives change the expected effects of the Forest Plans on federally listed species (plant and animal), other than the lynx.

Alternatives

An environmental impact statement must “rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for why they were eliminated” per 40 CFR 1502.14(a). The courts have established that this direction does not mean every conceivable alternative must be considered, but that the selection and discussion of alternatives must permit a reasoned choice and foster informed public participation and decision-making. A

reasonable alternative is one that meets the purpose and need and responds to one or more of the key issues.

The range of alternatives presented in this chapter was developed by evaluating comments in the context of the purpose and need. Other considerations included available scientific information on conserving the Canada lynx, the listing decision, and Endangered Species Act (ESA) requirements. Within these parameters, the alternatives display a reasonable range of programmatic direction to guide future project implementation, while responding to the issues and still meeting the purpose and need.

In addition to the four alternatives considered in detail, six alternatives were considered but eliminated from detail study. There is a brief explanation for each of the eliminated alternatives stating why they were not considered in detail. A comparison of the proposed action and the three other considered alternatives is displayed in Table 2-1.

Alternative A - No Action

Analyzing a no action alternative is a requirement of NEPA and Forest Service planning procedures. In this case, it means no change in current management (i.e., no amendment to current Forest Plans). However, this alternative may not provide for lynx persistence and recovery in the Southern Rocky Mountains Geographic Area (SRMGA), nor comply with the ESA requirements.

The No Action alternative is based on the management areas, standards and guidelines in the current Forest Plans. The No Action alternative is also based on policies and analysis requirements in the current Code of Federal Regulations and Forest Service Manual and Handbook direction including the road analysis requirements.

Except for the White River and the Medicine Bow Forest Plans, the No Action alternative does not include the conservation measures in the LCAS. While the Forest Service has been using the LCAS to evaluate projects in accordance with their Conservation Agreement with the US Fish and Wildlife Service, the measures have not been adopted as plan direction for the Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, San Juan, Rio Grande and Routt National Forests. The White River and Medicine-Bow National Forests released their Records of Decision for their Revised Land and Resource Management Plans in the spring of 2002 and fall of 2004, respectively.

Alternative B

Alternative B provides for the conservation and recovery of the Canada Lynx. Alternative B is based on the *Canada Lynx Conservation Assessment and Strategy* (LCAS) and includes management direction for vegetation and human use management activities and practices in lynx habitat and linkage areas. Alternative B is designed to address activities on NFS lands that can affect lynx and their habitat.

Timber and Wildland Fire Management

Timber and wildland fire management both can affect the amount of lynx forage and denning habitat. The proposed action would add management direction to provide certain habitat conditions.

Objectives describe desired conditions.

- ♦ Objectives **VEG O1** and **VEG O3** focus on using fire and timber management to emulate natural ecological processes.
- ♦ Objective **VEG O2** notes forage habitat should be near denning habitat.

Objectives **VEG O3** and **VEG O4** encourage using fire and timber management to develop lynx foraging habitat.

Standards set sideboards for projects.

Standard **VEG S1** limits to 30 percent in an LAU, the amount of lynx habitat that should be in an unsuitable condition. “Unsuitable habitat” is very young forests, where the trees are generally less than 15 to 40 years old, and the vegetation has not yet grown up enough to support snowshoe hares year round. Over time, it will grow into foraging habitat. The standard is meant to ensure lynx habitat is maintained at the scale of a lynx home range. Standard **VEG S1** is not intended to imply wildfires should be suppressed where the result of a fire would be that the standard was exceeded. The standard is based on general information about natural ecological conditions, and does not apply if a broad scale assessment substantiates different natural ecological levels.

Standard **VEG S2** limits to 15 percent in 10 years the amount of lynx habitat in an LAU that can be made unsuitable because of timber harvest. Timber harvest is not an exact ecological substitute for natural disturbance processes (LCAS pp. 2-2 through 2-3). Limiting the amount of timber harvest would allow for the natural disturbance processes – fire, insect and diseases – to play their natural ecological roles producing unsuitable habitat, and later, foraging conditions.

Standards **VEG S3** and **VEG S4** direct denning habitat be maintained.

Standard **VEG S5** limits precommercial thinning so that existing lynx foraging habitat will be maintained. Exceptions are made for safety and protecting property.

Standard **VEG S6** provides for the management of older Engelmann spruce-subalpine fir stands to provide snowshoe hare habitat.

Guidelines identify ways to meet the objectives.

Guideline **VEG G1** encourages managers to create foraging habitat where it’s lacking.

Guidelines **VEG G2 and VEG G3** note denning habitat needs and proximity to foraging habitat should be considered when timber and fire projects are designed.

Guideline **VEG G4** notes using fire should not create new trails that will lead to more snow compaction, and permanent firebreaks should not be built on ridges and saddles.

Guideline **VEG G5** notes habitat for red squirrels should be provided.

Livestock grazing

Livestock grazing may reduce lynx foraging habitat, especially where very young forests are re-growing, in stands of aspen and in wet areas. Livestock grazing also may reduce shrub-steppe habitat, which provides cover and prey for lynx when they're traveling.

Objective **GRAZ O1** notes grazing should be managed in a way that maintains or improves lynx habitat.

Standard **GRAZ S1** notes to manage so that shrubs and trees can re-grow.

Standard **GRAZ S2** notes to manage so aspen can survive.

Standards **GRAZ S3** and **GRAZ S4** note that in wet areas and shrub-steppe habitats, historic natural conditions should be emulated.

Human uses

Recreational use, forest backcountry roads and trails and other human developments may reduce lynx habitat connectivity or, by compacting snow, may provide a way for other predators to move into lynx habitat.

Objective **HU O1** and Guideline **HU G4** discourage snow-compacting activities in lynx habitat.

Objectives **HU O2**, **HU O4** and **HU O5**, and Guidelines **HU G1**, **G2**, **G3** and **G5**, provides for lynx habitat.

Objectives **HU O2**, **HO O3**, **HU O4**, **HU O 5** and **HU O6**, and Guidelines **HU G2**, **HU G3**, **HU G6**, **HU G7**, **HU G8** and **HU G9** maintains lynx habitat connectivity.

Standard **HU S1** maintains the status quo for snow-compacted areas. This would not limit dispersed use.

Standard **HU S3** controls where winter access other than for recreation may occur.

Standard **HU S2** maintains and provides diurnal security habitat in ski area expansions where needed.

Highways and Private Land Developments

Highways and private land developments may affect lynx connectivity or mortality.

Objectives **ALL O1**, **LINK O1** provides lynx habitat connectivity.

Objective **LINK O1** encourages working with private landowners to reduce impacts to lynx.

Standard **ALL S1** ensures developments and vegetative management projects provide lynx habitat connectivity.

Standard **LINK S1** identifies potential highway crossings.

Standard **LINK S2** directs managing shrub-steppe habitats to provide habitat connectivity.

Guideline **ALL G1** provides habitat connectivity by use of highway-crossing structures.

Guideline **LINK G1** retains National Forest System lynx habitat in public ownership.

Alternative C

Alternative C provides for the conservation and recovery of the Canada lynx by adding direction similar to LCAS, and was designed to respond to Key Issues concerns about restrictions on new snowmobile trails, providing for lynx foraging habitat in multistory forests, and precommercial thinning restrictions. The changes from Alternative B are:

Standard **VEG S1** is changed to increase the scale at which it's applied. Alternative C would apply the 30 percent standard to either an LAU or a combination of adjacent LAUs, so disturbance processes like fire could be factored in. In Alternative C, the standard would no longer limit the use of prescribed fire.

Standard **VEG S2** is changed to a guideline to allow additional flexibility in project planning.

Standard **VEG S4** changed to allow salvage logging in disturbed areas smaller than 5 acres, when such areas are within 200 feet of administrative sites, dwellings, and outbuildings. This would provide for most fire and fuel management activities and practices.

Standard **VEG S5** changed to apply to all vegetation management and to allow projects for research and genetic tests, to learn more about the effects of thinning and continue the genetic tree improvement program. It would provide for most fire and fuel management activities and practices.

Standard **VEG S6** would provide for carrying out most fire and fuel management activities and practices for the purposes of protection or ecological restoration.

Standard **HU S1** is changed to increase the scale at which it's applied. The no-net-increase standard for groomed or designated routes may be applied to either an LAU or a combination of immediately adjacent LAUs, to manage winter recreation more effectively.

Standard **HU S2** is changed to a guideline. Not all ski areas need to provide diurnal security habitat. Diurnal security habitat can be provided adjacent to ski areas, not just inside them. However, diurnal security does need to be taken into consideration when ski areas are developing or expanding.

Guideline **HU G6** changed emphasis from "avoid" to reduce effects of upgrading roads, if upgrading leads to substantial increases in traffic volumes or speeds. Some roads may be proposed for upgrades to reduce pollution, or to ensure safety and reduce maintenance.

Guideline **HU G10** was added to mitigate the effects from projects that result in winter forage habitat conversions by improving "other lynx habitat."

Alternative D

Alternative D was designed to go further in responding to the Key Issues than Alternative C while still contributing to the conservation of Canada lynx. It was developed to provide a broader range of alternatives and provides greater flexibility for multiple use management. This alternative adds direction similar to LCAS, but partially responds to concerns about restrictions on new snowmobile trails, precommercial thinning, fuel

reduction projects associated with communities at risk of wildfires, and modifies standards so that they may be more flexible so as to address local situations and new information. In addition to improving management direction for lynx, this alternative best responds to Executive Order 13212 of May 18, 2001, *Actions to Expedite Energy-Related Projects*, and to *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy* (USDA Forest Service 2001). The changes from Alternative C are:

Standard **ALL S1** was modified to provide assurance that collaborative fuels reduction and fossil fuels projects would not be affected by the standard.

Standard **ALL S2** was added to allow a project to go forward under certain circumstances without a Forest Plan amendment if it deviates from a lynx standard but is determined to not likely to adversely affect lynx or if it may result in short-term adverse effects to lynx but if long-term benefits to lynx and its habitat would result.

Standards **VEG S1 and S3** were modified to provide assurance that collaborative fuels reduction projects would not be affected by the standard.

Standard **VEG S4** was changed to a guideline (VEG G8) noting salvage logging should be limited after a disturbance kills trees in areas of 5 acres or less.

Standard **VEG S5** was changed to allow projects that would encourage lodgepole pine forests to develop old-growth characteristics. This standard provides assurance that collaborative fuels reduction projects would not be restricted by this standard.

Guideline **VEG G6** that addressed managing for mature and late successional stage spruce-fir stands was added in place of the Standard **VEG S6**.

Guideline **VEG G8** was added for disturbances in place of Standard **VEG S4**.

Guidelines **GRAZ G1, G2, G3 and G4** that pertain to livestock grazing management were added in place of the Standards **GRAZ S1, S2, S3 and S4** in response to the U.S. Fish and Wildlife Service's determination that grazing is not a threat to lynx.

Guideline **HU G10**, as it appears in Alternative C was dropped. This guideline mitigated the effects from projects that result in winter forage habitat conversions.

Guideline **HU G10** was added in place of Standard **HU S1** in response to the U.S. Fish and Wildlife Service's determination that snow compaction is not a threat to lynx.

Guideline **LINK G2** was added in place of Standard **LINK S2** in response to the U.S. Fish and Wildlife Service's determination that livestock grazing is not a threat to lynx.

Alternative F

Alternative F addresses the issues of wildland fire risk, the Healthy Forests Initiative, and the Healthy Forests Restoration Act, while contributing to lynx conservation. It responds to statements made in the Remand Notice (USDI FWS, 2003) that FWS has no information to indicate that grazing or snow compaction are threats to lynx at this time. For those risks found to be a threat to lynx populations' management direction is in the form of standards. For risks found to be a threat only to lynx individuals, management direction is in the form of guidelines.

This alternative also responds to many of the comments made by the public about problems and concerns with Alternative D. In particular many people and FWS felt Alternative D would not meet the purpose and need because it did not adequately address lynx needs.

Alternative F was developed to focus on those risk factors found to be a threat to lynx populations – specifically those factors related to the quantity and quality of lynx habitat as discussed in the wildlife analysis section in Chapter 3.

Standards **VEG S1, S2, S5, and S6** were modified and Guideline **VEG G10** was added. Under Alternative F these four standards apply outside the wildland urban interface (WUI) as defined by the Healthy Forests Restoration Act (HFRA), and Guideline **VEG G10** applies within the WUI. Guideline **VEG G10** states fuel treatment projects within the WUI as defined by HFRA should be designed considering Standards **VEG S1, S2, S5, and S6** to promote lynx conservation.

Under HFRA, the WUI can extend from 0.5 to 1.5 miles or more from a community at risk, depending on local circumstances and the community's wildfire protection plan. In order to estimate the impact on lynx habitat that using Guideline **VEG G10** would have; this document estimated the WUI as the area within 1 mile from a "community at risk" as defined by in the Federal Register (66 Fed. Reg. 753, January 4, 2001). Approximately three percent of lynx habitat falls within 1 mile of these communities.

Using a guideline rather than a standard within the WUI means the fuel reduction projects within the WUI have the potential to not meet Standards **VEG S1, S2, S5, and S6**. In order to conserve lynx while treating fuels within the WUI, Standards **VEG S1, S2, S5, and S6** limit the amount of "exceptions". They say the "cumulative total of fuel treatment projects that do not meet the vegetation standards shall not exceed 3 percent of mapped lynx habitat in the planning area."

The changes from Alternative B are:

Standard **ALL S1**. Wording is added that makes it clear the standard applies only in an LAU or in a linkage area.

Objective **VEG O1** states manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.

Objective **VEG O2** states provide a mosaic of habitat conditions through time that support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe hare habitat in both the stand initiation structural stage and in mature, multi-story conifer vegetation.

Objective **VEG O4** states focus vegetation management in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover.

Standard **VEG S1** states unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages, limit disturbance in each LAU as follows: If more than 30 percent of the lynx habitat in an LAU is

currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat no additional habitat may be regenerated by vegetation management projects.

It is important to note that under Alternative F, Standard **VEG S1** applies to all vegetation management practices and activities and fuel treatment projects outside the wildland urban interface (WUI) as defined by HFRA. A project that does not meet this standard can proceed, however a cumulative total of fuel treatment projects that do not meet the vegetation standards shall not exceed three percent of mapped lynx habitat on each administrative unit (a unit is a National Forest).

It is also important to note that fuel treatment projects that create stand initiation structural stage will be included in the 30 percent calculation addressed here in **VEG S1**. This means if a fuel treatment project within the WUI creates more than 30 percent, then other management projects that want to regenerate more would have to be modified or deferred until the standard can be met.

Standard **VEG S2** states timber management projects shall not regenerate more than 15 percent of lynx habitat on NFS lands in an LAU in a ten-year period.

Standard VEG S2 applies to all timber management practices and activities and fuel treatment projects that use timber harvest to achieve objectives, outside the wildland urban interface as defined by HFRA. A project that does not meet this standard can proceed, however a cumulative total of fuel treatment projects that do not meet the vegetation standards shall not exceed 3 percent of mapped lynx habitat in the planning area.

Standard **VEG S3** was dropped and the management direction included as Guideline **VEG G11**.

Standard **VEG S4** was dropped and the management direction included as Guideline **VEG G11**.

Standard **VEG S5** states precommercial thinning practices and activities that reduce snowshoe hare habitat, may occur from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat only:

1. Within 200 feet of administrative sites, dwellings, or outbuildings; or
2. For research studies or genetic tree tests evaluating genetically improved reforestation stock; or
3. Based on new information that is peer reviewed and accepted by the regional/state levels of the Forest Service, Bureau of Land Management, and FWS, where a written determination states:
 - a. that a project is not likely to adversely affect lynx; or
 - b. that a project is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat; or
4. For conifer removal in aspen, or daylight thinning around individual aspen trees, where aspen is in decline.

Standard **VEG S5** applies to precommercial thinning practices and activities and fuel treatment projects that use precommercial thinning to achieve objectives, outside the wildland urban interface as defined by HFRA. Cumulative total of fuel treatment projects that do not meet the vegetation standards shall not exceed 3 percent of mapped lynx habitat on each administrative unit (a unit is a National Forest).

Standard **VEG S6** states Vegetation management practices and activities that reduce snowshoe hare habitat in multi-story mature or late successional forests may occur only:

1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or
2. For research studies or genetic tree tests evaluating genetically improved reforestation stock; or
3. For incidental removal during salvage harvest (e.g. removal due to location of skid trails).

NOTE: Timber harvest is allowed in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover (e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow).

Standard **VEG S6** applies to all vegetation management practices and activities that regenerate forested stands, except for fuel treatment projects within the wildland urban interface as defined by HFRA. Cumulative total of fuel treatment projects that do not meet the vegetation standards shall not exceed 3 percent of mapped lynx habitat in the planning area.

Guideline **VEG G1** states Vegetation management practices and activities should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority should be given to stem-exclusion, closed-canopy structural stage stands for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.

Guideline **VEG G2** was dropped and the management direction included as Guideline **VEG G11**.

Guideline **VEG G3** was dropped and the management direction included as Guideline **VEG G11**.

Guideline **VEG G4** states prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.

Guideline **VEG G10** states fuel treatment projects within the WUI as defined by HFRA should be designed considering Standards **VEG S1, S2, S5, and S6** to promote lynx conservation.

Guideline **VEG G11** combines all the denning habitat direction into one guideline. It states denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small

wind thrown trees (“jack-strawed” piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.

Standards **GRAZ S1, S2, S3, and S4** were dropped and the management direction included in Guidelines **GRAZ G1, G2, G3, and G4**.

Guideline **GRAZ G1** says in fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.

Guideline **GRAZ G2** says livestock grazing should be managed to contribute to the long-term viability of the aspen

Guidelines **GRAZ G3** and **GRAZ G4** say livestock grazing should be managed in a manner to contribute or maintain conditions similar to historic conditions in riparian areas and shrub-steppe habitats.

Standard **HU S1** was dropped and the management direction included as Guideline **HU G10**.

Standard **HU S2** was dropped and the management direction included as Guideline **HU G11**.

Standard **HU S3** was dropped and the management direction included as Guideline **HU G12**.

Guideline **HU G2** says when developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area’s operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.

Guideline **HU G6** emphasizes using methods to avoid or reduce effects to lynx habitat connectivity should be used when upgrading unpaved roads to maintenance levels 4 or 5, where the result would be increased traffic speeds and volumes, or contribute to development or increases in human activity.

Guideline **HU G9** says if project level analysis determines that new roads adversely affect lynx, then public motorized use should be restricted. Upon project completion, these roads should be reclaimed or decommissioned, if not needed for other management objectives.

Guideline **HU G10** states designated over-the-snow routes, or designated play areas, should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs. Use the same analysis boundaries for all actions subject to this guideline.

This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline **HU G12**.

Guideline **HU G11** states when developing or expanding ski area and trails, access road and lift termini should be located to maintain and provide lynx diurnal security habitat.

Guideline **HU G12** states winter access for non-recreation special uses, and mineral and energy exploration and development, should be limited to designated routes or designated over-the-snow routes.

Standard **LINK S2** was dropped and the management direction included as Guideline **LINK G2**.

Guideline **LINK G2** states livestock grazing in shrub-steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.

The original monitoring item from Alternative B was rephrased to say: 1. Map the location and intensity of snow compacting activities, and designated and groomed routes that occurred inside LAUs during the period of 1998 to 2000. The mapping is to be completed within one year of this decision, and changes in activities and routes are to be monitored every five years after the decision.

Two other monitoring items were added in Alternative F. They are: 2. Annually report the number of acres where any of the exemptions 1 through 4 listed in Standard **VEG S5** were applied. Report the type of activity, the number of acres, and the location (by unit, and LAU21); and 3. Report the acres of fuel treatment in lynx habitat within the wildland urban interface as defined by HFRA when the project decision is approved. Report whether or not the fuel treatment met the vegetation standard. If standard(s) are not met, report which standard(s) are not met, why they were not met, and how many acres were affected.

Table 2-1, starting on the following page, compares the four action alternatives, Alternatives B, C, D, and F so differences and similarities among their various objectives, standards, and guidelines can be readily compared. Alternative A is noted to compare the direction previously adopted for the White River National Forest; for the Medicine Bow-Routt National Forest Plans their no action alternative is similar to Alternative B direction. For the remaining units, the Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, San Juan, and Rio Grande National Forests, the no-action alternative does not include lynx goals, objectives, standards, or guidelines to compare to the other alternatives.

The goal, objectives, standards, and guidelines would be amended into all existing plans for the NFs listed in Table 1-1. If a conflict exists between this management direction and an existing plan, the more restrictive direction would apply.

Table 2-1. Displays the differences between Proposed Action and the Alternatives

Southern Rockies Lynx Amendment FEIS Descriptions of the Alternatives	
<p>Bold words are defined in the glossary. Differences between the alternatives are <i>italicized</i>. O=objective; S=standard; G=guideline</p>	
Features common to all Alternatives	
<p>1. The following goals, objectives, standards, and guidelines would be incorporated into existing Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, Sand Juan, Rio Grande and Routt Forest Plans and would supercede the management direction for lynx incorporated in the White River and the Medicine Bow Revised Forest Plans.</p> <p>2. The following goals, objectives, standards, and guidelines apply only to National Forest system lands.</p> <p>Goals describe desired end results and are expressed in broad general terms;</p> <p>Objectives are concise statements of measurable desired results intended to promote achievement of goals;</p> <p>Standards are limitations on management activities that are within the authority and ability of the agency to meet or enforce. Standards are mandatory. Deviation from standards requires a Plan amendment and;</p> <p>Guidelines are preferred or advisable courses of action. Deviations from guidelines are permissible if the responsible official documents the reasons for the deviation.</p> <p>NA indicates not applicable.</p> <p>Note for the White River National Forest, the existing Forest Plan direction pertaining to lynx is noted in the WRNF No Action column. Note for the Medicine Bow National Forest, the existing Forest Plan direction (e.g. no action) pertaining to lynx is similar to Alternative B. For the remaining Forests management direction for lynx habitat management does not exist under no action.</p>	

Table 2- 1 - Description of the Alternatives

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
GOAL: Conserve the Canada lynx.				
ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL) - The following objectives, standards, and guidelines apply to all management practices and activities in lynx habitat in lynx analysis units (LAUs) and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use.				
	ALL O1. Maintain or restore lynx habitat connectivity.	(Same as Alternative B)	(Same as Alternative B)	ALL O1. Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
GL 1 Within key landscape linkage areas maintain or improve conditions that allow for lynx movement.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity. This standard does not apply to: 1. Fuel treatments identified through a process such as that described in <u>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan</u> . 2. Fossil fuel exploration and development practices and activities. 3. Energy transmission facilities associated practices and activities.	ALL S1. New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity in an LAU and/or linkage area.
NA	NA	NA	ALL S2. A project proposal that deviates from one or more lynx standards may proceed without amending the Plan, subject to ESA requirements, either: 1. If a written determination is made that the project is not likely to adversely affect lynx; or 2. If it may result in short-term adverse effects to lynx but if long-term benefits to lynx and its habitat would result.	NA
Goal & Objective 1 c. 8 Within 2 years of plan approval, map, identify, and prioritize site-specific locations where highway crossings are needed to reduce highway impacts on	ALL G1. Techniques to avoid or reduce effects on lynx should be used when constructing or reconstructing highways . Techniques could include underpasses or overpasses.	(Same as Alternative B)	(Same as Alternative B)	ALL G1. Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
lynx. Work cooperatively with the Federal Highway Administration and Colorado Department of Transportation in the creation of the map and to continuously address lynx movement and habitat connectivity and to reduce the potential for lynx mortality related to highways.				include fencing, underpasses or overpasses.
Note: Standards and guidelines in the “Canada Lynx” section apply only to lands within the lynx habitat matrix. Lynx analysis unit (LAU) boundaries will not be adjusted for individual projects. Forestwide LAU changes will only be completed in coordination and concurrence with the US Fish and Wildlife Service.	LAU S1. LAU boundaries would not be adjusted except through agreement with the US Fish and Wildlife Service, based on new lynx habitat information.	(Same as Alternative B)	(Same as Alternative B)	LAU S1. Changes in LAU boundaries shall be based on site specific habitat information and after review by the Forest Service Regional Office.
VEGETATION MANAGEMENT ACTIVITIES AND PRACTICES (VEG) - The following objectives, standards, and guidelines apply to vegetation management practices and activities in lynx habitat within lynx analysis units (LAUs). With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards, and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, roads, and the like. None of the objectives, standards, or guidelines apply to linkage areas.				
Goal & Objective 1.c.5, 1.c.6	VEG O1. Manage vegetation to be consistent with historical succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.	(Same as Alternative B)	(Same as Alternative B)	VEG O1. Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.
Goal & Objective 1.c.5, 1.c.6, Standard 6. In aspen stands, apply harvest prescriptions that favor regeneration of aspen.	VEG O2. Maintain or improve lynx habitat, with an emphasis on continued availability of high-quality foraging habitat in juxtaposition to denning habitat .	(Same as Alternative B)	(Same as Alternative B)	VEG O2. Provide a mosaic of habitat conditions through time that support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe hare habitat in both the

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
				stand initiation structural stage and in mature, multi-story conifer vegetation.
Goal & Objective 1.c.5, 1.c.6	VEG O3. Conduct fire use activities to restore ecological processes and maintain or improve lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 6. In aspen stands, apply harvest prescriptions that favor regeneration of aspen.	VEG O4. Design regeneration harvest , reforestation, and thinning to develop characteristics suitable for lynx and snowshoe hare habitat .	(Same as Alternative B)	(Same as Alternative B)	VEG O4. Focus vegetation management in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover.
Goal & Objective 1.c.5, 1.c.6, Standard 1: Limit disturbance within each lynx analysis unit (LAU) as follow: if more than 30 percent of lynx habitat within an LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management by federal agencies.	<p>VEG S1. 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 percent of lynx habitat within a 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.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> Wildland Fire Use practices and activities that restore ecological processes, or maintain or improve lynx habitat. Wildfire suppression. 	<p>VEG S1. Unless a broad scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each LAU <i>or in combination with immediately adjacent LAUs on NFS lands</i> as follows: if more than 30 percent of lynx habitat within a LAU <i>or combination of LAUs</i> is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities or practices.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> Fire Use practices and activities that restore ecological processes, or maintain or improve lynx habitat. Wildfire suppression. 	<p>VEG S1. Unless a broad scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each LAU <i>or in combination with immediately adjacent LAUs on NFS lands</i> as follows: if more than 30 percent of lynx habitat within a LAU <i>or combination of LAUs</i> is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities or practices.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> Fire Use practices and activities that restore ecological processes, or maintain or improve lynx habitat. Wildfire suppression. 	<p>VEG S1. <i>Where and what this applies:</i> Standard VEG S1 applies to all vegetation management practices and activities that regenerate forested stands, except for fuel treatment projects within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10.</p> <p>The Standard: Unless a broad scale</p>

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
		Use the same analysis boundaries for all future vegetation management projects subject to this standard.	<p>3. <i>Fuel treatments identified through a process such as that described in <u>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan.</u></i></p> <p>Use the same analysis boundaries for all future vegetation management projects subject to this standard.</p>	<p>assessment has been completed that substantiates different historic levels of stand initiation structural stages limit disturbance in each LAU as follows: If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.</p> <p>(Note: Fuel treatment projects that create stand initiation structural stage will be included in the 30 percent calculation – meaning that if a fuel treatment project w/in the WUI creates more than 30 percent, then other management practices and activities designed to regenerate more acres would have to be modified or deferred until the standard can be met.)</p>
Standard 3. Management actions such as timber sales, salvage sales, and prescribed fires will not change more than 15 percent of lynx habitat within a LAU to unsuitable condition within a 10-year period. To determine whether the 15% criterion over a 10-year period standard is met, base activities on the 1-year	VEG S2. Timber management practices, such as timber harvest and salvage sales, shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.	(See VEG G7.)	(See VEG G7.)	<p>VEG S2 Where and to what this applies: Standard VEG S2 applies to all timber management practices and activities that regenerate forested stands, except for fuel treatment projects within the WUI as defined by HFRA, subject to the following limitation:</p>

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
period immediately prior to the initiation of the project in question.				<p>Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10.</p> <p>The Standard: VEG S2. Timber management practices and activities shall not regenerate more than 15 percent of lynx habitat on NFS lands in an LAU in a ten-year period.</p>
<p>Standard 2. Within a LAU, maintain denning habitat in patches larger than 5 acres, comprising at least 10 percent of lynx habitat. Where less than 10 percent denning habitat is currently present within a LAU, defer management actions in stands that have the highest potential for developing denning habitat structure in the future.</p>	<p>VEG S3. Maintain denning habitat within a LAU in patches generally larger than 5 acres comprising at least 10 percent of the lynx habitat. Where less than 10 percent denning habitat is present in a LAU, defer vegetation management practices and activities in stands that have the highest potential to develop denning-habitat.</p> <p>This standard does not apply to: 1. Wildland Fire Use practices and activities that restore ecological processes. 2. Wildfire suppression.</p>	(Same as Alternative B)	<p>VEG S3. Maintain denning habitat within a LAU in patches generally larger than 5 acres comprising at least 10 percent of the lynx habitat. Where less than 10 percent denning habitat is present in a LAU, defer vegetation management practices and activities in stands that have the highest potential to develop denning-habitat.</p> <p>This standard does not apply to: 1. Wildland Fire Use practices and activities that restore ecological processes. 2. Wildfire suppression. 3. Fuel treatments identified through a process such as that described in A</p>	(See Guideline VEG G11)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
			<i>Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan.</i>	
<p>Standard 4. Following a disturbance such as blowdown, fire, insect or pathogen 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: (1) developed areas such as campgrounds, and (2) in LAUs where denning habitat has been mapped and field validated, salvage harvests may occur provided that at least 10 percent denning habitat is retained and is well distributed.</p> <p>Guideline 11. Use field verification to document denning habitat suitability, quantity, quality, and juxtaposition with other important habitat components, such as water and foraging habitats; design projects to avoid impacts at times suitable site may be occupied as natal or maternity dens.</p>	<p>VEG S4. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat, salvage harvest may only occur when the affected area is smaller than 5 acres in the following situations:</p> <ol style="list-style-type: none"> 1. Developed recreation sites, administrative sites, or authorized special use structures or improvements; 2. Designated road and trail corridors where public safety or access has been or may be compromised; and 3. LAUs where denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed. 4. <i>Within the structure ignition zone</i> (200 feet of administrative sites, dwellings and/or associated outbuildings). 5. Wildfire suppression. 6. Removal of dead or down trees for personal use (i.e., firewood collection). 	<p>VEG S4. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat, salvage harvest may only occur when the affected area is smaller than 5 acres in the following situations:</p> <ol style="list-style-type: none"> 1. Developed recreation sites, administrative sites, or authorized special use structures or improvements; 2. Designated road and trail corridors where public safety or access has been or may be compromised; 3. LAUs where denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed. 4. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); <i>landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices</i> 	<p>(See VEG G8)</p>	<p>(See Guideline VEG G11)</p>

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
		<p><i>and activities that restore ecological processes, or that maintain or improve lynx habitat.</i></p> <p>5. Wildfire suppression.</p> <p>6. Removal of dead or down trees for personal use (i.e., firewood collection).</p>		
<p>Standard 5. Allow silvicultural thinning treatments (such as pre-commercial thinning or weed-and- release treatments designed to reduce stocking in order to concentrate growth on the more desirable trees) only when stands no longer provide snowshoe hare habitat.</p>	<p>VEG S5. Precommercial thinning may be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes or stand composition and/or stand structure do not provide snowshoe hare cover and forage availability during winter conditions with average snow pack).</p> <p>The following precommercial thinning activities may occur prior to the stands no longer providing snowshoe hare habitat:</p> <ol style="list-style-type: none"> 1. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings). <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildfire suppression. 2. Wildland Fire Use. 3. Developed recreation sites, administrative sites, or 	<p>VEG S5. Precommercial thinning may be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes or stand composition and/or stand structure do not provide snowshoe hare cover and forage availability during winter conditions with average snow pack).</p> <p>The following precommercial thinning activities may occur prior to the stands no longer providing snow hare habitat:</p> <ol style="list-style-type: none"> 1. Research studies and genetic tests (i.e., performance tests) necessary to evaluate genetically improved reforestation stock. 2. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated 	<p>VEG S5. Vegetation management practices and activities that reduce snowshoe hare habitat may occur in forest stands with a structure and species composition that provides snowshoe hare cover and forage during winter only in the following situations:</p> <ol style="list-style-type: none"> 1. Associated with research studies and genetic tests (i.e., performance tests, long-term field tests and realized gain trials) necessary to evaluate genetically improved reforestation stock. 2. Conifer removal within aspen clones and/or daylight thinning around individual aspen trees. 3. Stands identified as “replacement” or “future” lodgepole old growth in the Forest Plan to provide structural and species diversity. 4. When a broad scale assessment has determined that early seral stages of forested habitat exceed what would be expected under the normal range of historic conditions. 5. Pruning, transplants, and 	<p>VEG S5</p> <p>Where and to what this applies:</p> <p>Standard VEG S5 applies to precommercial thinning practices and activities, except for fuel treatment projects that use precommercial thinning as a tool within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation:</p> <p>Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10.</p> <p>The Standard:</p> <p>Precommercial thinning practices and activities that reduce snowshoe hare habitat, may occur from the stand initiation structural stage until the stands no longer provide winter snowshoe hare habitat only:</p>

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
	authorized special use improvements including within permitted ski area boundaries.	<p><i>infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat.</i></p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildfire suppression. 2. Wildland Fire Use. 3. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 	<p><i>Christmas tree and ornamental tree harvest if done so as to not measurably reduce lynx forage habitat.</i></p> <p>6. <i>Salvage and regeneration harvests.</i></p> <p>7. Precommercial thinning conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings).</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Wildfire suppression. 2. <i>Fire use practices and activities that restore ecological processes.</i> 3. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 4. <i>Fuel treatments identified through a process such as that described in <u>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan</u>.</i> 	<ol style="list-style-type: none"> 1. Within 200 feet of administrative sites, dwellings, or outbuildings; or 2. For research studies or genetic tree tests evaluating genetically improved reforestation stock; or 3. Based on new information that is peer reviewed and accepted by the regional/state levels of the Forest Service and FWS, where a written determination states: <ol style="list-style-type: none"> a. that a project is not likely to adversely affect lynx; or b. that a project is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat; or 4. For conifer removal in aspen, or daylight thinning around individual aspen trees, where aspen is in decline.
~NA	VEG S6. Management practices and activities in mature and late successional,	VEG S6. Management practices and activities in mature and late successional,	(See VEG G6)	VEG S6 Where and to what this applies: Standard VEG S6 applies to

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
	<p>multi-layered Engelmann spruce-subalpine fir stands shall provide for winter snowshoe hare habitat.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Designated road and trail corridors where public safety or access has been or may be compromised; 2. Practices and activities conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings). 3. Wildfire suppression. 4. Wildland Fire Use. 5. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 	<p>multi-layered Engelmann spruce-subalpine fir stands shall provide for winter snowshoe hare habitat.</p> <p>This standard does not apply to:</p> <ol style="list-style-type: none"> 1. Designated road and trail corridors where public safety or access has been or may be compromised; 2. Practices and activities conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); <i>landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat.</i> 3. Wildfire suppression. 4. Wildland Fire Use. 5. Developed recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries. 		<p>all vegetation management practices and activities that regenerate forested stands, except for fuel treatment projects within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5 and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI, see guideline VEG G10.</p> <p>The Standard: Vegetation management practices and activities that reduce snowshoe hare habitat in multi-story mature or late successional forests may occur only:</p> <ol style="list-style-type: none"> 1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or 2. For research studies or genetic tree tests evaluating genetically improved reforestation stock; or 3. For incidental removal during salvage harvest (e.g. removal due to location of

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
				skid trails). (NOTE: Timber harvest is allowed in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover [e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow]).
Guideline 2. Vegetation management activities to improve lynx foraging habitat should primarily provide for recruitment of a high density of small diameter conifers, hardwoods, and shrubs preferred by snowshoe hares.	VEG G1. Where little or no habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Preference should be given to mesic sites and mid-seral stage stands. Provide for continuing availability of lynx foraging habitat in proximity to denning habitat .	(Same as Alternative B)	(Same as Alternative B)	VEG G1 Vegetation management practices and activities should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority should be given to stem-exclusion, closed-canopy structural stage stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.
Guideline 3. Retain standing dead trees and coarse woody debris during vegetation management activities to provide for adequate future denning habitat.	VEG G2. Where recruitment of additional denning habitat is desired, vegetation management practices should retain sufficient standing dead trees and coarse woody debris , consistent with the likely availability of such material under natural disturbance regimes. The juxtaposition of denning and foraging habitat should be	(Same as Alternative B)	(Same as Alternative B)	NA. (See Guideline VEG G11)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
	maintained or improved.			
Standard 2. Within a LAU, maintain denning habitat in patches larger than 5 acres, comprising at least 10 percent of lynx habitat. Where less than 10 percent denning habitat is currently present within a LAU, defer management actions in stands that have the highest potential for developing denning habitat structure in the future.	VEG G3. 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.	(Same as Alternative B)	(Same as Alternative B)	NA. (See Guideline VEG G11)
Guideline 9. When managing wildland fire, minimize creation of permanent travelways. Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities. (The WRNF does not create permanent fire breaks.)	VEG G4. 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.	(Same as Alternative B)	(Same as Alternative B)	VEG G4 Prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.
Goal & Objective 1.c.5	VEG G5. Habitat for alternate prey species (primarily red squirrel) should be provided in each LAU.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
~NA	(NA See VEG S6)	(NA See VEG S6)	VEG G6. <i>Mature and late successional, multi-layered Engelmann spruce-subalpine fir stands should be managed to provide for winter snowshoe hare habitat.</i>	(See Standard VEG S6)
Standard 3	(NA - See VEG S2.)	VEG G7. <i>Timber management practices should not change more than 15 percent of lynx habitat within</i>	(Same as Alternative C)	(See Standard VEG S2)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
		<i>a LAU to an unsuitable condition within a 10-year period.</i>		
Standard 4	(NA - See VEG S4.)	(NA - See VEG S4.)	VEG G8. Following a disturbance, such as blowdown, fires, insects, or pathogens mortality that could contribute to lynx denning habitat , salvage harvest should not occur when the affected area is smaller than 5 acres, unless denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed.	(See Guideline VEG G11.)
				VEG G10 Fuel treatment projects within the WUI as defined by HFRA should be designed considering standards VEG S1, S2, S5 and S6 to promote lynx conservation.
				VEG G11 - Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
LIVESTOCK GRAZING MANAGEMENT ACTIVITIES AND PRACTICES (GRAZ) - Applies to grazing practices and activities in lynx habitat in Lynx Analysis Units (LAUs). They do not apply to linkage areas.				
Goal & Objective 1.c. 6, Standard 7	GRAZ O1. Manage livestock grazing to be compatible with the improvement or maintenance of lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 8. Manage livestock use in post-fire and post-harvest created openings to assure successful regeneration of the shrub and tree components.	GRAZ S1. In fire- and harvest-created openings, manage livestock grazing to ensure impacts do not prevent successful regeneration of shrubs and trees.	(Same as Alternative B)	(See GRAZ G1)	(See GRAZ G1)
Guideline 4. Manage livestock grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.	GRAZ S2. In aspen stands, manage livestock grazing to ensure impacts do not prevent or inhibit sprout survival sufficient to perpetuate the long-term viability of the clones.	(Same as Alternative B)	(See GRAZ G2)	(See GRAZ G2)
Standard 7. . Manage livestock grazing to maintain or achieve mid-seral or later conditions in shrub-steppe habitats, riparian areas, and willow carrs.	GRAZ S3. Manage livestock grazing in riparian areas, and willow carrs, to contribute to maintaining or achieving a preponderance of mid- or later-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	(Same as Alternative B)	(See GRAZ G3)	(See GRAZ G3)
Goal & Objective 1.c. 6	GRAZ S4. Manage livestock grazing in shrub steppe habitats, in the elevational ranges that encompass forested lynx habitat (within LAUs) to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar the conditions that would have occurred under historic disturbance regimes.	(Same as Alternative B)	(See GRAZ G4)	(See GRAZ G4)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Standard 8	(NA – See GRAZ S1)	(NA – See GRAZ S1)	GRAZ G1. In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.	GRAZ G1. In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.
Guideline 4	(NA – See GRAZ S2)	(NA – See GRAZ S2)	GRAZ G2. In aspen stands, livestock grazing should be managed to contribute to long-term viability of the clones.	GRAZ G2. In aspen stands, livestock grazing should be managed to contribute to the long-term viability of the aspen.
Standard 7	(NA – See GRAZ S3)	(NA – See GRAZ S3)	GRAZ G3. In riparian areas and willow carrs , livestock grazing would be managed to contribute to maintaining or achieving a preponderance of mid- or later-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	GRAZ G3 In riparian areas and willow carrs, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.
Goal & Objective 1.c.6	(NA – See GRAZ S4)	(NA – See GRAZ S4)	GRAZ G4. Livestock grazing in shrub steppe habitats, in the elevational ranges that encompass forested lynx habitat (within LAUs) should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar the conditions that would have occurred under historic disturbance regimes.	GRAZ G4 In shrub-steppe habitats, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs, to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.
HUMAN USES MANAGEMENT ACTIVITIES AND PRACTICES (HU) - The following objectives and guidelines apply to human use projects, such as special uses (other than grazing), recreation management, roads, highways, and mineral and energy development, in lynx habitat in lynx analysis units (LAUs), subject to valid existing rights. They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.				
Goal & Objective 1.c. 6, 1.c.7, Guideline 12	HU O1. Maintain the lynx's natural competitive advantage over other predators in deep-snow by discouraging the expansion of snow compaction activities in lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Goal & Objective 1.c. 5, 1.c. 6, Guideline 1. Within key landscape linkage areas maintain or improve conditions that allow for lynx movement.	HU O2. Manage recreational activities to maintain lynx habitat and connectivity.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU O3. Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU O4. Provide for lynx habitat needs and connectivity when developing or expanding developed recreation sites or ski areas.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU O5. Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c.8	HU O6. Reduce adverse highway effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity, and to reduce the potential for lynx mortality.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Guideline 12. On federal lands, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU, unless additional designations result in the consolidation of unregulated use, and improves lynx habitat through the net reduction of compacted snow	HU S1. 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.	HU S1. 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 , <i>by LAU or in a combination of immediately adjacent LAUs</i> unless the grooming or designation serves to	(See Guideline HU G10)	(See Guideline HU G10)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
areas within higher quality lynx habitat, and landscape linkages. This does not apply to permitted ski areas, winter logging, oil and gas exploration and development, access to private inholdings, and trail re-routes for public safety.	<p>This does not apply within permitted ski area boundaries, to winter logging, reroutes that reduce public risks from avalanches, access to private in-holdings, roads and trails designed and managed for non-winter use, and to other access regulated by HU S3.</p> <p>Special Use Permits, authorizations, or agreements could be allowed to expand inside baseline routes and baseline areas of consistent snow compaction.</p> <p>Grooming could be allowed to expand in side baseline areas of consistent snow compaction, and on routes that have been designated but not groomed in the past.</p>	<p>consolidate use and improve lynx habitat.</p> <p>This standard does not apply inside permitted ski area boundaries, to winter logging, reroutes that reduce public risks from avalanches, access to private inholdings, roads and trails designed and managed for non-winter use, and to other access regulated by HU S3.</p> <p>Special Use Permits, authorizations, or agreements could be allowed to expand inside baseline routes and baseline areas of consistent snow compaction.</p> <p>Grooming could be allowed to expand inside baseline areas of consistent snow compaction, and on routes that have been designated but not groomed in the past.</p>		
MA 8.25 Standard 1. . When developing large winter recreation facilities, design new trails, roads and lift termini to protect lynx diurnal security habitats in and around proposed developments or expansions.	HU S2. When developing or expanding ski areas, locate trails, access roads and lift termini to maintain and provide lynx diurnal security habitat if it is identified as a need.	(See HU G11)	(See HU G11)	(See HU G11)
Standard 9. Where over-snow access is required for activities such as non-recreation special use permits, oil and gas exploration and development,	HU S3. Winter access for non-recreation special uses, and mineral and energy exploration and development, shall be limited to designated routes or designated over-	(Same as Alternative B)	HU S3. Winter access for non-recreation special uses shall be limited to designated routes or designated over-snow routes.	(See Guideline HU G12)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
access to private in-holdings, or timber sales, restrict use to routes designated by the Forest Service.	the-snow routes.			
MA 8.25 Guideline 1 When designing ski area expansions, provide adequate sized coniferous inter-trail islands, including the retention of coarse woody material, to maintain snowshoe hare habitat.	HU G1. When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris to maintain lynx foraging habitat.	(Same as Alternative B)	(Same as Alternative B)	HU G1. When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris, so winter snowshoe hare habitat is maintained.
MA 8.25 Guideline 2. Evaluate and adjust as necessary, ski operations in expanded to newly developed areas to provide nocturnal foraging opportunities for lynx in a manner consistent with operational needs, especially in landscapes where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	HU G2. When developing or expanding ski areas, nocturnal foraging opportunities should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	(Same as Alternative B)	(Same as Alternative B)	HU G2. When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.
Goal & Objective 1.c. 6, Guideline 1 Within key landscape linkage areas maintain or improve conditions that allow for lynx movement.	HU G3. Recreational development and recreational operational uses should be planned to provide for lynx movement and to maintain effectiveness of lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Guideline 10. Remote sensing of oil and gas drill sites and facilities should be required as the primary method of monitoring	HU G4. Remote monitoring of mineral and energy development sites and facilities should be encouraged to reduce snow compaction.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
NA - Regulations in Minerals CFR Part 228 Subpart A and Subpart B	HU G5. 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.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1.c. 6	HU G6. 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 maintenance levels 4 or 5) that would result in substantially increased speeds, traffic volume or potential future use.	HU G6. <i>Methods to avoid or reduce effects to lynx habitat connectivity should be used when upgrading unpaved roads to maintenance levels 4 or 5 where the result would be increased traffic speeds and volumes, or contribute to development or increases in human activity.</i>	(Same as Alternative C)	(Same as Alternative C)
Guideline 6 New trails and roads should be located away from forested stringers. & Guideline 8 Roads should not be built on ridgetops, saddles, and other areas identified as important for lynx habitat connectivity	HU G7. New permanent roads should not be built on ridge tops and saddles or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers .	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Guideline 5 In order to provide snowshoe hare habitat, roadside brushing should be minimized while providing for public safety on low speed and low volume roads.	HU G8. Cutting brush along low-speed, low-volume roads should be done to the minimum level necessary to provide for public safety.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 10 Close newly constructed roads built for project specific activities such as mineral exploration and development or timber sales to public motorized access during project activities. Upon project completion, reclaim or obliterate these roads if not needed for other objectives as documented in the appropriate NEPA document.	HU G9. On new roads built for project-specific activities, public motorized use should be restricted. 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.	(Same as Alternative B)	(Same as Alternative B)	HU G9 If project level analysis determines that new roads adversely affect lynx, then public motorized use should be restricted. Upon project completion, these roads should be reclaimed or decommissioned, if not needed for other management objectives.
Term and Condition #2 from the Biological Opinion	NA	HU G10. Where projects result in a permanent conversion of winter foraging habitat , a project component should be included to treat, through stand regeneration activities and practices, “other lynx foraging habitat” equal to or greater than the number of acres being affected, within the same or adjacent LAU. Focus of these activities should be within mature mesic and mid-seral lodgepole pine stands.	NA	NA

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Guideline 12 On federal lands, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU, unless additional designations result in the consolidation of unregulated use, and improves lynx habitat through the net reduction of compacted snow areas within higher quality lynx habitat, and landscape linkages. This does not apply to permitted ski areas, winter logging, oil and gas exploration and development, access to private inholdings, and trail re-routes for public safety.	NA (See HU S1)	NA (See HU S1)	HU G10. Designated over-the-snow reroutes or play areas should not expand outside baseline areas of consistent snow compaction by LAU or in a combination of immediately adjacent LAUs, unless designation serves to consolidate use and improve lynx habitat. This does not apply inside permitted ski area boundaries, to winter logging, or rerouting trails for public safety, to accessing private inholdings or to access regulated by HU S3.	HU G10 Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs. This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings or to access regulated by Guideline HU G12. Use the same analysis boundaries for all actions subject to this guideline.
MA 8.25 Standard 1. . When developing large winter recreation facilities, design new trails, roads and lift termini to protect lynx diurnal security habitats in and around proposed developments or expansions.	NA (See HU S2.)	HU G11 When developing or expanding a ski area and trails, access roads and lift termini should be located to maintain and provide lynx diurnal security habitat .	(Same as Alternative C)	HU G11 When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat .
	NA	NA	NA	HU G12 Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes or designated over-the-snow routes.

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
LINKAGE AREAS (LINK) - The following objective, standard and guidelines apply to all practices and activities within linkage areas, subject to valid existing rights.				
Goal & Objective 1c.9	LINK O1. In areas of intermixed land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Goal & Objective 1c.8	LINK S1. When highway construction or reconstruction is proposed in linkage areas , identify potential highway crossings	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 7	LINK S2. Manage livestock grazing in shrub steppe habitats to contribute to maintaining or achieving a preponderance of mid- or late-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	(Same as Alternative B)	(See LINK G2)	(See LINK G2)
Goal & Objective 1c.9, SRNF FP under Real Estate p. 2-38 Standard 1 and p. 2-40 Guideline 4	LINK G1. National Forest System lands should be retained in public ownership.	(Same as Alternative B)	(Same as Alternative B)	(Same as Alternative B)
Standard 7	NA - See LINK S2.	NA - See LINK S2.	LINK G2. Livestock grazing in shrub steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages , similar to conditions that would have occurred under historic disturbance regimes.	(Same as Alternative D)

WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F Preferred Alternative
Guideline 13. Design new winter use activities to minimize effects on habitat needs for Canada lynx. Options include, but are not limited to: <ul style="list-style-type: none"> • Move the activity • Place seasonal or daily restrictions on the activity. • Modify the activity 				

Table 2-2 displays the monitoring included by alternative. Note the monitoring item noted in the column “WRNF No Action” reflects the existing direction applicable to the White River National Forest only.

Table 2- 2 - Monitoring

MONITORING				
WRNF No Action	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
<p>Goal & Objective 1c.7 Term and Condition #3 from Biological Opinion Mapping of snow compaction (B1/C2/D4)</p>	<p>1. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998-2000 within one year and monitor every five years.</p>	<p>1. Monitor and evaluate annually under what conditions and extent fuels treatment projects occur in lynx habitat.</p> <p>2. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998-2000 within one year and monitor every five years.</p>	<p>1. Monitor and evaluate annually under what conditions and extent fuels treatment projects occur in lynx habitat.</p> <p>2. Monitor and evaluate annually under what conditions and extent fossil fuel exploration and development practices and activities occurs in linkage areas.</p> <p>3. Monitor and evaluate annually under what conditions and extent standard ALL S2 is applied.</p> <p>4. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998-2000 within one year and monitor every five years.</p>	<p>1. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998 to 2000. The mapping is to be completed within one year of this decision, and changes in activities and routes are to be monitored every five years after the decision.</p> <p>2. Annually report the number of acres where any of the exemptions 1 through 4 listed in Standard VEG S5 were applied. Report the type of activity, the number of acres, and the location (by unit, and LAU).</p> <p>3. Report the acres of fuel treatment in lynx habitat within the wildland urban interface as defined by HFRA when the project decision is approved. Report whether or not the fuel treatment met the vegetation standard. If standard(s) are not met, report which standard(s) are not met, why they were not met, and how many acres were affected.</p>

Alternatives Eliminated from Detail Study

Public comments received in response to the proposed action provided suggestions for alternative management direction. In this particular instance, the suggested alternatives are mostly suggestions for particular standards and guidelines, rather than complete alternatives covering the full spectrum of Canada lynx conservation and recovery. Therefore, most of the alternatives considered, but not in detail are standards or guidelines for managing a particular resource. The rationale for not analyzing these alternatives (standards or guidelines) in detail is generally based on a comparison to the proposed action and other fully developed alternatives and the purpose and need for the proposed action.

Scoping Proposed Action

Some people were confused by parts of the proposed action described in the original scoping package. Others found it redundant and disorganized.

The scoping proposed action was eliminated from detailed study because Alternative B, the DEIS proposed action, provides clearer management direction by eliminating duplication and providing better organization, with no difference in effects. Appendix E contains a crosswalk between the scoping proposed action and Alternative B, the DEIS proposed action.

Prohibit grazing in lynx habitat on federal lands and/or add stronger standards to reduce impacts on hare forage and cover

It was suggested grazing be prohibited in lynx habitat, or stronger standards for grazing in lynx habitat are needed to reduce impacts on hare forage and cover.

This was not analyzed in detail because the proposed action establishes standards that require the management of livestock grazing to (1) ensure impacts do not prevent successful regeneration of shrubs and trees; (2) ensure impacts do not prevent or inhibit sprout survival sufficient to perpetuate the long-term viability of the clones; (3) manage livestock grazing in riparian areas, and willow carrs; and (4) manage livestock grazing in shrub steppe habitats, within the elevation ranges that encompass forested lynx habitat (within LAUs). Management of livestock grazing could include using management techniques such as rest rotation, or timing of use to provide for lynx needs which are more appropriately addressed at the project level due to the site specificity. Such standards already significantly reduce or eliminate grazing impacts on snowshoe hare forage and cover while still providing for livestock grazing, an existing multiple-use activity.

Prohibit all over-the-snow related activities or not further restrict the activities

It was suggested that dispersed over-the-snow use off the groomed or designated trails, or designated snow play areas not be allowed, in addition to no net increase in groomed or designated routes. Others suggested that there be no increase in restrictions on winter activities.

There is little scientific information about effects of snow compaction on lynx. Some information suggests that snow-compacting activities can provide competitors, such as coyotes, access into lynx habitat, while other studies do not show that relationship. Whether or not the effects of coyote competition, facilitated by human-caused snow compaction, are significant, or are even an effect to be concerned about, is simply unknown.

An alternative to drop all snow-compacting standards was not developed in detail because there is evidence coyotes use packed trails. Until more information is collected, it was determined to be prudent to maintain the current levels of snow compacted areas. Otherwise, it is possible that unregulated expansion of compacted snow over time would impair lynx conservation efforts in the future.

An alternative to prohibit all snow-compacting activities or limit dispersed use was evaluated, but not considered in detail because there is no evidence that competition is currently negatively affecting lynx populations. It also does not meet the amendment's purpose and need to retain the multiple-use direction in existing plans. When research can provide more answers, this information can be addressed when plans are amended or revised in the future.

Remove ski areas or don't let ski areas expand

It was suggested that existing ski areas should not be allowed to continue operations in order to reduce the risk to lynx viability and recovery.

This was not considered in detail because consultation with the U.S. Fish and Wildlife Service on effects to lynx has occurred, or will occur, on these developments. The alternatives include management direction for new ski areas and expansions which are designed to provide for lynx movement and habitat needs.

Include more road restrictions, turn the restrictions into standards, or ban all road construction

A review of the LCAS and other literature found no information indicating road building should be banned or that further restrictions were needed.

Many internal comments expressed concern that the road management guidelines would not let managers address watershed and safety concerns. However, the team determined that guidelines were the best way to provide direction about what should be considered for lynx, while providing some flexibility to address other concerns.

The available information indicates that some management direction is needed to ensure lynx needs are considered in road management decisions; therefore an alternative to drop road-related direction was not considered in detail.

Prohibit harvest in old-growth or mature timber

Some people asked that an alternative be considered that prohibits harvest in old-growth and/or mature timber including spruce-fir stands to protect denning habitat and provide forage.

The proposed action includes management direction relating to forage and denning habitat. Standards and guidelines provide restrictions on what activities may take place in these stands. Alternative C adds a guideline and Alternative F adds a standard to manage mature and old-growth multi-layered spruce-fir stands to provide winter snowshoe hare habitat.

Prohibiting harvest of all mature or old-growth timber would substantially change the overall multiple-use direction in existing plans; therefore, not meeting the purpose and need.

This was not considered in detail because it does not meet the purpose and need and is outside the scope of this amendment.

Comparison of the Alternatives

A comparison of alternatives by Key Issues is displayed in Table 2- 3 and a comparison of alternatives by standards and guidelines is displayed in Table 2- 4. These comparison tables summarize information from the environmental effects analysis and show only the effects where the standards and guidelines differ between alternatives and where there is an appreciable difference in the effects between the alternatives. A complete discussion of the affected environment and environmental consequences is found in Chapter 3.

Table 2- 3 - Comparison of Alternatives by Key Issue Considering All National Forest Units in the Southern Rockies Amendment Area.

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
Lynx Productivity, Mortality and Movements					
a. Forest management activities such as timber harvest, precommercial thinning, grazing, fire, salvage harvest may impact lynx productivity by affecting denning and foraging habitat.	Leads to "Likely to adversely affect" determination in 1999 Biological Assessment on existing Forest Plans. The White River and Medicine Bow NFs completed subsequent consultations, and the effects of the no action (no change to the Revised Plans) are similar to Alternative B.	Adds management direction to protect important components of lynx habitat.	Effects similar to Alternative B, but allows for combination of LAUs to address unsuitable habitat standard.	Effects similar to Alternative B. Exceptions in standard VEG S5 and the ALL S2 standard may lead to adverse effects.	Effects similar to Alternative B, but allows some exceptions for precommercial thinning and for fuels treatment projects.

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
b. Activities resulting in snow compaction may affect lynx productivity by a reduction in the prey resource as a result of allowing competing predators into lynx habitat areas during the winter on the compacted routes and areas.	<p>Contributes to “Likely to adversely affect” determination in 1999 BA on existing Forest Plans</p> <p>The White River and Medicine Bow NFs completed subsequent consultations, and the effects of no action (no change to the Revised Plans) are similar to Alternative B.</p>	Adds regulatory direction that limits new snow compaction areas.	Effects similar to Alternative B, but allows for combination of LAUs to address snow compaction standard.	Effects similar to Alternative C, but changes some standards to guidelines	Effects similar to Alternative C, but changes the standards to guidelines
c. Landscape connectivity can be affected by Forest Service management activities, which can negatively impact lynx movements (and therefore productivity), and can increase mortality.	<p>Important factor contributing to the “Likely to adversely affect” in the 1999 BA for existing Forest Plans.</p> <p>The White River and Medicine Bow NFs completed subsequent consultations, and the effects of no action (no change to the Revised Plans) are similar to Alternative B..</p>	Adds provisions for the maintenance of connectivity between patches of lynx habitat and within lynx linkage areas.	Effects similar to Alternative B.	Effects similar to Alternative B. The exceptions to standards in VEG S5 and the ALL S2 may lead to adverse effects.	Effects similar to Alternative B.
Probability of Lynx Persistence	Substantial decreases in probability of lynx persistence, as compared to Alternative B.	Adds management direction that would be likely to maintain lynx productivity and movements in the	Slightly decreases probability of lynx persistence, as compared to Alternative B, but	Decreases probability of lynx persistence, as compared to Alternative B, but greater than Alternative A. Management direction may	Slightly decreases probability of lynx persistence, as compared to Alternative B, but provides management

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
	The White River and Medicine Bow NFs completed subsequent consultations, and the effects of no action (no change to the Revised Plans) are similar to Alternative B.	SRMGA.	provides management direction that maintains sufficient habitat quality/quantity, with some gaps in habitat distributions.	not ensure sufficient habitat quantity, quality, distribution, and other conditions to provide for lynx productivity.	direction that maintains sufficient habitat quality/quantity, with some gaps in habitat distributions.
Public Safety					
The proposed amendment may limit construction of defensible fuel profiles around dwellings and structures, and may limit vegetation treatments to create defensible fuels profiles in support of the Fire Use Program.	Current management emphasis and direction are maintained under current Forest Plan direction.	Fire hazard thinning prohibited unless stands no longer provide snowshoe hare habitat, thereby may impact ability to create defensible space or defensible fuels profiles.	Fire hazard thinning allowed within 200 feet of dwellings or other structures and landscape settings critical for the creation of defensible fuels profiles. Allows fire use practices and activities to restore ecological processes that maintain or improve lynx habitat.	Does not limit fire hazard thinning to within 200 feet of structures, thereby allowing the creation of defensible fuels profiles.	Does not limit fire hazard thinning to within 200 feet of structures, thereby allowing the creation of defensible fuels profiles.
Human Uses					
The proposed amendment may negatively impact human uses of the forest by limiting winter recreation opportunities (i.e.	- Expansion of groomed and ungroomed trails would continue to grow by about 20%, except on the White River and Medicine Bow NFs.	- Expansion of total groomed and ungroomed trails would be limited to existing snow compacted areas. Some existing ungroomed trails could be converted into groomed trails, allowing the groom trail system to expand by about 20%. - Winter recreation would experience additional crowding and conflict, as opportunities to expand are restricted. - Winter recreation use for both motorized and non-motorized visitors are expected to increase by an additional 4.4 million forest visits.			

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
snowmobiling, cross country skiing, ski area expansion).	<ul style="list-style-type: none"> - Quality winter recreation would continue to expand as increase use expands. - Winter recreation use for both motorized and non-motorized visitors would increase by an additional 4.4 million forest visits. -Growth in the number of outfitter and special uses would continue to slow as capacities are reached. -Existing and potential ski areas would continue to be managed according to the direction in existing Forest Plans. 	<p>-Growth in the number of outfitter and special uses would continue to slow as capacities are reached and expansions under permits or authorizations would be limited to existing groomed or designated routes but able to expand into areas of consistent snow compaction.</p> <p>-Ski area expansions would incorporate design strategies to provide for lynx habitat and movements.</p>			
The proposed amendment may impact human uses of the forest by limiting timber harvest opportunities.	Average Annual Acres of Accomplished Precommercial Thinning in a 5-year period: 4,700 acres. Regeneration harvest average of 4000 acres annually	Average Annual Acres of Precommercial Thinning: 3,040 acres. Regeneration harvest acreage remains approximately 4000 acres annually.	Average Annual Acres of Precommercial Thinning: 3040 acres. Regeneration harvest acreage remains approximately 4000 acres annually.	Average Annual Acres of Precommercial Thinning: 3750 acres. Regeneration harvest acreage remains approximately 4000 acres annually.	Average Annual Acres of Precommercial Thinning: 3750 acres. Regeneration harvest acreage remains approximately 4000 acres annually.
The proposed amendment may impact human uses of the forest	Possible loss of lynx habitat through conveyance, or the acquisition of lynx	Requirement to retain NFS lands in linkage areas could affect future exchanges or limit federal parcels available for exchange			

Issue	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
by limiting land adjustment opportunities.	habitat through purchase or exchange. The White River includes specific direction and management area direction.				
The proposed amendment may impact human uses of the forest by limiting lands special use proposal options.	Current management emphasis and direction are maintained under current Forest Plan direction.	There may be some limitations or constraints on options for location of facilities (communication sites, etc).			

Table 2- 4 - Comparison of Alternatives by Standards and Guidelines

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
VEG S1					
Wildlife: Lynx Habitat	Foraging habitat for lynx can be created through regeneration timber harvest; however habitat conversions are not limited by Forest Plans. Most SRLA existing Forest Plans did not have direction to protect or enhance lynx foraging habitat.	Would limit the amount of lynx habitat that is currently unsuitable (immediately post-fire or post-regeneration harvest) to less than 30% of lynx habitat in LAUs.	Would limit the amount of lynx habitat that is currently unsuitable to less than 30% of lynx habitat in LAUs or a "combination of immediately adjacent LAUs". This could result in the displacement or indirect mortality (starvation) of individual lynx.	Effects would be similar to Alternative C. ALL S2 could lead to adverse effects since it allows some lynx standards to not be met.	Effects would be similar to Alternative C.
Timber Management	The average annual harvest for the seven Forests in this analysis covers 3,800 acres. Most LAUs have 3-8%	This standard would not, in itself, reduce timber management activities in the Southern Rockies.	This standard would not, in itself, reduce timber management activities in the Southern Rockies.	This standard would not, in itself, reduce timber management activities in the Southern Rockies.	This standard would not, in itself, reduce timber management activities in the Southern Rockies.

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
	unsuitable habitat, with virtually all below 20%				
Fuels Management:	Current management emphasis and direction for fire use and fuels reduction activities are maintained under current Forest Plan direction	If the thresholds specified are reached, fuels reduction efforts would be curtailed regardless of the critical nature of the work or location (wildland urban interface). This can compromise firefighter and public safety. At the current time no LAUs are close to exceeding the 30% threshold so the probability of this standard having a significant impact on fuels treatments is small. Wildland Fire Use is not limited. Wildfire suppression activities are not subject to this standard.	Effects would be the same as Alternative B, except that prescribed fire activities are exempted also.	Effects would be the same as Alternative B, except that prescribed fire activities are exempted also.	Effects would be the same as Alternative B, except that prescribed fire activities are exempted also.
VEG S2					
Wildlife: Lynx Habitat	Foraging habitat for lynx can be created through regeneration timber harvest. However, habitat conversions are not limited by existing Forest Plans. Most existing Forest Plans in the Southern Rockies did not have direction in plans protecting lynx	Limits habitat conversions due to timber harvest to less than 15% of lynx habitat within a LAU to unsuitable condition within a 10-year period.	Effects similar to Alternative B, with the exception that it is a guideline under this alternative.	Effects similar to Alternative B, with the exception that it is a guideline under this alternative.	Similar to Alternative B, except fuels treatment projects within WUI may occur on up to 3% of lynx habitat on each administrative unit (NF).

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
	foraging habitat.				
Timber Management	No change would occur in Forest Plan or funded timber management practices.	This standard may limit the amount of even-aged harvest activity that takes place in an individual LAU, but overall would not reduce timber management activities in the Southern Rockies over the next 10-year period.	Direction is presented as a guideline VEG G7. The effects would be similar to Alternative B.	Direction is presented as a guideline VEG G7. The effects would be similar to Alternative B.	This standard may limit the amount of even-aged harvest activity that takes place in an individual LAU, but overall would not reduce timber management activities in the Southern Rockies over the next 10-year period.
Fuels Management	Current management emphasis and direction for fire use and fuels reduction activities are maintained under current Forest Plan direction.	This standard may limit the amount of timber harvest activity that provides secondary benefits of fuels reduction but at the current time no LAUs are close to exceeding the 15% threshold so the probability of this standard having a significant impact on fuels treatments is small.	Direction is presented as a guideline HU G7, but the effects would be similar to Alternative B.	Same as C	Direction is presented as a guideline HU G7, but the effects would be similar to Alternative B.
VEG S3					
Wildlife: Lynx Habitat	Deemed adequate for overall denning habitat retention, due to old growth requirements and non-developmental land allocations. Marginal for denning structure maintenance.	Specifically maintains denning habitat across the landscape.	Effects similar to Alternative B.	Effects similar to Alternative B. However, ALL S2 could lead to adverse effects.	Effects similar to Alternative B.
Timber	No change would occur in	Implementation of this	Effects similar to	Effects similar to	Direction is presented as

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
Management	Forest Plan or funded timber management practices.	standard is similar to VEG S2 in that individual LAUs may have restrictions on the acres that could be harvested or salvaged using even-aged methods and practices that reduce coarse woody debris, but no overall reduction in timber management practices should occur.	Alternative B.	Alternative B.	a guideline VEG G11, but the effects would be similar to Alternative B.
Fuels Management	Current management emphasis and direction for fire use and fuels reduction activities are maintained under current Forest Plan direction.	Fuels treatments may be restricted in stands that can develop denning habitat structure if a LAU has less than 10% denning habitat. At the current time denning habitat in all LAUs within the amendment area greatly exceeds the 10% threshold and the probability of this standard limiting fuels treatment activities is low. Wildland Fire Use is not limited Wildfire suppression activities are not subject to this standard.	Effects similar to Alternative B. Fuels treatments could occur to create defensible fuel profiles.	No restrictions for fuels treatments.	No restrictions for fuels treatments.
VEG S4					
Lynx: Denning Habitat (Forest Floor structure)	Current plans contain some provision for both standing and dead and	Specifically maintains small disturbances that provide current or	Effects similar to Alternative B. Fire hazard thinning allowed	Effects similar to Alternative B, with the exception that it is a	Guideline maintains pockets of denning habitat distributed in

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
	down coarse woody debris, but are very minimal.	future denning structure.	within 200 feet of dwellings or other structures and landscape settings critical for the creation of defensible fuels profiles. Allows fire use practices and activities to restore ecological processes that maintain or improve lynx habitat. Effects to lynx are the same as Alternative B.	guideline under Alternative D. More potential denning structures could be removed, so this alternative may have additional impacts to denning habitat.	each LAU.
Timber Management	No limitations would occur in management activities aimed at controlling insect or disease infestations or in salvage of dead or dying trees.	Spruce beetle epidemics are usually triggered when large spruce trees are blown down. This standard has the potential to contribute to substantially increase the size of spruce beetle infestations resulting from blowdown and small infestations that could result in a significant loss of trees.	No major difference would result in general salvage program levels in lynx habitat compared to Alternative B. Effects on forest stands would be similar to those projected for Alternative B.	VEG G8 provides more flexibility for salvage opportunities than VEG S4. Potential to increase the size of insect infestations resulting from blowdown and initial infestations could remain if guideline is treated like a standard in situations where denning habitat has not been mapped/field verified and there is potential that the salvage of windthrown spruce could be delayed and result in a spruce beetle epidemic. Effects on timber management would be less than the effects associated with Alternatives B and C.	Effects would be similar to Alternative D.
Fuels Management	Current management emphasis and direction for fire use and fuels reduction activities are maintained under current	Limits the use of salvage harvest of . Other Mechanical Fuels treatments are not restricted	Limits the use of salvage harvest of areas smaller than 5 acres. Provides for an exception allowing salvage harvest within	Direction is presented as a guideline VEG G8. No restriction on fuel treatments.	Direction is presented as a guideline VEG G8. No restriction on fuel treatments.

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
	Forest Plan direction.		200 feet of a dwelling and/or associated outbuildings. This allows for the use of commercial salvage harvest within the structure ignition zone and allows landscape settings for the creation of defensible fuels profiles. Other Mechanical Fuels treatments are not restricted		
VEG S5					
Lynx: Foraging Habitat (precommercial thinning)	Lynx foraging habitats not protected in existing plans. Risk of adverse effects.	Protects lynx foraging habitat.	Adds the exception, precommercial thinning associated with research and genetic tests. This exception to the restrictions on precommercial thinning would have very minor and insignificant effects on the overall foraging habitat.	The exceptions to the standard could lead to the possibility of adverse effects to snowshoe hare and lynx foraging habitat. ALL S2 could lead to adverse effects.	Adds the exception, precommercial thinning associated with research and genetic tests. This exception to the restrictions on precommercial thinning would have very minor and insignificant effects on the overall foraging habitat.
Timber Management	No limitations would be placed on precommercial thinning.	This standard would result in essentially no pre-commercial thinning within lynx habitat located outside urban interface zones for an indefinite period. For non-thinned lodgepole pine stands in management areas where commercial timber production is a goal, an 89% reduction of production of	Effects similar to Alternative B.	This alternative would reduce thinning, particularly in lodgepole pine stands, compared to present levels. However, Alternative D would allow for thinning to occur in some stands prior to a permanent loss of the physiological ability of a tree to respond. Reductions in future sawlog volume production would be less than under	Similar to Alternative D and would limit precommercial thinning within lynx habitat for an indefinite period, but it also provides exceptions for WUI areas compared to Alternatives B and C. Reductions in future sawlog volume production would be less than under Alternative B.

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
		sawlog-sized material would be anticipated over the next 60 years.		Alternative B.	
Fuels Management	Current management emphasis and direction for fire use and fuels reduction activities are maintained under current Forest Plan direction.	Fire Hazard Reduction Thinning is generally not permitted unless stands no longer provide snowshoe hare habitat. Allows fire hazard reduction thinning within the structure ignition zone only. The inability to conduct thinning can affect the units' ability to create defensible space or defensible fuels profiles. This can have effects on public and fire fighter safety, private property values and the ability to conduct fire use. Wildfire suppression activities are not subject to this standard	Permits Fire Hazard Reduction Thinning within the structure ignition zone and landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities or facilitate fire use practices and activities that restore ecological processes that maintain or improve lynx habitat. This alternative allows managers to conduct fire hazard reduction thinning to create defensible fuels profiles. Fire use activities should not be affected as thinning of critical landscape settings may occur. Firefighter and public safety should not be adversely affected in this alternative.	Effects similar to Alternative C, however fuels treatments would not be restricted.	Effects similar to Alternative C, however fuels treatments would not be restricted.
HU S1					
LYNX: Snow Compaction (Competition & Predation)	Motorized and non-motorized winter recreation activities may continue to contribute to a risk of adverse effects on lynx.	Limits, to a certain extent, potential increase competition and predation risks to lynx.	Negative impacts in one LAU could be offset by protection of more pristine areas of another LAU.	Effects similar to Alternative C, however ALL S2 could lead to adverse effects.	Negative impacts in one LAU could be offset by protection of more pristine areas of another LAU
Winter Recreation Use	- Expansion of groomed and ungroomed trails would continue to grow by	- Expansion of total groomed and ungroomed trails would be limited to existing areas of snow compaction. Some existing ungroomed trails would be converted			Effects similar to Alternatives B, C and D.

Standards	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
	about 50%. - Quality winter recreation would continue to expand as increase use expands. - Winter recreation use for both motorized and non-motorized visitors would increase by an additional 4.4 million forest visits. -Growth in the number of outfitter and special uses would continue to slow as capacities are reached.	into groomed trails, allowing expansion of the groomed system by about 50%. - Winter recreation would experience additional crowding and conflict, as opportunities to expand are restricted. - Winter recreation use for both motorized and un-motorized visitors would increase by an additional 4.4 million forest visits. -Growth in the number of outfitter and special uses would continue to slow as capacities are reached and expansions under permits or authorizations would be limited to existing groomed or designated routes.			
HU S2					
Recreation: Skiing	Ski based resorts would continue to be managed according to the direction in existing Forest Plans.	The requirements may be to reduce the potential efficiency of ski operations. The costs of constructing developments to protect potential diurnal security habitat and maintaining connectivity, as well as associated operational costs, may increase.	Direction is presented as guideline HU G11, but the effects would be similar to Alternative B.	Direction is presented as guideline HU G11, but the effects would be similar to Alternative B.	Direction is presented as guideline HU G11, but the effects would be similar to Alternative B.
LINK S2					
Wildlife: Habitat Connectivity	Most existing forest plans do not specifically address connectivity. Overall weakness of the LRMP's in the Southern Rocky Mountain Geographic Area in addressing linkage or connectivity potentially contributes to a risk of adverse effects to lynx under this alternative.	Contains provisions for the maintenance of connectivity between patches of lynx habitat within and between LAUs. It also contains specific provisions for the protection of linkage areas. Identification and maintenance of linkage areas would facilitate movement of lynx throughout and between landscapes.		Effects similar to Alternative B with direction as a guideline. ALL S2 could lead to adverse effects.	Effects similar to Alternative B with direction as a guideline.

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Chapter 3 – Affected Environment and Environmental Consequences

Introduction

This chapter describes the environment being affected by the alternatives discussed in Chapter 2 and forms the scientific and analytic basis for the comparison of these alternatives. The impacts for each alternative are discussed for those resources identified during internal and external scoping and considered to be factors in the decision being made.

For each resource, this chapter addresses: a) the affected environment, b) direct and indirect effects, c) cumulative effects and d) other applicable laws, regulations, policies and direction. The analysis area for cumulative impacts is the Southern Rocky Mountain Geographic Area. The analysis considers past, present, and reasonably foreseeable future actions.

Background

The Lynx Conservation and Assessment Strategy (LCAS) (Ruediger et al. 2000) was developed to provide a consistent and effective approach to conserving lynx on Federal lands in the contiguous United States. The overall goals of the LCAS are to recommend lynx conservation measures, provide a basis for reviewing the adequacy with regard to lynx conservation of Forest Service Land and Resource Management Plans (Forest Plans), and to facilitate consultation under Section 7 of the Endangered Species Act.

Southern Rocky Mountain Geographic Area Amendment Area

The Southern Rocky Mountain Geographic Area (SRMGA) is comprised of 14.6 million acres of National Forest System (NFS) lands, with about 7.5 million acres (51 percent) mapped as lynx habitat within Lynx Analysis Units (LAU).

The National Forests of the Central and Southern Rocky Mountains (Arapaho Roosevelt National Forests, Medicine Bow – Routt National Forests, Grand Mesa, Uncompahgre and Gunnison National Forests, Pike San Isabel National Forests, San Juan National Forest, Rio Grande National Forest and White River National Forest) are dominated by rugged mountains, with broad valleys and remnants of high plateaus. They have variable geologic history, soil parent material, topography, and elevations ranging from 7,590 feet to 14,590 feet result in numerous habitat types, plant associations and tree cover-types.

There are five primary forest cover types in the Central and Southern Rocky Mountains, four of which are of concern related to Lynx habitat. The four are:

1. Aspen
2. Engelmann Spruce – Subalpine fir
3. Mixed Conifer

4. Lodgepole pine

Lynx habitat is mapped within LAUs. Where feasible, and in order to simplify other resource analyses, LAU boundaries follow previously delineated units such as watersheds, Forest Plan geographic areas, land type associations, and sometimes national forest boundaries. LAUs approximate the size of a female lynx's annual home range and encompass all seasonal habitats. However, LAUs are not intended to depict actual lynx home ranges, but are intended to provide analysis units of the appropriate scale with which to begin the analysis of potential direct and indirect effects of projects or activities on individual lynx, and to monitor habitat changes.

LAUs contain a mosaic of lynx habitat to the extent they may actually support lynx at the landscape level. LAUs also contain areas of non-lynx habitat, such as some high elevation grasslands, lower elevation drier sites, lakes, and alpine areas. Lynx conservation measures would apply only to lynx habitat (or habitat matrix for **HU S1**) within LAUs, except those measures related to linkage areas, which would be applied in some areas that are outside of LAUs.

Cumulative Impacts

Cumulative effects are analyzed for the Southern Rockies Geographic Area, including contiguous non Forest Service lands, temporally for the life of the amended Forest Plans, unless otherwise noted in the individual resource analyses. Below are the past, present, and reasonably foreseeable actions that are included in the cumulative effects analyses. Past actions are those for which a decision has been made and the direction has been implemented. Present actions are those for which a decision has not been rendered, but the actions are well into the planning process and their effects are anticipated to occur. Reasonably foreseeable future actions are those anticipated to occur within the next 10 to 20 years (e.g. during the time span of a Forest Plan).

Forest Service Actions

The following past, present and reasonably foreseeable programmatic actions and decisions will affect forests in the amendment area. These actions were used to evaluate the cumulative programmatic effects.

Existing Forest Plans in the Amendment Area - These documents were approved between 1983 and 2003 for the various National Forest System units in the amendment area. The effects of implementing these plans have previously been determined and disclosed in appropriate NEPA documents. The White River and Medicine Bow Revised Forest Plans incorporated objectives, strategies, standards and guidelines for lynx conservation, which are similar to Alternative B of this EIS.

2001 Roadless Rule - The 2001 roadless rule was enacted in January of 2001, and, subsequently was the subject of nine lawsuits in Federal district courts. As part of the legal challenge to the roadless rule by the State of Wyoming, the U.S. District Court for the District of Wyoming issued a permanent injunction and set aside the roadless rule in July of 2003. In February 2007, a United States District Court in California reinstated the

2001 roadless rule for National Forest System IRAs. In August of 2008, the Federal District Court in Wyoming again held that the 2001 be permanently enjoined.

State Petitions under the Administrative Procedures Act (APA) - In July of 2004, Agriculture Secretary Ann M. Veneman proposed a rule that responded to the lengthy litigation concerning the 2001 roadless rule. The proposal was to establish a process for Governors to work with the Forest Service to develop locally-supported rules for conserving IRAs in their states. On May 5, 2005, Agriculture Secretary Mike Johanns announced the adoption of the final State Petitions Rule which replaced the 2001 roadless rule. This rule became effective on May 13, 2005. The decision in *Cal. Ex rel. Lockyer*, 2006 U.S. Dist. LEXIS 72226, 52, set aside the State Petitions Rule and reinstated the 2001 roadless rule. Since petitions may no longer be submitted under the State Petitions Rule, and significant time and resources have already been committed to their formulation, States may instead submit petitions to amend the 2001 roadless rule to the United States Forest Service in accordance with the Administrative Procedures Act, pursuant to 7 C.F.R. 1.28, under the authority of 5 U.S.C.S. § 553(e).

The proposed Colorado Roadless Rule is a regulation specific to Colorado that provides management direction for approximately four million roadless acres of National Forest System lands in Colorado. A roadless area is defined as generally undeveloped land that is at least 5,000 acres in size or is adjacent to congressionally-designated Wilderness. The proposed Colorado rule does two things: 1) establishes Colorado roadless areas by accurately identifying areas with roadless character and 2) provides prohibitions on road-construction and tree-cutting in those roadless areas. The 90-day comment period on the proposed Colorado Roadless Rule and its associated draft environmental impact statement (DEIS) ended on October 23, 2008.

USDA Forest Service Rule 2005 Travel Management - The Travel Management Rule finalized in December 2005, and published in the federal register directs forest to manage motorized use by creating a designated system of roads, trails and areas. The Travel Management Rule provides the agency ability to regulate the use of snowmobiles and other over-snow vehicles while in use in areas and at times not covered by snow. This is addressed in Subpart 212.80, Purpose and Scope, "The purpose of this subpart is to provide for regulation of use by over snow vehicles on National Forest System roads and National Forest System trails and in areas on National Forest System lands." And in subpart 212.81, "Use by over-snow vehicles (a) General. Use by over-snow vehicles on National Forest System roads and National Forest System trails and in areas on National Forest System lands may be allowed, restricted or prohibited." The Department has chosen to exempt snowmobiles from the mandatory designation procedure for other off-road vehicles. However forests now have the option to use this rule to manage winter over the snow motorized use if they so choose. This provides much stronger regulatory ability than past forest orders. As needed, some forests are now amending their Forest Plans to be compatible with the provisions of the travel management rule.

Other Federal Agency Actions

Management of Lynx Habitat - Rocky Mountain National Park identified lynx habitat, which is included as part of the Arapaho-Roosevelt National Forest's LAUs. Bureau of

Land Management lynx habitat may also be incorporated into adjacent National Forest LAUs and is addressed in the cumulative effects analysis.

I-70 Mountain Corridor Programmatic Environmental Impact Statement - This effort focuses on long-term planning associated with the I-70 corridor transportation upgrade plans for the next 20 years. Within this process, a sub-group called “ALIVE” (A Landscape Level Inventory of Valuable Ecosystem Components) was formed to address creating or maintaining permeability for wildlife movements across the corridor through key stretches. The initial focus was on forest carnivores with the intent to identify and restore key landscape level corridors blocked or impeded by I-70.

Forest Plan Revisions

Revisions have been initiated for the San Juan National Forest, Grand Mesa-Uncompahgre-Gunnison National Forests, and the Pike-San Isabel National Forests. As each plan is revised, Plan direction will be updated as needed to respond to new information and remain consistent with current law, regulation and policy.

Organization of Chapter 3

Chapter 3 is organized by resource. Each resource area will discuss the affected environment for that resource and disclose the environmental direct, indirect and cumulative impacts of the No Action Alternative, the Proposed Action and alternatives to the Proposed Action.

The Relationship between Programmatic and Site-Specific Effects Analysis

This analysis is for a programmatic plan. It discloses the environmental consequences of the management direction contained in the Forest Plans that govern the use of resources on a national forest. It does not describe or predict the environmental consequences for applications of the standards and guidelines at individual site-specific projects.

Those finer-scale determinations of environmental consequences for site-specific projects depend on how the projects are implemented, the ways in which the standards and guidelines are applied to them individually, and the actual environmental conditions at the specific sites.

Wildlife

Introduction

This section is a disclosure of the potential effects of the alternatives on terrestrial wildlife. The proposed objectives, standards and guidelines identified under the various alternatives are applicable within lynx habitat on specific National Forest System lands in the Southern Rocky Mountain Geographic Area (SRMGA). These lands include seven National Forest units, in southern Wyoming and Colorado. The Medicine Bow-Routt National Forests were combined recently, and are still operating under two separate Forest Plans; therefore, there are eight Forest Plans to be amended.

Canada Lynx and Lynx Habitat

Background

Within the contiguous United States, lynx range extends into different regions, or geographic areas, that are separated from each other by ecological barriers consisting of large areas that are not suitable for lynx, e.g., the Northern Great Plains and the Wyoming Basin. The LCAS describes five geographic areas in the contiguous United States, while the Final Rule describes four geographic areas, combining the Northern Rocky Mountains and Cascades Geographic Areas into one. The Rocky Mountain Region of the Forest Service occurs in two of these geographic areas. The Shoshone and Bighorn National Forests in northern Wyoming are included in the Northern Rocky Mountain Geographic Area. The Medicine Bow National Forest in southern Wyoming and all of the National Forests in Colorado are in the Southern Rocky Mountain Geographic Area. The focus of the proposed action is on eight forest plans for the portion of the Rocky Mountain Region of the Forest Service that is within the Southern Rocky Mountain Geographic Area (SRMGA).

In November 2006, the U. S. Fish and Wildlife Service (FWS) designated critical habitat for the contiguous United States distinct population segment of the Canada lynx (USDI Fish and Wildlife Service 2006). The FWS did not designate critical habitat for any NFS lands covered under the SRLA. These lands were not included because through the Conservation Agreement (rev. 2006) between the U. S. Forest Service (USFS) and the FWS, the USFS agreed to consider the conservation measures in the LCAS to guide actions on those lands they administer. Refer to the final rule (Federal Register Vol. 71, no. 217, pp. 66008-66061, 11/09/06) for details of the critical habitat designation.

The Recovery Outline (USDI Fish and Wildlife Service 2005) identifies core areas, secondary areas and peripheral areas, based on historical and current occurrence records, as well as confirmed breeding.

The Southern Rockies (Colorado and southern Wyoming) were identified as a Provisional Core Area. This designation was identified because this area contains a reintroduced population, which has successfully reproduced in the wild.

Biological Elements of the Lynx Environment

Life histories of Canada lynx and its primary prey resource, the snowshoe hare, are thoroughly described in *The Ecology and Conservation of Lynx in the United States* (Ruggiero et al. 2000). The proposed actions and alternatives in this amendment would be applied only to lynx habitat within the Amendment Area in National Forests and to lynx linkage areas on NFS lands that are identified on Figure 1, Map of the Analysis area, in this document.

In the following sections various components of lynx habitat in the SRMGA are discussed: denning and foraging habitat, linkage areas, and connectivity between habitats. Several of the risk factors affecting lynx productivity and lynx movements identified in the LCAS will be described, and effects due to potential changes in habitat from

implementing each alternative are disclosed. These are the risk factors the Forest Service has the most ability to affect through land management. Risk factors affecting lynx mortality identified in the LCAS (trapping, predator control, incidental and illegal shooting, competition and predation, connectivity problems) will be addressed, as well as the effects to lynx for each alternative due to human activities.

The effects, by alternative, of incorporating lynx conservation measures into existing forest plans on other terrestrial wildlife species will also be analyzed for threatened, endangered and proposed species (TEP) in the assessment area, as well as each National Forest's Management Indicator Species (MIS) that occur in lynx habitat.

Much of the discussion in the general description of the Affected Environment is based on information contained in the LCAS, the Final Rule listing the Canada lynx as threatened (Federal Register, Vol. 65, No. 58, pages 16052-16086, 03/24/2000), the Interagency Biological Assessment (Hickenbottom et al. 1999), the Fish and Wildlife Service Biological Opinion (USDI Fish and Wildlife Service 2000a), and Ecology and Conservation of Lynx in the United States (Ruggiero et al. 2000). These documents represent a review and synthesis of virtually all published literature pertaining to Canada lynx and its primary prey, the snowshoe hare, as well as information, at the time of their publication. Individual citations from the source scientific literature are not presented in the text, for the most part if the synthesis document can be referenced. Sources of information used that are not from these four documents are appropriately identified.

Characteristics of Lynx Habitat in the Southern Rocky Mountain Geographic Area

In the contiguous United States, the distribution of the lynx is associated with the southern boreal forest comprised primarily of subalpine coniferous forest in the West and mixed coniferous/ deciduous forest in the East. The southern boreal forest of Colorado and southeastern Wyoming is isolated from boreal forest in Utah and northwestern Wyoming by the Green River Valley and the Wyoming Basin. At its southern margins, the boreal forest becomes naturally fragmented into various sized patches as it transitions into other vegetation types. These southern boreal forest habitat patches are small relative to the extensive northern boreal forest of Canada and Alaska, which constitutes the majority of the lynx range. Lynx in the contiguous United States are considered part of a larger metapopulation whose core is located in the northern boreal forest of central Canada. Colorado is the southern edge of the range of the lynx.

Lynx habitat in the SRMGA is usually found in the subalpine and upper montane forest zones, typically between 8,000 and 11,500 feet in elevation. Upper elevation subalpine forests are dominated by subalpine fir and Engelmann spruce. As the subalpine zone transitions down to the upper montane, spruce-fir forests begin to give way to predominance of lodgepole pine, aspen, or mixed stands. Engelmann spruce and/or subalpine fir may retain dominance on cooler, more mesic mid-elevation sites, intermixed with aspen, lodgepole pine, and Douglas-fir. White fir appears in the San Juan Mountains and Sangre de Cristo Range in southern Colorado.

The lower montane zone is dominated by ponderosa pine, pinyon pine/juniper communities and Douglas-fir, with pine typically dominating on lower, drier, more exposed sites, and Douglas-fir occurring on moister and more sheltered sites. Although

this forest zone is generally below lynx habitat, montane forests can be important as connective travel habitat where they may facilitate lynx dispersal and movements between blocks of lynx habitat, and may provide some foraging opportunities during those movements.

In summary, lynx habitat should be thought of in terms of a habitat mosaic within these southern boreal forest landscapes, rather than as simple vegetation types. Spruce-fir, lodgepole pine, white fir, aspen, and mesic Douglas-fir may all provide foraging and/or denning habitat for lynx. Also potentially important in many parts of the SRMGA are the high elevation sagebrush and mountain shrub communities found adjacent to or intermixed with forested communities, affording potentially important alternate prey resources. Riparian and wetland shrub communities (e.g.: willow, alder, serviceberry) found in valleys, drainages, wet meadows, and moist timberline locations may also support important prey resources.

In the SRMGA, most lynx habitat occur on federal lands in public ownership including National Parks, Bureau of Land Management, and National Forest System lands.

Forests in the SRMGA are naturally patchy, with many openings and breaks in forested canopies. Much of the SRMGA is in non-developmental management designations such as Wilderness Areas, Research Natural Areas, and other NFS lands where Forest Plans place additional restrictions on human impacts.

Lynx habitat in southern Wyoming and Colorado is geographically isolated from the rest of the Rocky Mountain chain by the vast sagebrush and desert shrub expanses of the Wyoming Basin and the Red Desert in Wyoming and similar vegetation patterns in the Green and Colorado River plateaus in western Colorado and eastern Utah. This geographic isolation may have some long-term implications for maintenance of lynx populations in the SRMGA, as lynx from the northern meta-populations may not be able to easily disperse into this area.

Snowshoe hares are strongly associated with stands that are densely stocked or have a dense understory and with coniferous cover in the winter months. Densities of snowshoe hare appear to be positively correlated with density of horizontal cover that is one to three meters in height. This structure (dense horizontal cover) is common in early seral stages, but also may occur in mature stands that have a well-developed understory (Hodges 2000).

Studies in northern Wyoming and a more limited study in Colorado found that snowshoe hares had a strong affinity for the higher elevation mature to late-successional spruce-fir forests. The Wyoming study showed that hares did not utilize early successional stages (less than 15 years of age), since these conditions probably were not yet providing suitable hare habitat. In Colorado, Dolbeer and Clark (1975) reported higher survival of snowshoe hares in mature spruce-fir forests and mixed spruce-fir/lodgepole pine forests, which contained dense undercover, than in open lodgepole stands lacking understory. The Colorado study was conducted in a very limited area, and did not sample younger sapling stage stands (15 to 40 years) to compare hare densities with those that were reported for mature and late-successional spruce-fir forests. Therefore, it remains somewhat unclear what role young sapling forests play in providing snowshoe hare habitat in the SRMGA; however, it is generally accepted that they are of more value than

pole-size stands, especially in lodgepole pine, based on literature from the northern boreal forests.

Both timber harvest and natural disturbance processes can provide good foraging habitat for lynx when the resulting understory has enough horizontal cover to meet the forage and cover needs of snowshoe hare. These characteristics include a dense, multi-layered understory that maximizes cover and browse at both ground level and at varying snow depths throughout the winter (stems and branches from one to three meters above the ground).

Lack of widespread disturbance processes in lodgepole pine for much of this century have led to many highly stocked, even-aged stands that do not now provide the dense ground- and snow-level cover and forage necessary to support higher densities of snowshoe hare, but may provide red squirrel or other prey species. The crowns of these dense stands have lifted far above the reach of hares, and the dense canopies limit light penetration, contributing to the somewhat barren understory.

Late successional spruce-fir forests, by contrast, do provide cover and forage for hares and red squirrels, and thus are generally more valuable than mature lodgepole forests, in providing stable supplies of prey resources. Lodgepole pine is the more dominant vegetation type in the northern portions of the SRMGA, especially on the Medicine Bow-Routt and Arapaho-Roosevelt National Forests. Large areas of dry site, climax lodgepole stands that are not in close proximity to denning habitats are not mapped as lynx habitat, as they would not be able to function as part of a home range.

Extensive pure stands of aspen may not provide quality habitat for hares due to deficiencies in winter habitat characteristics. These habitat conditions exist in some areas on the western portions of the SRMGA: Grand Mesa, Uncompahgre, and Gunnison, San Juan, and White River National Forests. Some of these pure aspen stands have not been mapped as lynx habitat in this portion of the SRMGA, as they are not in close enough proximity to winter or denning habitats, and therefore would not be expected to provide the required components for lynx home ranges.

Many parts of the Southern Rockies have a shortage of dense early successional forest stands, particularly in lodgepole pine. This may make it very important to protect existing sites that have high densities of snowshoe hares. Regenerating stands of lodgepole pine and mixed conifer-aspen stands, to maximize densities of horizontal cover at ground through maximum snow depth height, would likely improve habitat for snowshoe hares. It is equally important to protect and encourage those habitats that are good producers of alternate prey, such as red squirrels, grouse, and other lagomorph species (rabbits, hares and pikas). Woody debris can also improve cover where vegetation is lacking.

Lynx habitat in the SRMGA is naturally fragmented by alpine tundra, open valleys, shrubland communities, and dry vegetation types associated with southerly and westerly exposures or lower montane zone elevation. Because of the southerly latitude, spruce-fir, lodgepole pine, and mixed aspen-conifer forests constituting primary lynx habitat are typically found in elevational bands along the flanks of mountain ranges or on high plateaus. Although naturally fragmented, it remains generally interconnected through the numerous mountain chains and intervening low elevation forests and brushlands. There are important topographic features and vegetation communities that link these fragmented

forested landscapes of habitat together, providing for movement of individuals between subpopulations. Connectivity may be provided by narrow forested mountain ridges or plateaus that connect more extensive mountain habitats, or wooded riparian communities that provide travelways across open valley floors between mountain ranges. Lower elevation ponderosa pine, pinyon-juniper woodlands, or shrublands may also serve the same function.

All national forests in the SRMGA have mapped their lynx habitat. Models for denning and foraging habitat were developed using habitat definitions and descriptions contained in the LCAS. Interpretations of the LCAS and development of mapping protocols have been a cooperative dialogue between State, Forest Service, FWS Biologists, as well as the Lynx Biology Team, who authored the LCAS, and the Lynx Science Team, who authored "Ecology and Conservation of Canada Lynx in the United States". Please refer to the Glossary and Appendix F for more details. Each Forest has documented the criteria used along with their rationale as to how they developed their lynx habitat mapping.

Lynx Population in the Southern Rockies

Most of the records and literature on lynx abundance and distribution indicate that historical lynx populations were relatively rare in the SRMGA, compared to populations in Alaska and the northern portions of Washington and Montana. A statewide lynx verification program was conducted in Colorado from 1978-1980 and concluded that a viable but low-density lynx population persisted in Eagle, Pitkin, Lake, and Clear Creek counties with evidence of lynx occurrence in Grand and Park Counties. Lack of evidence from other parts of lynx range in Colorado is probably due to lack of adequate surveys. The population in Colorado was believed to be too small to be self-sustaining and a reintroduction project was initiated.

The Colorado Division of Wildlife released a total of 218 lynx in the San Juan Mountains from 1999 to 2006. Of the total 218 lynx released, there are 80 known mortalities as of June, 2006: 21 percent due to starvation or disease, 31 percent were human-induced which were attributed to vehicle collisions or gunshot and 33 percent were unknown causes (Dr. Tanya Shenk, Research Wildlife Biologist, Colorado Division of Wildlife, periodic lynx update, 11/2006). This mortality pattern can be expected from reintroduced animals due to unfamiliarity with the area and large-scale movements often characteristic of reintroduced animals. Reproduction has been documented, with 37 dens with an average of 3 kittens each located from 2003-2006. In 2006, a female lynx that was born in Colorado gave birth to a litter of kittens, documenting the first recruitment of a Colorado-born lynx into the Colorado breeding population. In the last 3 years, 113 kittens have been documented born in Colorado. CDOW reports that most lynx remain in the southern Colorado release area; although some are located in the Collegiate Peaks/Taylor Park area and some have moved north of I-70.

Disturbance regimes important to Lynx habitat in the Southern Rockies

Fires have been, and will continue to be, a significant influence in forests inhabited by lynx. Fire intensity tends to be high with long natural fire return intervals in subalpine forest types in the West. Generally, in forests with high-severity fire regimes, a number of smaller fires may burn a small proportion of the forests, while fewer larger fires

account for most of the area burned over time (See Fuels and Fire Ecology section). This creates extensive even-aged patches of regenerating forests.

Fires in the SRMGA spruce-fir forests are generally stand replacement events because of their severity or the inability of the trees to withstand even moderate temperatures associated with fires. Fire frequency in the SRMGA boreal forests ranges from 100 to 400 years. Natural barriers, such as large open parklands, lakes, reservoirs and barren ridges, often play a role in how extensive fires become in the SRMGA boreal forests. In some geographic locations, the spruce-fir forest may be considered to be included in the non-fire regime, due to topographic location and local climatic conditions.

Insects also play a role in the disturbance regimes of SRMGA boreal forests. Most important are the mountain pine beetle in lodgepole pine, and the spruce beetle in spruce-fir forests. Mountain pine beetle generally infest large diameter trees, which can naturally thin, or create openings within the lodgepole pine stands. In an extreme epidemic, an entire even-aged stand could be killed, thus regenerating the stand. Spruce beetle, at endemic levels, create small openings or canopy gaps by killing small areas of mature trees. At epidemic levels, which are most common in over mature stands, the predominant response is the release of sub canopy trees of both spruce and fir (Veblen et al. 1994), but stands tend to be dominated by subalpine fir after an outbreak (Schmid and Hinds 1974). These large outbreaks also result in additional herbaceous growth on the forest floor.

Affected Environment and Environmental Consequences

Mapped LAUs for national forests in the SRMGA tend to be large, generally from 65,000 to 120,000 acres in size. As suggested in the LCAS, densities of lynx in the lower 48 states are lower than in northern boreal forests due to lower prey densities and inherent habitat patchiness. Lower prey densities are thought to result in increased home range size. Therefore, although this is somewhat speculative, a gradient in home range size may occur in the U.S., with largest home range size occurring in the patchy habitats of the SRMGA.

The Affected Environment includes the seven National Forests previously listed (the “Amendment Area”) that are all within the SRMGA. The Amendment Area covers a large portion of the SRMGA, but does not include BLM, National Park Service, or any other federal, state or private lands within the SRMGA.

To provide an adequate amount of habitat to support a resident lynx and to provide a continuous supply of foraging habitat, the LCAS recommends limiting the early seral stages of lynx habitat due to timber harvest and fire to 30 percent of lynx habitat within an LAU, until a broadscale assessment of historical natural conditions can be completed. The 30 percent limitation would apply to the early successional stages of forested stands created by both silvicultural treatments and prescribed fire, and was established based on studies from three independent sources (Poole et al. 1996, Koehler 1990, and Brittell et al. 1989) which indicate that limiting the proportion of a lynx home range currently in unsuitable condition to no more than 30 percent is a reasonable approach to conserve lynx, until more local analysis can be completed.

Table 3- 1 shows the currently modeled denning, additional winter foraging, and other lynx foraging habitat within LAUs for the Amendment Area. There are approximately 14.6 million acres of NFS lands within LAUs, of which approximately 7.5 million acres is lynx habitat.

Table 3- 1 - NFS Acres of Lynx Habitat within the Amendment Area

National Forests	Total Lynx habitat Acres	Denning/Winter Forage Habitat*	Winter Forage (Non-denning)*	Other Lynx Foraging	Total Suitable Lynx Habitat	Currently Unsuitable Lynx Habitat
Arapaho-Roosevelt	690,082	159,630	481,654	32,354	673,638	16,444
GMUG	1,641,664	615,822	224,208	787,537	1,627,568	14,096
Medicine Bow/Routt	1,192,466	171,103	128,978	858,852	1,158,933	33,533
Pike-San Isabel	826,156	274,515	269,385	276,546	820,446	5710
Rio Grande	1,035,420	373,005	187,538	392,357	952,900	82,520
San Juan	1,048,567	452,392	110,361	427,280	990,033	58,534
White River	1,142,794	459,800	321,382	344,580	1,125,762	17,032
Total:	7,577,149	2,506,267	1,723,506	3,119,506	7,349,280	227,869

GMUG: Grand Mesa, Uncompahgre, Gunnison NF's

*Denning habitat, in this table, is also considered winter foraging habitat, so the two columns need to be added to get total winter forage habitat.

Table 3- 2 displays acres of lynx habitat that are considered to be currently in unsuitable condition. This is defined in the Glossary as areas within identified and mapped lynx habitat that are in early successional stages as a result of recent fires or vegetation management, and in which the vegetation has not developed sufficiently to support snowshoe hare populations during all seasons. Management created openings would include clearcut and seed tree harvest units, and might include shelterwood and commercially-thinned stands depending on unit size and remaining stand composition and structure.

Table 3- 2 - Acres of Suitable and Currently Unsuitable Condition Lynx Habitat in the Amendment Area (Forest-wide Average) as of 2002

National Forests	Suitable (NFS acres)	Unsuitable (NFS acres)	Total Lynx Habitat (NFS)	Percent Unsuitable
Arapaho-Roosevelt	673,638	16,444	690,082	2
GMUG	1,627,568	14,096	1,642,473	<1
Medicine Bow-Routt	1,158,933	33,533	1,192,466	3
Pike-San Isabel	820,446	5710	826,156	<1
Rio Grande	952,900	82,520	1,035,420	8
San Juan	990,033	58,534	1,048,567	5
White River	1,125,762	17,032	1,142,794	1.5

In 2002, there was one LAU in the Amendment Area with 30 percent or more of the lynx habitat in currently unsuitable condition, due to a large wildfire. Most of the LAUs ranged from 3 to 8 percent of the lynx habitat being in a “currently unsuitable condition”. In areas affected by the mountain pine beetle epidemic, additional acreage of currently unsuitable conditions have been created.

Lynx Conservation and Assessment Strategy - Risk Factors

In the proposed rule to list Canada lynx, the USDI Fish and Wildlife Service (USFWS) identified various risk factors, including competition, habitat loss and fragmentation, and the inadequacy of existing regulatory mechanisms to protect the species, as potentially affecting lynx populations. The USFWS disclosed in the Final Rule for listing that there is inconclusive evidence that any of the factors identified, with the exception of inadequate regulatory mechanisms, may actually adversely affect the contiguous U.S. lynx population. This was reiterated in the July 3, 2003 Final Rule, which re-affirmed that the status of Canada lynx in the contiguous United States was “threatened”. Because a substantial amount of lynx habitat in the contiguous United States occurs on federally managed lands, particularly in the West, the USFWS concluded that one factor that was responsible for a low to moderate threat to lynx in the contiguous United States is the lack of guidance in existing Federal land management plans for conservation of lynx and lynx habitat. Implementation of lynx conservation through revision of Federal land management plans would reduce or remove some threats facing lynx and lynx habitat, and therefore would strongly influence future lynx status determinations.

The LCAS identified several specific management activities and practices termed “risk factors” for the Southern Rockies geographic area. Risk factors affecting lynx productivity included fire exclusion, grazing, and winter recreational uses that create compacted snow conditions. Fire exclusion has resulted in a lack of early successional stages of conifers, which provide important snowshoe hare habitat.

Unmanaged grazing by domestic and wild ungulates in aspen and high elevation willow stands can degrade snowshoe hare habitat.

Road, trail and recreational activities that results in snow compaction may facilitate increased access into lynx habitat and competition for food resources by competitors (primarily coyotes).

Risk factors affecting lynx mortality include trapping, predator control activities and predation by mountain lions, and being hit by vehicles on major highways, such as I-70, State Highway 550, and many of the major mountain passes in the SRMGA.

Risk factors affecting lynx movement include barriers to movements such as major highways and associated development within rights-of-way. Private land development, especially along road corridors in mountain valleys, may also fragment habitat and impede movement of lynx. Urban expansion and development on private land has further fragmented an already patchy distribution of lynx habitat, many times in response to development or expansion of a developed recreational facility on NFS lands within lynx habitats.

On July 3, 2003 the USFWS published their finding for Canada lynx in the *Federal Register* (USDI Fish and Wildlife Service 2003). The USFWS concluded there was a low threat to the contiguous United States lynx population from timber harvest and thinning and fire suppression activities on both non-Federal and Federal lands in the Southern Rocky Mountains. The USFWS also concluded there was a moderate threat to the contiguous United States lynx population from lack of Federal land management plan guidance and high volume traffic and private land development in the Southern Rocky Mountains.

Based on the national Lynx Biological Assessment (BA) and Final Rule, existing land management plans in the SRMGA, include approximately 25 percent of the lynx habitat in non-developmental land allocations. For the Amendment Area only, this figure is approximately 32 percent. These are lands where natural ecological processes may predominate. Fire could be allowed to play a significant role in creating a natural mosaic of vegetation communities and age classes across the landscape. Human activities potentially affecting lynx such as timber harvest, road construction, recreation developments, and motorized dispersed recreation generally do not occur in these areas, or are extremely limited.

Within the land allocations where development of some type is permitted, there is opportunity to maintain lynx habitat through vegetation manipulation and other land management activities. There are also potential impacts to lynx such as road building, recreation and other development, unrestricted alteration of habitat, and motorized recreation activities.

National Forests in the SRMGA have mapped their lynx habitat and delineated LAU since the national Biological Assessment and Final Rule were published. An examination of the distribution of management area prescriptions on NFS lands within mapped LAUs provides better insight into the distribution of management activities, hence, the relative amounts of protection as well as potential impacts or risks to lynx habitat. Table 3-3 shows three broad groups of management area emphasis for national forests in the SRMGA. Non-developmental allocations generally include management area categories 8 and 10 in the original forest plans, and categories 1 and 2 in the newer, second generation forest plans. Developmental allocations are managed for a broader range of multiple-uses, and are separated into two groups.

The first represents development allocations characterized by generally lower levels of multiple-use (less development) and includes management area categories 2 and 3 in the original forest plans, and categories 3 and 4 in the newer forest plans. The second group of development allocations represents full multiple-use management activities (allows for more development) and includes management area categories 1, 4, 5, 6, 7, and 9 in the original forest plans, and categories 5, 6, 7, and 8 in the newer forest plans. Included are the forest plans being amended, therefore, they are automatically incorporated by reference. (See individual Forest Plans for detailed descriptions of the Management Area Descriptions).

Table 3- 3 - Groups of Land Management Allocations by Percent of Lynx Analysis Unit

Forest	Percent Non-developmental	Percent Developmental (low multiple use – some development)	Percent Developmental (full multiple use – allows more development)
Arapaho-Roosevelt	41% (cat. 1, 2)	30% (cat. 3, 4)	29% (cat. 5, 7, 8)
GMUG	20% (cat. 8, 10)	21% (cat. 2, 3)	59% (cat. 1, 4, 5, 6, 7)
Medicine Bow/Routt	37% (cat. 1,2)	11% (cat. 3,4)	52% (cat. 5,7,8)
Pike-San Isabel	25% (cat. 8, 10)	29% (cat. 2, 3)	46% (cat. 1, 4, 5, 6, 7, 9)
Rio Grande	22% (cat. 1, 2)	35% (cat. 3, 4)	43% (cat. 5, 6, 7)
San Juan	34% (cat. 1.1's, 10)	34% (cat. 2, 3)	32% (cat. 1B, 4, 5, 6, 7)
White River	46% (cat. 1,2)	8% (cat. 3,4)	46% (cat. 5,6,7,8)
Average (%)	32	24	44

In the Amendment Area, a total of 2.37 million acres (32 percent) of all NFS acres of lynx habitat within lynx habitat are in non-developmental management area allocations. Most of these “non-developmental allocation” lands are in wilderness areas, research natural areas, and other similar allocations that generally have minimal impacts from human activities. The risks to lynx and lynx habitat are considered minimal within these allocations but the lack of vegetative management activity limits opportunities to create foraging habitat. However, there are some management activities occurring or being considered in wilderness areas, such as grazing and fire use and management (which include prescribed and natural ignition fires) that may have limited effects on lynx or lynx habitat. Incorporation of the lynx conservation measures into the Amendment Area Forest Plans would result in little or no change in current management direction for these areas, with the exception of possibly allowing fire to play more of a natural role in these areas. Changes to lynx and lynx habitat would be negligible because these resource values are already being addressed by current Forest Plan direction, with the possible exception of the fire management.

The LCAS objective of allowing fire to play its natural role as a disturbance process, which could create younger successional stages of forested stands in a natural mosaic, may benefit lynx habitat long term.

Twenty-four percent of all NFS lands in mapped lynx habitat are in developmental management area allocations in which potential impacts from management activities are low to moderate. These lands include allocations for special interest areas, backcountry uses, scenic rivers and byways, a variety of dispersed recreation uses, municipal watersheds, and corridors connecting core areas.

There are a variety of potential impacts to lynx and lynx habitat from multiple use activities. Anticipated impacts from habitat modification, road construction, motorized

recreation, developed recreation, or other developments are relatively low and/or localized due to restrictions placed on them in existing forest plans. The proposal to implement lynx conservation measures into SRMGA Forest Plans may not change the existing level of activities in these management areas, but may preclude increases of winter dispersed recreational activities into currently unused areas. Standards and guidelines associated with the maintenance of lynx habitat, the competitive advantage of lynx, and habitat connectivity could affect specific locations, distribution, and timing of some activities. Therefore, implementation of lynx direction in Forest Plans would emphasize conservation actions that provide greater benefit (e.g. connectivity, reduced road mortality) to lynx and lynx habitat within these management area allocations than the current direction in the Forest Plans.

Forty-four percent of all Amendment Area lands in mapped lynx habitat are in developmental management area allocations managed for a full range of multiple use activities. These lands include allocations for forest vegetation management (wood fiber production), range vegetation management, and other forest products; as well as big game winter range, habitat for wildlife management indicator species, ski-based resorts and other developed recreation complexes; administrative sites, residential/forest interface, and utility corridors. Potential impacts to lynx and lynx habitat from multiple use activities associated with these land allocations are the greatest relative to other land allocations. The proposal to implement lynx conservation measures into Amendment Area Forest Plans would have the greatest potential to reduce or remove risks to lynx and lynx habitat identified in the LCAS and Final Rule on these land allocations. These lands probably also provide the greatest opportunity to maintain or increase lynx foraging habitat through vegetation manipulation and other land management activities.

Trapping

Affected Environment

Lynx seem to be vulnerable to trapping and as a result may have been over exploited in the past. Road access may increase the vulnerability of lynx to trappers. At low population levels, or in situations where reproduction or recruitment are low, trapping mortality can be additive and lead to population declines. Incidental trapping may occur where regulated trapping is permitted for other species (such as coyote and fox) whose range overlaps with that of the lynx.

Regulation of trapping is not within the jurisdiction of the Forest Service but is regulated by the states. Trapping seasons are closed for lynx in Wyoming and Colorado. It is possible that lynx could be incidentally trapped during trapping seasons for other species in Wyoming. Trapping with leghold traps is illegal in Colorado. The Final Rule for listing indicates trapping does not currently appear to be a significant mortality factor in the SRMGA; the July 3, 2003 Final Rule reiterated this indication.

Environmental Consequences

None of the alternatives addresses trapping; therefore there will be no change from existing situation. It will continue to be regulated by the States, with a small potential for incidental or illegal trapping occurring.

Predator Control

Affected Environment

Predator control activities occur on public lands throughout this geographic area to protect livestock from predation. Methods include trapping, shooting, and poisoning. These activities are directed at specific animals or target species. Predator control activities can occur in lynx habitat, but more often take place outside of lynx habitat and at lower elevations.

Predator control activities on NFS lands in lynx habitat are limited. Any predator control activity is directed at a particular species or offending animal and is usually done on sheep allotments in the higher elevations. Unintentionally trapped lynx can be released. Information provided by the Animal and Plant Health Inspection Services (APHIS-Wildlife Services) shows that no lynx have been incidentally taken in the Western Region for the past 30 years. Predator control activities that affect lynx or lynx habitat on NFS lands must be done in compliance with the Endangered Species Act.

Environmental Consequences

None of the alternatives would change the current practices of predator control on public lands. Predator control activities conducted by APHIS-Wildlife Services are subject to their own separate Section 7 consultation process; therefore, there will be no change from the existing situation.

Incidental or Illegal Shooting

Affected Environment

Lynx can be mistakenly shot by hunters or illegally killed by poachers. The magnitude of shooting mortality within the contiguous United States is unknown. Road access into lynx habitat can increase the risks of accidental shootings.

Regulations for shooting animals are not within the jurisdiction of the Forest Service but rather rest with the States. There are a very few records of lynx being shot in the SRMGA. Of the reintroduced lynx in Colorado, 31 percent of the mortalities have been human caused (Dr. Tanya Shenk, Research Wildlife Biologist, Colorado Division of Wildlife, periodic lynx update November, 2006), with nine confirmed and possibly 14 being shot. Recently released lynx may be more mobile than lynx with established home ranges, making them more vulnerable to being shot. One of the shooting mortalities occurred in western Nebraska.

Environmental Consequences

None of the alternatives specifically addresses shooting, but alternatives B, C, D and F may reduce public use of special project and special use roads due to proposed standards and guidelines. This may indirectly reduce illegal shooting; however, any change would be unquantifiable.

Competition and Predation (Lynx productivity and mortality risk factor)

Affected Environment

Lynx interact with other carnivores throughout their range. Competition with coyotes, mountain lions, and bobcats have been inferred or documented throughout the range of the lynx. Definitive data on the threats of mountain lions on lynx is somewhat lacking, but because lions and lynx occupy different ecological niches and depend on different prey species, the effects of mountain lions on lynx populations is believed to be minimal.

There is no evidence that the bobcat out-competes the lynx for habitat and food resources. There is, however, one confirmed mortality of a released lynx in Colorado due to bobcat predation (Shenk 2004).

Buskirk et al. (in Ruggiero et al. 2000a) described the two major competition impacts to lynx as exploitation (competition for food) and interference (avoidance). Of several predators examined (birds of prey, coyote, wolf, mountain lion, bobcat and wolverine), coyotes were deemed to most likely pose local or regionally important exploitation impacts to lynx; coyotes and bobcats were deemed to possibly have important interference competition effects on lynx (LCAS 1-12). Coyotes have greatly expanded their winter range, and the use of packed snow trails and plowed roads, which may allow them to occupy winter habitats of lynx in some cases. The lynx and coyote seem to hunt under different snow conditions with coyotes using shallower and more compacted snow while lynx tend to use deeper snow areas.

With respect to winter recreation activities, the LCAS describes a programmatic planning standard and guidelines involving the mapping of a winter snow compaction baseline and then mapping and monitoring the location and intensity of snow compaction activities that coincide with lynx habitat, to facilitate future evaluation of effects on lynx as information becomes available (Ruediger et al. 2000, LCAS page 7-9). Widespread human activity (snowshoeing, cross-country skiing, snowmobiling, snow cats, etc.) may lead to patterns of snow compaction that make it possible for competing predators such as coyotes and bobcats to occupy lynx habitat through the winter, reducing its value to and even possibly excluding lynx (Ruediger et al. 2000, Ruggiero et al. 2000, Chapter 4).

The Forests within the SRMGA have completed a first draft of their baseline snow compaction mapping, and the total number of miles of snow compacted routes and trails within lynx habitat in the Amendment Area is estimated to be approximately 4,825 miles (See Recreation Section).

Environmental Consequences

Direct and Indirect Effects

While there is some concern that predation on lynx could occur due to the abundance of mountain lions in the Region, predation is not documented to be a factor that is threatening the lynx in the SRMGA. It is hypothesized that coyotes, bobcats, and mountain lions could be competitors with lynx. Where historically the ranges of these species overlapped with the lynx, deep snow excluded them from winter habitats for the lynx. Lynx have evolved a competitive advantage in deep soft snow environments that

tend to exclude other predators during the middle of winter, a time when prey is most limiting. Widespread human activity on the snow may lead to patterns of snow compaction that make it possible for competing predators such as coyotes and bobcats to occupy lynx habitat through the winter, reducing its limited prey base. Even though there is no hard scientific evidence that snow compaction can lead to increased competition from other predators as yet, the LCAS recommends that “Until conclusive information is developed concerning lynx management, we recommend the agencies retain future options. That is, choose to err on the side of maintaining and restoring habitat for lynx and their prey.” (Ruediger et al. 2000).

Alteration of forests and development of compacted trails through the snow could facilitate movement of potential lynx competitors into lynx habitat in the winter. Lynx and carnivore biologists (Bider 1962, Ozaga and Harger 1966, Murray and Boutin 1991, Koehler and Aubry 1994, Murray et al. 1995, and Lewis and Wenger 1998, all cited in Ruggiero et al. 2000) have suggested that packed trails created by snowmobiles, cross-country skiers, snowshoers, as well as by other predators, may serve as travel routes for potential competitors and predators of lynx, especially coyotes. Buskirk et al. (in Ruggiero et al. 2000) hypothesize that the usual spatial segregation of lynx and coyotes “may break down where human modifications to the environment increase access by coyotes to deep snow areas. Such modifications to the environment include expanded forest openings throughout the range of the lynx in which snow may be drifted, and increased snowmobile use in deep snow areas of the western mountains.” Recent advances in snowmobile technology allow snowmobiles to travel through deeper snow and into areas that were not accessible with the older machines. Coyotes have been shown to increase their use of open habitats between November and March due to the increase in packed snow conditions and the load-bearing strength of snow in openings. It is this strong prey and habitat switching ability of the coyote that may contribute to its success as a competitor (LCAS p. 2-8).

Some timber harvest practices increase edges and openings that may improve conditions for generalists that can move into the areas and compete with lynx. Plowed roads and snow compaction of roads and trails associated with a variety of forest management and recreational activities may also increase the potential for competitors to move into lynx habitat.

Alternative A – No Action

Alternative A, the No Action alternative, does not directly address snow compacting activities that have the potential to allow competitors to move into lynx habitat, except for the White River and the Medicine Bow NF Forest Plans. Some Forest Plans have direction for winter sports. The Biological Assessment completed on Forest Service and BLM plans (Hickenbottom et al. 1999) concluded that “both mechanized and non-mechanized winter recreation may contribute to a risk of adverse effects on lynx where they are allowed within the geographic areas, by providing packed trails for other carnivores to more easily enter lynx habitat and either compete with lynx for food resources or prey on lynx.”

Alternative B

Alternative B, the proposed action, under **HU S1**, restricts increases in “groomed or designated” recreational snow compacting activities to areas that are already consistently compacted, thus limits to a certain extent, potential increased competition and predation risks to lynx. “Designated” snow compacting activities are those activities that the Forest Service authorizes, promotes or encourages, through special use permits, agreements with Snowmobile Clubs, signing, trailheads, etc. This standard allows for some management flexibility in allowing new authorizations for over the snow activities in areas in which the snow is already consistently compacted by dispersed recreational use. These baseline areas and routes are or would be mapped based on what existed in the years 1998-2000, and 2002 for the White River National Forest. This standard would maintain the status quo as much as possible, in regards to the areas of snow compaction that allow access in the winter to competitors of lynx. However, **HU S1** allows for increases in grooming on the already designated snow compacted areas. Increased grooming of trails along existing routes could indirectly lead to an increase in use and possibly an increase in snow compacted areas at the end of the newly groomed trails. This is based upon the assumption of grooming greatly increasing use of trails, bringing more users into formerly difficult to access areas.

Alternative C

Alternative C allows the standard regarding no net increase in designated or groomed snow routes (**HU S1**) to be addressed at larger scales than that of the LAU scale, which is in the Proposed Action, but could be allowed in combination with immediately adjacent LAUs. Once a combination of LAUs is used for analysis of snow compaction to apply the standard, this combination would become a set analysis boundary to track snow compaction in that area.

Alternative C also allows for some management flexibility in allowing new authorizations for over the snow activities in areas in which the snow is already consistently compacted by dispersed recreational use (according to baseline mapping for snow compaction). It is generally the same as Alternative B, except that it allows for the no net increase in “designated” use to be analyzed at a larger scale. A combination of immediately adjacent LAUs” could be up to 400,000-500,000 acres in the amendment area. Effects that would be different at the larger scale could be increased snow compaction in one LAU, but this could possibly be offset by the protection of more pristine areas of another LAU. Therefore, effects from this alternative on lynx could be positive if lynx habitat features are factored into leaving some pristine areas. However, in general, a large scale use of the no net increase of snow compaction could have negative effects to individual lynx, by allowing more competitors into some LAUs, during the most limiting season for forage resources.

Alternative D

The direction on no net increase in authorized snow compaction is a guideline under **Alternative D (HU G10)**, which would not require it to be implemented on all proposed activities.

Failing to implement the **HU G10** guidance at the project level may lead to additional negative impacts to individual lynx from competition for prey resources, depending on the frequency of the guideline not being followed at the project level. Predicted groomed trail increases are the same under all action alternatives.

Alternative F

The direction on no net increase in authorized or designated snow compaction areas is a guideline under Alternative F (**HU G10**), which would have the same effects as Alternative D above. Alternative F also has a Guideline **HU G12** that states: “Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes or designated over-the-snow routes.” This is a standard in Alternatives B and C (**HU S3**). Failure to implement this guideline may lead to additional negative impacts to individual lynx from competition for prey resources.

Denning and Foraging Habitat

Affected Environment

Approximately 2.5 million acres are estimated to provide denning habitat characteristics currently across the Amendment Area (Table 3- 1). Denning habitat is defined as habitat used during parturition and rearing of young until they are mobile, and is characterized by large amounts of coarse woody debris that provides escape and thermal cover (see Glossary for more complete definition). Denning habitat in the Southern Rockies is likely to occur most often in late-successional spruce-fir forest with a substantial amount of large diameter woody debris on the forest floor. Lodgepole pine and Douglas fir stands can also be denning habitat provided that the cool, moist conditions and coarse woody debris are present. Usually these conditions occur in lodgepole stands that are successional to the spruce-fir habitat type. Engelmann spruce and subalpine fir are often present in the stand. Denning habitat often is found on, but is not restricted to, northerly exposures due to the cooler conditions. In the SRMGA, all modeled denning habitat is also considered winter foraging habitat, as lynx denning habitat contains the habitat characteristics needed by snowshoe hares, as well.

Currently in the Amendment Area, most of the LAUs have 20-50 percent of each LAU in modeled denning habitat. This is due to the large occurrence of older successional stage forested stands in the Southern Rockies, which were regenerated during the large fires of the mid-late 1800’s. Lack of large fires and long fire return intervals for spruce-fir are the most probable reasons for the large amount of mature spruce-fir, which usually provides good denning habitat due to the natural disturbances processes associated with it, such as blowdown, insects and disease. These processes all create snags and down logs, which provide the structure on the forest floor that is used for denning by lynx.

Foraging habitat for lynx in the SRMGA includes all of the primary forest types that make up lynx habitat (spruce-fir, lodgepole pine, Douglas-fir, and aspen). Spruce-fir occupies 45 percent of the lynx habitat in the Amendment Area. Aspen stands account for 25 percent of the lynx habitat, lodgepole occurs on 22 percent, and Douglas-fir and mixed conifer occupy 8 percent of the lynx habitat within the Amendment Area (See Table 3- 9

in the Forest Resources and Timber Management Section). Also potentially important are the high elevation sagebrush and mountain shrub communities, as well as riparian and wetland shrub communities found in adjacent valleys, drainages, wet meadows, and moist timberline locations, which all may support alternate prey resources. Forests in the SRMGA area have modeled winter foraging habitat as a subset of all lynx habitat. Winter is a limiting factor for many wildlife species. Winter foraging areas are those that have the structural characteristics (described earlier) that provide cover and food for snowshoe hares through the deep snow conditions of winter. These areas actually provide yearlong habitat for hares. In summer, hares shift their diet to a higher proportion of grasses, forbs, and herbaceous portions (new growth) of shrubby species that are not available in winter, and thus may occupy additional areas in summer where these plants are more abundant and available. Currently there are approximately 4.23 million acres of modeled winter foraging habitat in the Amendment Area (Table 3- 1; winter forage, non-denning and denning habitat columns).

Most of the lynx habitat within the LAUs in the amendment area is currently suitable for foraging, with generally only three to eight percent of most of the LAUs being in the currently unsuitable condition—in an early seral stage (See Table 3- 2).

Environmental Consequences — Denning Habitat

Direct and Indirect Effects

Alternative A – No Action

Alternative A, No Action, has direction in existing Forest Plans that potentially maintains denning habitat for lynx even though lynx aren't specifically identified in most plans (except the White River and the Medicine Bow NF Plans). Table 3- 4 shows a summary of direction in existing Amendment Area Forest Plans that provides for some characteristics of lynx denning habitat.

In most Forest Plans, existing direction (Alternative A) for the maintenance of old growth or late-successional forest approximates direction for lynx denning habitat contained in the proposed action (Alternative B). The old growth requirement in the San Juan National Forest Plan is 5 percent, which is lower than the 10 percent minimum for denning habitat in the Proposed Action and alternatives. The Rio Grande National Forest Plan contains no specific provision for old growth retention. However, existing wilderness areas and other non-developmental lands would also, by default, protect areas of denning habitat from planned management activities or developments, but not necessarily from large, contiguous wildfires. Given the patchiness of the forested lynx habitat within the SRMGA, largely due to grassland and alpine areas, large contiguous wildfires in high elevation lynx habitats are rare. Within the Amendment Area, an average of 32 percent of the land within LAUs is in non-developmental management allocations, much of which includes denning habitat.

The USFWS Biological Opinion (USDI 2000a) on the current Forest Plans stated that within non-developmental allocations, denning habitat would likely be maintained at or above historic levels, and that within developmental allocations, existing Plan direction to maintain old growth habitat was judged to be adequate to provide for lynx denning habitat in the SRMGA.

Table 3- 4 - Summary of Direction in Existing Amendment Area Forest Plans

Forests	Old Growth Requirement*	Snag Requirement	Dead and Down Log Requirement
Medicine Bow	15%-25% depending on cover type by mountain range	1-10/acre within harvest units based on species; 0-12/ac recruits within harvest units based on species	1-15 tons/acre based on species
Routt	Guideline to provide a mix of successional stages (young to late-successional)	1/acre	33-50 linear ft/ac
Arapaho-Roosevelt	Objective to manage for increase in mature and old growth	1/acre	33-50 linear ft/ac
GMUG	5-12%	200-300/100 ac	10-20 tons/ac 50 linear ft/ac
Pike-San Isabel	10%	20-30/10 ac	33-50 linear ft/ac
Rio Grande	None	2/acre	33-50 linear ft/ac
San Juan	5%	20-30/10 ac	33-50 linear ft/ac
White River	10% denning, 30% late-successional in spruce-fir. VEGS3 and S4	3/ac, 1 large/5 acres	150 linear ft/ac (spruce-fir)

GMUG = Grand Mesa, Uncompahgre, and Gunnison National Forests.

* Mature and old growth standards are generally by Diversity Unit, Fourth Order Watershed, or other landscape boundaries such as mountain ranges, to ensure good distributions across the Forest.

Coarse woody debris is also an important characteristic of lynx denning habitat. All existing Forest Plans in the SRLA contain some provision for both standing and dead and down coarse woody debris.

All existing plan requirements for dead and down logs range from 33-50 linear feet per acre. This standard can usually be met with only one or two downed logs per acre, which represents an essentially bare forest floor, which would not be considered enough down woody debris for denning habitat. Existing Forest Plan requirements for snags (standing dead trees) range from one to three snags per acre. Standing dead trees represent future recruitment to the dead and down log component. The minimum amounts of biomass necessary to meet these two standards is very low and does not compare to the amounts of coarse woody debris characteristic of denning sites. These standards do not provide the regulatory mechanisms, in and of themselves, to provide for denning structure. However, it must be kept in mind that these standards represent minimums and actual amounts in natural forest conditions within the SRLA are usually much higher. As these structural characteristics are not protected or maintained very well under the existing Forest Plans, this alternative does not specifically maintain the forest floor structure needed for denning as well as the action alternatives.

Alternative B

Alternative B, Proposed Action, has direction specific to lynx denning habitat and for addressing denning habitat on a large scale. **VEG S3** addresses denning habitat at the LAU scale by maintaining a minimum of 10 percent of each LAU in denning habitat in patches generally larger than 5 acres each. **VEG S4** addresses denning structure at the site-specific scale, maintaining those natural disturbance patches of less than 5 acres such as blowdown, small fires, insect and disease patches, or other mortality. Under Alternative B, there are allowances for salvaging these smaller than 5 acre patches of dead and/or down trees within:

- ♦ Developed recreation or administrative sites; designated road and trail corridors for public safety;
- ♦ LAUs where denning habitat has been field validated and is at least 10 percent of the LAU;
- ♦ The structure ignition zone, which is within 200 feet of administrative sites, dwellings and/or associated outbuildings. This allowance is to provide for defensible space from wildfires.

These allowances would not result in any quantifiable negative effects to lynx habitat, as the intent of the standard is to maintain denning habitat structure on the forest floor, and in most cases, actual lynx denning would occur away from high amounts of human activity, such as near a dwelling, developed recreation site or open roads.

Human uses such as minerals and special uses such as ditches, utility lines, etc, may also affect denning habitats, in some cases. Many of these uses are already in place, and the corridors and roads are permanently maintained in a non-forested condition. For new human use proposals, generally roads and corridors can be located so as to avoid important habitats, so any impacts to denning habitat from new authorizations for human uses would most likely be incidental or very minor. By the addition of these denning habitat standards to the existing Forest Plan standards for well-distributed old growth, along with the fact that 31 percent of the Amendment Area is in wilderness and non-developmental management prescriptions, Alternative B would likely provide sufficient direction to maintain denning habitat across the landscape.

Alternative C

Alternative C is the same as Alternative B with regard to **VEG S3**, to maintain a minimum of 10 percent denning habitat across the LAU, but there are differences in the direction provided by **VEG S4**. Under Alternative C, **VEG S4**, salvage harvest of the smaller than 5-acre patches would also be allowed “in landscape settings *critical* for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat”. This exception would allow for the reduction of denning structure on additional acreages of lynx habitat than would be allowed under Alternative B, but provides more protection of these important components than the No Action alternative (A). In order to use this exception/allowance, the analysis would have to provide the documentation as to why the landscape is critical to the defensible fuels profiles. Municipal watersheds are only those that are documented in the Forest Plans.

Alternative D

VEG S3, the denning habitat standard under Alternative D, adds an allowance for “Fuels treatments identified through a process such as that described in *“A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10 Year Comprehensive Strategy Implementation Plan.”* (USDA Forest Service 2001) For site-specific project level analysis, this could result in adverse effects to individual lynx. If the exception to the standard is used, the conditions within the LAU could be changed to less than 10 per cent of the lynx habitat with denning habitat characteristics, which could adversely affect individual lynx. The LCAS identified the minimum threshold for denning habitat at 10 percent within each LAU. In most cases, these LAUs would primarily be those outside of wilderness. However, some Wilderness Areas now have a Fire Use Plan, which would allow fuels treatments in the form of prescribed fire within the some of the Wilderness Areas.

Under Alternative D, **VEG S4** as proposed in Alt. B and C is a guideline called **VEG G8**. As a guideline, these smaller than 5-acre disturbances that provide future denning structure would be more likely to be removed, or salvaged, across the landscape. Under this guideline, future denning structures could be removed, so this alternative could have more negative impacts than Alternative B or C to potential denning habitat, but would likely provide more denning habitat protection than the No Action Alternative (A).

In addition to the above potential impacts to lynx under Alternative D, there may be other impacts to denning habitat, from the **ALL S2** standard which allows the lynx standards to be exempted based on the effects determination by the project level biologist. This could lead to additional impacts to lynx, depending on how much or how often the denning standard is not applied at the project level. It would be very difficult at this programmatic analysis level, to estimate how the **ALL S2** standard will be applied, but worst-case scenario, it could lead to adverse effects to several individual lynx, and ultimately, with no limits on the use of the general allowance, it may negatively impact lynx productivity, and therefore possibly the lynx population within the Amendment Area.

Alternative F

Under Alternative F, there are no standards addressing denning habitat. VEG S3 and S4 are substituted with a Guideline (**G11**), which states: “Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind-thrown trees (“jackstrawed piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris piles, or residual trees to provide denning habitat in the future.”

As stated previously, the USFWS Biological Opinion (USDI 2000) on the current Forest Plans stated that within nondevelopmental allocations denning habitat would likely be maintained at or above historic levels, and that within developmental allocations, existing Plan direction to maintain old growth habitat was judged to be adequate to provide for lynx denning habitat in the SRMGA. After the SRMGA forests modeled and mapped lynx denning habitat since May, 2000, it appears that denning habitat may not be a limiting factor for lynx in the SRMGA, as most LAUs have between 20-40 percent

denning habitat. Based on this and the Biological Opinion (2000), the Guideline G11 will likely be adequate to be able to maintain good distributions of denning structure.

Environmental Consequences — Foraging Habitat

Direct and Indirect Effects

The LCAS also infers that limits must be placed on the extent of habitat alteration that can occur at one time within an LAU, to limit the short term effects to an individual lynx, as most treatments to create future foraging habitat can result in short term (15-20 years) unsuitable habitat conditions. Early structural stages of a forested stand within lynx habitat (primarily coniferous) that do not provide either snowshoe hare or red squirrel (primary prey sources) habitats are considered unsuitable habitat.

Precommercial thinning occurs both to enhance growth on remaining trees, and to reduce fuels in fuels treatment areas. In the SRLA, this would primarily occur in the lodgepole pine type (22 percent of lynx habitat) and the mixed conifer type (8 percent), which are the ecosystems primarily affected with unnatural fuel build-ups due to fire suppression, within lynx habitat. Only minor amounts of precommercial thinning occur in spruce-fir, generally to reduce stocking of subalpine fir. The LCAS assumes that maintaining foraging habitat within each LAU through time is very important. Stem density and/or horizontal cover appear to be directly and positively correlated to snowshoe hare density (Conroy et al. 1979, Sullivan and Sullivan 1988, Koehler 1990, Hodges 2000a). Precommercial thinning reduces the density of sapling sized conifer trees and understory shrubs, and therefore, is likely to be detrimental to snowshoe hare habitat.

Foraging habitat for lynx can be created through regeneration timber harvest under Alternative A, but is specifically provided for in Alternative B, C, D and F.

Alternative A - No Action

Foraging habitat is not well protected under Alternative A, as it allows for, and directs outputs for the precommercial thinning in those densely regenerating stands that provide high quality snowshoe hare habitat, as well as in the mature stands of spruce-fir, which generally provide stable winter foraging habitat. Forty-seven hundred acres per year is the best estimate of what would continue under the No Action Alternative. The interagency Biological Assessment (Hickenbottom et al. 1999) determined that precommercial thinning may result in adverse effects to lynx within the SRMGA.

Alternative B

Limits on habitat alterations in LAUs are intended to aid in maintaining a distribution of suitable lynx habitat across the landscape and over time. Application of certain conservation measures at the LAU scale allows blocks of quality lynx habitat to be maintained within each LAU, thereby maintaining a good distribution of lynx habitat at the scale of a lynx home range.

One of the major standards in the LCAS that is designed to limit habitat alteration is **VEG S1**, which limits currently unsuitable lynx habitat to no more than 30 percent per LAU. In conifer habitats, unsuitable habitat conditions persist for about 20 years after a fire or some types of vegetation management activities, but would vary from forest to

forest depending on the forest ecosystems affected and site conditions. This standard would limit potential adverse effects on an individual lynx, as it would be applied at the LAU (home range) scale, until a broad scale assessment is completed, which would suggest what scale is appropriate for the disturbance regimes and vegetative types found in the assessment area. Most of the lynx habitat within the LAUs in the Amendment Area is currently suitable for foraging, with generally only three to eight percent of most of the LAUs being in the currently unsuitable condition—in an early seral stage (See Table 3-2). Standard **VEG S2** in Alternative B is related to the standard described above; however, it regulates the rate of timber harvest that would change suitable lynx habitat into an unsuitable condition. This does not pertain to prescribed or wildland fire, as the intent of the LCAS is to encourage fire. According to the LCAS, timber harvest is not an exact ecological substitute for natural disturbance processes. For a list of these differences, see the LCAS, page 2-2 and 2-3.

This standard could still result in up to 30 percent of an LAU in unsuitable condition within 20 years due to mortality events such as insect epidemics, but it is highly unlikely that this amount of regeneration harvest would occur in an individual LAU in the SRMGA. On average, the LAUs in the Amendment area have between three to eight percent of the lynx habitats in currently unsuitable conditions, including both timber activities and fire (wild and prescribed). Most of the LAUs within the SRMGA have spruce-fir habitat as the basis for lynx habitat within the LAUs, and typically, clearcutting is not the preferred method of harvest for spruce-fir. However, overstory removal could result in unsuitable habitat conditions in some cases, in spruce-fir. Generally, it is the clearcutting in lodgepole pine that results in unsuitable habitat conditions temporarily. Clearcutting in aspen also can cause unsuitable conditions temporarily, but aspen can regenerate very quickly, providing snowshoe hare forage above snow levels in five to 10 years.

Standard **VEG S3**, although intended for denning habitat, also provides for well-distributed foraging habitat. Denning habitat also serves as good foraging habitat, as it typically provides habitat for both snowshoe hare and red squirrel, the two primary prey species for lynx.

Standard **VEG S5** protects the majority of the highest quality snowshoe hare habitats, the young, densely regenerating coniferous stands, which may have a higher density of hares than other structural stages of forest, and can serve as an important foraging area in which a lynx may regularly hunt/forage. It also protects the areas of mature stands that provide moderate densities, but likely more stable populations of snowshoe hare. The acreage of foraging habitat potentially affected by the exception for structure ignition zones is unknown, but expected to be very minor.

Standard **VEG S6** protects the majority of the winter foraging or snowshoe hare habitats that are found in the mature and late successional Engelmann spruce and subalpine fir stands.

These stands “shall provide for winter snowshoe hare habitat except in a few specific cases, such as the structure ignition zone, which is to provide for defensible space for dwellings, and other buildings. The acreages potentially affected by the allowances under this standard are expected to be very minor.

Standards **GRAZ S1** and **S2** would help to manage grazing to protect the regeneration of stands. These vegetation standards would contribute to the maintenance of lynx populations across the landscape of the Amendment Area, as they meet the intent of the conservation recommendations in the LCAS, which is based on the most up to date information available on the potential risks to lynx viability.

Alternative C

Standard **VEG S1** under Alternative C allows for the 30 percent unsuitable conditions level to be addressed at a larger scale of “**combination of immediately adjacent LAUs**”. With the large LAUs in Amendment Area, this could be an analysis scale from approximately 250,000 acres to 500,000 acres.

This alternative allows for the limitation of the 30 percent of unsuitable habitat to be analyzed at a larger scale than the LAU scale, without completing a broad scale assessment of the natural historical ecological conditions of the landscape. As the LAUs were delineated based on the approximate home range size of an individual lynx, this could result in the displacement or indirect mortality (starvation) of several lynx. By addressing the 30 percent unsuitable conditions limitation over a larger scale, it is possible that most of the lynx habitat in one or more LAUs could be in unsuitable condition, with no further restrictions placed on vegetation management activities. Allowing this level of disturbance over large scales as described in Alternative C, could be detrimental to individual lynx in the Southern Rockies, as forested habitats are already highly fragmented naturally, with many areas already having 20 to 30 percent of their landscapes in montane or alpine grasslands.

Standard **VEG S5** under Alternative C adds an exception to the restrictions on precommercial thinning as compared to the proposed action. These exceptions are:

1. Research studies and genetic tests (i.e., performance tests) necessary to evaluate genetically improved reforestation stock.
2. Conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings); landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat.

This standard (VEG S5 under Alt. D.) does not apply to:

- 1) Wildfire suppression
- 2) Wildland Fire Use.
- 3) Developed Recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries.

The exceptions for **VEG S5** under Alternative C could lead to the possibility of adverse effects to snowshoe hare habitat and lynx foraging habitat. Effects from precommercial thinning that reduces snowshoe hare habitat for defensible space, or structure ignition zones, would be the same as for Alternative B, but the exception for Alternative C also allows precommercial thinning in lynx foraging habitat for the development of defensible fuels profiles. The worst case scenario, however, with no limitations to the exception, is

that the alternative may not provide management direction that would ensure the maintenance of well-distributed, high quality lynx foraging habitat.

To provide some context of how much this exception would be expected to be used, the fuels, fire, and fire ecology section indicates that, although not restricted in this exception, it would likely be used as follows:

- ♦ In the Wildland Urban Interface (within one mile of communities at risk) and around wilderness or roadless area boundaries, where fire use plans have been completed. Fire use plans have been completed on the following forests: Arapaho Roosevelt; Grand Mesa, Uncompahgre and Gunnison; Medicine Bow, Routt; San Juan; Rio Grande; and White River National Forests.
- ♦ The most intensive fuel treatments, which would include precommercial thinning, would be in ponderosa pine (non-lynx habitats) and mixed conifer (generally is lynx habitat) near communities, because those are the vegetative types within the Amendment area that are most changed (outside of normal range of conditions) as a result of fire suppression in the last 50 years. There are not very many “communities at risk” within the mixed conifer vegetation types in the Amendment area; therefore, the overall treatment acres in mixed conifer, which is lynx habitat, would be less than ponderosa pine.
- ♦ The overall expected use of precommercial thinning for treatments within lynx habitat under the defensible fuels profile exception is expected to be very limited in amount and intensity.
- ♦ In most cases, precommercial thinning for fuels treatments in lodgepole pine stands would be in stands that do not currently provide snowshoe hare winter habitat, (the crowns have lifted to above 3 meters above the ground) which would not be restricted in any way by **VEG 5** Standard, even under Alternative B.
- ♦ Very minor amounts of precommercial thinning would be needed in spruce/fir types, only for fuelbreaks and defensible space more than 200 feet from a dwelling. Fuelbreaks are terrain dependent, generally ridgetops, saddles, etc. that would be “critical” to suppressing a fire. These are moderately limited across landscapes.

Therefore, it is expected, given this context, that effects to lynx foraging habitat from the defensible fuels profiles exception could be somewhat limited across the landscape. This exception for precommercial thinning may also provide the flexibility to enable more fire use (prescribed and wildfire) activities in higher risk areas. In the long term, this may improve lynx foraging habitat, as long as it is designed with lynx habitat components in mind.

This standard, with exceptions, still protects the majority of the highest quality snowshoe hare habitats, the young, densely regenerating coniferous stands, which may have a higher density of hares than other structural stages of forest, and can serve as an important foraging area in which a lynx may regularly hunt/forage. It also protects the areas of mature stands that provide moderate densities, but likely more stable, populations of snowshoe hare. The acreage of foraging habitat potentially affected by the exception for structure ignition zones and research projects is unknown, but expected to be very minor.

The exception for defensible fuels profiles may affect larger acreages, but in the Southern Rocky Mountain Geographic Area, forest fuels management projects principally occur in lower elevation mixed conifer, ponderosa pine, grassland, shrublands and dry site lodgepole pine habitat types, most of which are non-lynx habitat.

Guideline **VEG G7** proposes direction limiting timber harvest activities to changing more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period as a guideline. (It is a standard in Alternative B- **VEG S2**). On average, the LAUs in the Amendment Area have between three to eight percent of the lynx habitats in currently unsuitable conditions, including both timber activities and fire (wild and prescribed). It is unlikely that this level of timber harvest (15 percent of lynx habitat) would occur in the Amendment Area, based on economics primarily. Therefore, this direction was proposed as a guideline for Alternatives C and D. Given that **VEG S1** already limits overall habitat conversions to unsuitable conditions, this should not change the impacts to lynx unless the economic conditions for wood fiber production significantly change within the timeframe of the Forest Plans. In areas with very large fires or large areas of insect caused mortality, this could become an issue. The Big Fish Fire on the White River changed 21 percent of one LAU to unsuitable habitat.

Standard **VEG S6** and guideline **HU G10 (under Alternative C)** address the protection and improvement of winter foraging conditions for lynx. Many human uses (vegetation management, recreation use and facilities) can degrade or remove winter foraging habitat, which may be one of the limiting factors for lynx productivity. Standard **VEG S6** gives direction to maintain the important and stable source of winter foraging habitat provided by mature spruce-fir stands. In guideline **HU G10**, the guidance encourages treatment within the lodgepole stands, as densely regenerating lodgepole stands can provide excellent snowshoe hare habitat. Aspen regeneration would also improve snowshoe hare habitat, if it were in juxtaposition with other winter foraging habitats.

Alternative D

The following are additional exceptions that affect lynx foraging habitat under Alternative D:

Standards **All S1**, **VEG S1**, **VEG S3**, and **VEG S5** contain the following allowance:

“This standard does not apply to fuels treatments identified through a process such as that described in *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10 Year Comprehensive Strategy Implementation Plan*.” (USDA Forest Service 2001). Under the worst case scenario, this allowance may have negative impacts to lynx foraging habitat, as there is no limit to treatments in lynx habitat defined. With no limits defined within the standard, there could be adverse effects to individual lynx, as well as the Southern Rockies lynx population, if high quality foraging habitat is not maintained in a well-distributed fashion.

The results of this fuels treatment allowance on the above vegetation standards and lynx habitat is expected to be somewhat limited. According to the Fuels, Fire and Fire Ecology section of the Supplemental DEIS fuels reduction planning projects within the Amendment Area contain approximately 611,150 acres of lynx habitat. This would be approximately 6 percent of the lynx habitat within the Amendment Area.

Of this, it is likely that 80,000 acres of lynx habitat, slightly more than one percent, would actually be treated in the next 10 years, as there is some documentation (Finney 2001) that has demonstrated that fuels treatment effectiveness can be optimized while treating approximately 20 percent of the landscape in a strategically placed pattern of overlapping treatments. Depending on how the strategically placed treatments are designed, this could have negative impacts on individual lynx. However, given the fact that the priorities for the “Collaborative Approach” plan are communities and their associated values, most of the negative effects to lynx foraging habitat would likely be adjacent to communities. Overall, given the expected amounts of treatment within lynx habitat, foraging habitat could be maintained at sufficient levels within the LAUs.

Under Alternative D, **VEG S5** restricts some vegetation management activities and practices that reduce snowshoe hare habitat. This applies to more than precommercial thinning practices, it applies to all silvicultural and vegetation treatments that are not specifically excluded. There are seven exceptions and five additional situations under which the **VEG S5** standard does not apply. They are as follows:

1. Associated with research studies and genetic tests (i.e., performance tests, long-term field tests and realized gain trials) necessary to evaluate genetically improved reforestation stock.
2. Conifer removal within aspen clones and/or daylight thinning around individual aspen trees.
3. Stands identified as “replacement” or “future” lodgepole old growth in the Forest Plan to provide structural and species diversity.
4. When a broad scale assessment has determined that early seral stages of forested habitat exceed what would be expected under the normal range of historic conditions.
5. Pruning, transplants, and Christmas tree and ornamental tree harvest if done so as to not measurably reduce lynx forage habitat.
6. Salvage and regeneration harvests.
7. Precommercial thinning conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings).

This standard (VEG S5 under Alt. D.) does not apply to:

- 1) Wildfire suppression
- 2) Fire use practices and activities that restore ecological processes.
- 3) Developed Recreation sites, administrative sites, or authorized special use improvements including within permitted ski area boundaries.
- 4) Fuel treatments identified through a process such as that described in *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10 year Strategy Implementation Plan*.

Removing conifers in aspen stands that are providing cover and forage between one to three meters above the ground would, in most cases, degrade snowshoe hare habitat. Aspen stands mixed with conifer are generally well used by snowshoe hares, but the year round use is in most cases dependent on the conifer component. Pure aspen stands in general, do not support snowshoe hare in the winter, due to lack of cover.

Snowshoe hare mortality is primarily predation; therefore cover is extremely important to their choice of habitats.

Precommercial thinning is a vegetation management practice sometimes used in lodgepole pine to provide structural diversity within lodgepole stands for future or replacement old growth, especially in regards to the characteristic of large diameter trees. This form of treatment is an attempt to replace low intensity fires that historically could underburn a lodgepole pine stand, reducing tree density. With the advent of fire suppression, these fires typically are suppressed, especially in the wildland urban interface. In lynx habitat in the Southern Rockies, lodgepole pine is typically seral to spruce-fir, so old growth pure lodgepole pine (climax lodgepole pine) stands are rare in lynx habitat. However, thinning in lodgepole pine would not by itself, create large diameter trees. In most lodgepole stands, a variety of disturbance agents, such as wind, weather, insects, and disease disturb these lodgepole stands, which leads to changes in the stand structure as it develops. Specific characteristics of the site would also be integral, such as soils, climate, and site productivity, which all would influence whether or not the site can produce certain old growth characteristics, such as larger diameter trees.

Precommercial thinning in densely regenerating lodgepole pine stands has also been documented to be an adverse effect to snowshoe hare densities (as previously cited), as the young regenerating dense stands that are typically precommercially thinned, provide high quality snowshoe hare habitat for a relatively short amount of time (approximately 20 years out of a 200 year life span), but could be highly critical in maintaining high numbers of hares for dispersal, such as in a “source” population. As such, they could also provide key areas for lynx to hunt.

Under Alternative D, the direction for managing spruce-fir stands to provide for winter snowshoe hare habitat becomes guideline **VEG G6**. As such, it does not provide the stronger direction that a standard does, and could allow for adverse effects to individual lynx.

The effects of **VEG G7**, under this alternative, are the same as described under Alternative C.

The grazing standards in Alternatives B and C (**GRAZ S1, S2, S3 and S4**) are guidelines under Alternative D (**GRAZ G1, G2, G3 and G4**). As such, it does not provide the stronger direction that the standards provide. If this grazing direction is not implemented, grazing activities could result in adverse effects to foraging habitat, and therefore to individual lynx. In most cases, however, grazing standards are being met due to other Forest Service standards and policies.

Under Alternative D, there is an overall “**ALL S2**” standard. This standard allows for project level analysis to override all lynx standards. This could lead to cumulative adverse effects to lynx foraging habitat that are difficult to monitor at the project level. Therefore, **ALL S1, VEG S1, VEG S3, and VEG S5**, with exceptions as proposed in Alternative D, as well as the allowance **ALL S2** implemented at the project level, could lead to adverse effects to individual lynx as well as increase the risk to the ability of lynx populations to persist within the SRMGA. See cumulative effects section for effects to lynx persistence within the Southern Rockies.

Alternative F

Under Alternative F, **VEG S1, S2, S5 and S6** are basically the same as Alternative B with the following exception: Fuel treatment projects within the “WUI” that do not meet Standards **VEG 1, VEG S2, VEG S5 and VEG S6** may occur on no more than three percent (cumulatively) of lynx habitat on each administrative unit (National Forest). For fuel treatment projects within the WUI, see guideline **VEG G 10**, which says “Fuel treatment projects within the WUI, as defined by HFRA, should be designed considering standards **VEG S1, S2, S5 and S6**.”

Fuel treatments outside of the WUI should follow the VEG standards. WUI is defined in the glossary, but can vary from ½ mile to 1.5 miles from a “Community at risk” as defined in the Federal Register (66 Fed. Reg. 753, January 4, 2001). Community Plans are supposed to define this at the local level, but most plans are not yet completed.

For **VEG S1**, this could lead to more than 30 percent of several LAUs being in a “Currently Unsuitable” condition.

For **VEG S2**, this could lead to more than 15 percent of several LAUs being in a “Currently Unsuitable” condition due to timber management projects.

For **VEG S5**, this exception could lead to a degradation of snowshoe hare habitat on three percent of the winter foraging lynx habitats within each NF administrative unit, which would most likely be in lodgepole pine habitat.

For **VEG S6**, this exception could lead to a degradation of snowshoe hare habitat on three percent of the spruce-fir winter foraging lynx habitat within each NF administrative unit.

However, the above effects are the worst case scenario for each standard, as the fuels exception is a cumulative three percent of lynx habitat within each national forest administrative unit for all Vegetation standards. It is unlikely all three percent (227,315 acres in the SRLA) would be in just one type of vegetation treatment.

The Fuels section of the FEIS estimates that approximately 8100 acres per year of all types of hazardous fuels treatments may occur within lynx habitats.

VEG G11 is a guideline under Alternative F, which takes the place of **VEG S3 and S4** in Alternative B. It states: “Denning habitat should be well-distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small windthrown trees (“jackstrawed” piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.”

The grazing standards in Alternatives B and C (**GRAZ S1, S2, S3 and S4**) are guidelines under Alternative F (**GRAZ G1, G2, G3 and G4**). As such, it does not provide the stronger direction that the standards provide. If this grazing direction is not implemented, grazing activities could result in negative effects to foraging habitat, and therefore indirectly to individual lynx. In most cases, however, grazing standards are being met due to other Forest Service standards and policies.

Summary of Effects to Denning and Foraging Habitat

All the action alternatives provide better direction for vegetation management for conserving lynx denning and foraging habitat than the No Action Alternative, and Alternative B provides direction that would be more protective of lynx habitat elements than Alternatives C, D and F. Alternatives A, C, D and F have aspects in the vegetation standards as written, that would allow for some negative impacts to individual lynx or their reproductive success. Alternatives A and D have aspects that could have adverse impacts to several lynx within the Southern Rockies, based on what would be allowed in vegetation management, especially in regards to the **ALL S2** standard in Alternative D.

Alternatives C, D and F may not maintain denning structure as well as Alternative B, as denning structure would likely be reduced in many developed or accessible areas, but these alternatives would likely maintain denning habitat better than the No Action alternative (A). However, the Biological Opinion for the Forest Plans (USDI 2000) states that under current conditions, denning habitat within most geographic areas is probably not limiting to lynx, and existing Forest Plan direction will not result in adverse effects. However, the National Fire Plan has been implemented since this Biological Opinion was issued, which increases expected outputs in treatments. Alternatives B and C, most likely, would not result in adverse effects to lynx denning habitat across the entire SRLA, but Alternative C could have some negative impacts to lynx reproductive success in local areas, due to the exceptions to the **VEG S3** and **VEG S4** standards under Alternative C.

Alternative D could have adverse effects to individual lynx and local lynx populations, due to the fuels treatment exception as well as the general allowance (**ALL S2**), which allows project level discretion on implementation of the lynx standards, which may result in short-term adverse effects to lynx but anticipated to result in long-term benefits to lynx and lynx habitat. With uncertain use of the allowed exceptions or the **ALL S2** standard there is a greater amount of uncertainty as to the effects to lynx. The worst-case scenario could be short-term adverse effects to both denning and the associated foraging habitat, which could ultimately affect lynx populations in some localized areas. The scale and intensity of the current insect outbreaks will greatly increase snag and down woody material over the SRMGA over the next few decades.

Alternative F could have some negative impacts to individual lynx and possibly local lynx populations due to the fact that managing for retention of minimum amounts of denning habitat is not a requirement. However, as denning habitat is not currently a limiting factor, the guideline may be effective in maintaining a good distribution of denning structure and habitat.

Factors Potentially Affecting Lynx Movements

Affected Environment

Habitat connectivity (landscape) is defined as cover (vegetation) in sufficient quantity and arrangement to allow for the movement of lynx. Linkage areas are defined as “Habitat that provides landscape connectivity between blocks of habitat. Linkage areas occur both within and between geographic areas, where blocks of lynx habitat are separated by intervening areas of non-habitat such as basins, valleys, agricultural lands,

or where lynx habitat naturally narrows between blocks. Connectivity provided by linkage areas can be degraded or severed by human infrastructure such as high-use highways, subdivisions or other developments” (LCAS revised definition, Oct. 2001). Special management emphasis is recommended to maintain or increase the permeability of linkage areas.

Alpine tundra, open valleys, shrubland communities, and dry southern and western exposures naturally fragment lynx habitat within the subalpine and montane forests of the Southern Rockies. Because of the fragmented nature of the landscape, there are inherently important natural topographic features and vegetation communities that link these fragmented subalpine forested landscapes together, providing for dispersal movements and interchange among individuals and subpopulations of lynx. Landscape connectivity may be provided by: (a) narrow forested mountain ridges and plateaus connecting more extensive mountain forest habitats, (b) wooded or willow riparian communities providing travel cover across open valley floors between mountain ranges, or (c) lower elevation ponderosa pine, pinyon-juniper woodlands or shrublands that separate high elevation spruce-fir forests.

Human activities that change vegetation patterns of the natural landscape affect ecological processes such as competition, dispersal, and predation in various ways. Generalist species, such as coyotes and great-horned owls, are strongly linked to human-dominated vegetation mosaics where fragmentation and competition provide the environments needed by these generalist species. Although the magnitude of these effects is poorly understood, it is clear that the function and structure of these animal communities can be altered.

Since the mid-to-late 1800’s, human actions have continually affected forested landscape linkages in the SRMGA. The gold rush began in the mid-1800s and continued to the end of the century.

The effects of mining and large-scale logging are still evident today in much of the landscape. Permanent habitat loss and road building have continued into this century. Building of residences and roads on and into private in-holdings has continued. A rapidly developing ski industry, a growing and affluent population, and telecommuting capabilities have converged to spur rapid growth in many mountain valleys. Transportation corridors have been, and continue to be modified and expanded to handle increasing volumes of traffic and higher speeds, thus altering historical movement patterns of wide-ranging species and creating barriers to movement. These and other factors, both historical and current, have combined to eliminate or degrade many landscape connections within the SRMGA.

The National BA states the Southern Rockies geographic area is the most distant geographic area from Canadian source population. Hostile desert environments separating the geographic area from the Northern Rockies combine with urban, rural, and recreational development and highway impacts to further isolate and fragment landscape connections in this geographic area. Maintaining a persistent population will be challenging in this area and dependent on maintaining landscape linkages primarily within the geographic area itself. (Hickenbottom et al. 1999).

It is suggested in the Ecology and Conservation of Canada Lynx (Ruggiero et al. 2000) that lynx in the contiguous United States may exist as several smaller, but effectively isolated metapopulations. An example of this is the boreal forests in Colorado and Utah are separated from the larger areas of boreal forest in northern Wyoming by at least 100 km. Metapopulation stability depends not only on habitat quality, but also on successful dispersal between isolated habitat patches. The likelihood of a species persistence declines with increasing fragmentation and isolation. That does not mean that more isolated, and therefore more vulnerable, subpopulations are unimportant. Peripheral populations may contain valuable genetic, physiological or behavioral adaptations that allow them to persist (Hickenbottom et al. 1999). Lynx and snowshoe hare habitats are more prone to a metapopulation structure in the western forests due to fragmented landscapes and heterogeneous distribution of topographic, climatic, and vegetative conditions.

Ruggiero et al. (2000) indicates that we know little about the degree of connectivity or its role in the viability of lynx, but assumes that connectivity plays an important role. Protecting, maintaining, and improvement of lynx habitat afforded by the various conservation measures contribute to the conservation of lynx and population viability. Maintaining habitats to provide for dispersal movements and interchange among individuals and subpopulations may be the most important provision for maintenance of population viability contained in the LCAS. An interconnected ecosystem can be essential to maintain the ability of subpopulations to expand and colonize new habitats, to recolonize areas where subpopulations have been locally extirpated, to provide population support to declining populations, to allow individuals to find mates among neighboring subpopulations, and to effect dispersal and genetic interchanges (Noss and Cooperrider 1994).

In January 2002, an interagency group from throughout the SRMGA met to discuss and draft potential areas of concern for lynx movements.

These areas were then to be proposed as lynx “linkage” areas, as defined in the LCAS and required by the Conservation Agreement signed by the Forest Service, Bureau of Land Management (BLM) and USFWS.

The interagency group of biologists expressed several types of lynx movement concerns:

- ♦ Areas that required larger scale movements, between isolated and disjunct blocks of lynx habitat. These areas include non-lynx habitats, but have habitats that can provide alternate prey sources such as jackrabbits, grouse, etc. These areas also tend to be mixed land ownership, such as Forest Service, BLM and private. These areas are generally at the large scale.
- ♦ Areas that are suspected to be important movement habitats within blocks of lynx habitat. These areas include some areas that have narrow areas of lynx habitats, surrounded by non-habitat, that connect 2 larger blocks of habitat. These areas may have no immediate threats, but it would be important to maintain/protect these areas for movement purposes. This type is generally at the mid-scale.
- ♦ Some areas of concern for lynx movements include areas that are limited to remaining undeveloped habitats, in highly developed areas. In this case it would be

important to protect and maintain the remaining undeveloped habitat. This type is also generally at the mid-scale, but can be at the site-specific scale.

- ♦ One type of movement concern was at the mid-scale, areas where there is good contiguous lynx habitat intersected with a barrier or impediment that can cause direct mortality, such as 2 or 4 lane highways. In specific cases, important areas near stretches of a highway are in need of maintenance and protection, and the permeability of a highway may be in need of improvement to reduce the potential for mortality. Potential site-specific crossing areas were not identified at in this programmatic assessment.

It is likely that all of these types of concern areas could result in a lack of genetic interchange and direct mortality, which if connectivity is not maintained, could affect the lynx persistence in the Southern Rocky Mountain Geographic Area.

The negative effects of highways on rare carnivores include habitat fragmentation, direct mortalities, direct loss of habitat, displacement due to noise and human activity, and secondary loss of habitat due to associated urban sprawl. When traffic volume increases, there is an evolution of highways from gravel roads to paved two lane roads, and from two lane highways to more problematic four lane highways, and the interstate highways, which have the most adverse effects to wildlife movements. The result of this progression of upgrades in the transportation system is the mortality of individuals attempting to cross the highway and potential sub-population isolation, both of which result in a slow decline in the population and ultimately can affect viability for some of the low-density carnivores such as lynx and wolverine (Ruediger, et al. 2000). A critical point in development of highways occurs when gravel forest or backcountry roads are paved, which results in higher speeds, higher traffic volumes and increased human developments.

For most connectivity issues, lynx require a regional or sub-regional approach to management because of their free ranging habits. Lynx need to be able to move between different geographic areas and mountain ranges.

In some cases, they move long distances through unfavorable habitat. If linkages or corridors are blocked because of human alteration, lynx populations can become isolated and more vulnerable to extirpation in the long term.

The Southern Rockies has a naturally fragmented spatial pattern of lynx habitat. The capability to maintain a meta-population in this area depends on successful dispersal between habitat fragments, and potentially between geographic areas. Increased fragmentation and isolation has occurred due to cumulative impacts from highways and residential and recreational development often tied to ski areas developed on National Forest System lands (Hickenbottom et al. 1999). While the ecosystem remains largely interconnected at this time, ongoing development and other activities continue to pressure those linkages. The I-70 highway corridor along with the development of resort and the associated subdivisions and entire communities, have compromised the permeability of portions of the area in the center of the SRMGA. As the SRMGA may not be connected to the Northern Rockies due to large expanses of desert in between, maintenance of regional scale habitat connectivity is perhaps more important in this geographic area than any other (Hickenbottom et al. 1999).

Environmental Consequences

Alternative A – No Action

Alternative A does not specifically address connectivity in most existing Forest Plans. The revised Arapaho-Roosevelt National Forest Plan contains a goal and a guideline for the establishment, maintenance, and protection of landscape linkages. The White River National Forest Plan Revision and the Medicine Bow Revised Plan have already incorporated direction similar to the LCAS conservation measures, which may help to maintain habitat and habitat connectivity in the central and northern most portion of the SRMGA. The linkage area standards and guidelines the White River National Forest has adopted will pertain to the linkages that are on the White River National Forest. This Forest is in the center of the SRMGA, and is critical for maintaining connectivity within the geographic area.

Overall weakness of the Forest Plans in the SRMGA in addressing linkage or connectivity potentially contributes to a risk of adverse effects to lynx under this alternative, based on the Biological Opinion on the Forest Plans (USDI 2000a) which states that connectivity concerns with highway and development are especially relevant to the more fragmented nature of lynx habitat in the mountains of the SRMGA.

Connectivity on the Forests will be addressed at the project level through Biological Assessments and consultation with the USFWS. In projects that would be within linkage areas, cumulative effects of all activities would be addressed during the Section 7 (ESA) consultation process.

Alternatives B and C

Alternatives B and C contain provisions for the maintenance of connectivity between patches of lynx habitat within and between LAUs, through the objectives, standards and guidelines to be applied in the overall lynx habitat as well as the additional objectives, standards, and guidelines specific to the identified linkage areas. Within the LAUs, these measures include **ALL 01, ALL S1, ALL G1 and HU G6**, which would help to ensure that connectivity within lynx habitat would not be severed or greatly decreased, in most cases. The **ALL S1** standard applies not only in linkage areas, but all lynx habitat as well and is as follows: *“New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity.”*

For the Amendment Area Linkage areas, the measures include **ALL 01, ALL S1, ALL G1, LINK 01, LINK S1, LINK S2, and LINK G1**.

These special provisions under Alternatives B and C would help to facilitate movement of lynx throughout and between landscapes within the Amendment Area. Chapter 1 and Appendix D describe these linkage areas. Twenty-six of these involve primarily NFS lands, and 12 have predominately mixed ownerships, including BLM, State Forest, and National Park Service lands, intermingled with private lands. Under this amendment process, objectives, standards and guidelines proposed in Alternatives B and C under “ALL Management Activities and Practices”, as well as the direction under “Linkage

Areas” would apply to all NFS lands within linkage areas that are within the Amendment Area, not just the lynx habitat. They would not apply to other federal or private lands.

If linkage areas occur within lynx habitats, all other proposed lynx standards and guidelines (by alternative) would also apply. All action alternatives incorporate conservation measures (objectives, standards and guidelines) to maintain connectivity, both in LAUs and in linkage areas.

Alternative D

Alternative D has all the above objectives, standards and guidelines, but it has several additional exceptions to the **ALL S1** standard, which provides direction to maintain habitat connectivity. These additional exceptions are:

- ♦ Fuel treatments identified through a process such as that described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan.
- ♦ Fossil fuel exploration and development practices and activities.
- ♦ Energy transmission facilities, associated practices and activities.

Alternative D also allows an exception to all lynx standards (**ALL S2**), if a project specific analysis determines it is not likely to adversely affect lynx (see below), or if it has short-term adverse effects with long-term benefits in that project.

The results of the fuels treatments allowance, expected and worst case analysis, was discussed under foraging habitat. The juxtaposition of foraging habitat directly relates to connectivity and movements of lynx, so the analysis of expected treatment acreages and worst case analysis would be the same for connectivity, regarding the hazardous fuels reduction exception to **ALL S1**, the connectivity standard. However, as the standard for maintaining connectivity is critical in the Southern Rockies, any exceptions to this standard would potentially have adverse effects to both individuals and possibly to the local populations of lynx.

The exceptions for fossil fuel exploration and development, as well as the energy transmission facilities are topics that are more difficult to assess at the programmatic level. Most Forests within the Amendment Area have low “richness potential” for oil and natural gas resources. However, the San Juan and the Grand Mesa National Forests have “high” potential for development of natural gas. Specific details for each Forest are provided at the Forest level, either in the Forest Plans, or the Forest’s Oil and Gas Leasing analysis documents.

For this programmatic assessment, the assumption is that if the above exceptions to the maintaining connectivity standard, **ALL S1**, are utilized, habitat connectivity could be adversely effected in the areas of development.

The effects to lynx, if habitat connectivity is not maintained, can be a critical factor in the persistence of the population, especially in habitats that are naturally fragmented by open parks and alpine grasslands, such as occurs in the Southern Rockies. Depending on the scale of the project, or how many times these exceptions are implemented across the Amendment Area, the exceptions to maintaining connectivity could reduce the likelihood

that the Canada lynx population would have the ability to persist in the Southern Rocky Mountain Geographic Area.

The result of the exceptions to **ALL S1** and the potential effects of the implementation of **ALL S2** exception/ standard may adversely affect not only individual lynx, but may affect lynx persistence as well within the SRMGA, as the connectivity and linkage standards may be some of the most critical standards for lynx for this Geographic Area. Hickenbottom et al. (1999) stated in the National BA for lynx in the SRMGA the following: “Maintaining a persistent population will be challenging in this area and dependent on maintaining landscape linkages primarily within the geographic area itself.” The connectivity concerns are broadscale, landscape issues. It may be very difficult at the project level to assess and/or monitor cumulative effects to connectivity and permeability for lynx across the entire SRMGA.

Alternative F

Alternative F contains provisions for the maintenance of connectivity between patches of lynx habitat within and between LAUs, through the objectives, standards and guidelines to be applied in the overall lynx habitat as well as the additional objectives, standards, and guidelines specific to the identified linkage areas. Within the LAUs, these measures include **ALL 01, ALL S1, ALL G1 and HU G6**, which would help to ensure that connectivity within lynx habitat would not be severed or greatly decreased, in most cases. The **ALL S1** standard applies not only in linkage areas, but all lynx habitat as well and is as follows: “New or expanded permanent developments and vegetation management practices and activities must maintain habitat connectivity in an LAU and/or linkage area.”

For the Amendment Area Linkage areas, the Alternative F measures include **ALL 01, ALL S1, ALL G1, LINK 01, LINK S1, LINK G1, and LINK G2**. The only difference between Alternative B and F is that LINK S2 became a guideline: **LINK G2**. **LINK G2** is “Livestock grazing in shrub-steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid or late seral stages, similar to conditions that would have occurred under historic disturbance regimes.” Alternative F would help to facilitate movement of lynx throughout and between landscapes within the Amendment Area. Appendix D describes these linkage areas. These provisions would not apply to other federal or private lands within the linkage areas.

Other Effects to Lynx Productivity and Movements

The Ecology and Conservation of Lynx in the United States (Ruggiero et al. 2000) states: “Because lynx occupy large home ranges and occur at low densities, the long-term viability of lynx populations cannot be achieved at the spatial scale of relatively small parcels of public land, or even larger units such as individual National Forest’s or National Parks. Consequently, we believe that lynx conservation in the contiguous United States can only succeed as part of an ecosystem management strategy that is designed to address the needs of a variety of potentially conflicting resource uses over long periods of time and broad spatial scales.”

The common exception/allowance in standard **ALL S2** in Alternative D applies to all lynx standards. This exception allows short-term adverse effects to lynx with long-term

benefits to lynx or lynx habitat. The **ALL S2** exception standard for all lynx standards, under Alternative D, would be discretionary at the project level, and the cumulative effects analysis at a project level may be very difficult to accomplish, in order to adequately address cumulative effects for the SRMGA lynx population.

The USFWS Biological Opinion on the existing LRMP's states: "For most agency actions, noncompliance with the standards in the LCAS increases the likelihood that actions would adversely affect lynx."

ALL S2, or deviations from standards allowed under it, may allow for direct and indirect actions that may adversely effect lynx or lynx habitat. This could cumulatively adversely affect the lynx habitat conditions and connectivity between habitats. This may impact how well sufficient quantity, quality and distribution of lynx habitat would be likely to provide for lynx persistence and recovery within the SRMGA.

Cumulative Effects to Lynx Productivity and Movements

This analysis focuses on the effects to lynx of past, present and reasonably foreseeable programmatic actions. Programmatic actions set the sideboards for future development and/or availability.

Geographic Area for Cumulative Effects

Cumulative effects were evaluated for the Amendment Area and the Southern Rocky Mountain Geographic Area. These boundaries were used to evaluate the cumulative effects of this amendment in addition to other past, present and reasonably foreseeable actions within the amendment area and how this amendment cumulatively would affect lynx within the entire Southern Rocky Mountain Geographic area.

Cumulatively, with the Rocky Mountain National Park, (NPS) and BLM lynx habitat data added in, the SRMGA as a whole contains approximately 7.9 million acres of lynx habitat. See Table 3- 5 for SRMGA lynx habitat data.

Table 3- 5 - SRMGA Acres of Suitable Lynx Habitat on Federal Lands

National Forest	Total Lynx Habitat Acres (Federal lands)
Arapaho-Roosevelt	714,681 (24,599 NPS)
GMUG	1,641,664
Pike-San Isabel	852,459 (23,669 BLM)
Medicine Bow-Routt	1,192,501
Rio Grande	1,035,420
San Juan	1,048,713 (147 BLM)
White River	1,164,974 (22,180 BLM)
BLM stand alone LAUs	260,850
Total	7,911,262

The cumulative effects of the indirect and direct activities on private lands within LAUs are likely to reduce the suitability of areas for lynx to forage, reproduce, and rear young successfully on private lands within the Southern Rockies Geographic area. Spatial considerations of forage and denning habitat are generally not incorporated into project activities on private lands and may result in further reductions in habitat suitability on these lands and adjacent federal lands. A reduction in suitability of areas is also occurring from insect caused mortality on private lands.

Transportation improvements are being considered by the Colorado Department of Transportation for the Interstate 70 (I-70) mountain corridor to address increased traffic volumes as a result of rapid human population growth in Colorado and the western United States. The I-70 mountain corridor carries both interstate (freight transport and passenger travel) and intra-state (commuters and summer and winter recreation) traffic. In 1998, the Colorado Department of Transportation (CDOT) completed a Major Investment Study to identify short-term and long-term solutions to increase safety and reduce congestion along the I-70 mountain corridor between Denver International Airport and Glenwood Springs. In response to public comment, CDOT and the Federal Highway Administration began preparation of a programmatic EIS for the proposed 127-mile mountain corridor. As part of that effort, interagency teams were formed to address and streamline compliance with NEPA and ESA for wildlife, fish and rare plants. The team addressing terrestrial species (ALIVE) developed a landscape level inventory of natural resource features within the I-70 corridor and surrounding landscape. Part of this inventory included identification and prioritization of wildlife crossing areas along the I-70 corridor. Twelve areas have been identified that are of particular concern with regard to impeding wildlife movements and causing wildlife mortalities, which will be considered in the development of alternatives for the I-70 PEIS.

The information relevant to lynx is incorporated into the analysis of effects for the Southern Rockies Lynx Amendment DEIS.

This CDOT I-70 programmatic planning process may result in better crossing areas or structures for lynx and other wildlife at a site-specific scale, but may also add additional impacts due to the upgrading of the transportation corridor over the next 20 years.

The BLM is considering the LCAS conservation measures in project planning within lynx habitat, under their Conservation Agreement with the US Fish and Wildlife Service.

Rocky Mountain National Park is considering the LCAS conservation measures when applicable, under Section 7 (ESA) consultation processes.

There are two different scenarios for how roadless areas will be managed in the future. The “Roadless Rule” under the Clinton administration (of 2000) includes direction that could maintain security and connectivity needs for lynx. The Roadless direction under the Bush administration (2001) allows for states to propose which areas should remain roadless. Colorado has proposed that most roadless areas remain roadless, with a few exceptions. Both cases are being challenged in court at the current time, but in either scenario, for Colorado, most roadless areas will provide for security and connectivity for lynx.

Cumulatively, the other past, present and reasonably foreseeable programmatic actions described above would generally have beneficial effects on lynx. The majority of these cumulative actions include direction that improves security, reduces competition and maintains habitat needs for lynx. It is likely that activities on private land within lynx habitat may continue to affect lynx through habitat loss.

Synthesis and Conclusions: Lynx Conservation

Under the provisions of the 1982 NFMA regulations, Forest Plan documentation must demonstrate that management direction would provide habitat to insure viability of all native and desired non-native plant and animal species. All alternatives evaluated are not expected to achieve the goal of providing for viability of lynx with the same level of certainty. Alternatives differ in the level of risk to lynx, which may affect species viability within the SRMGA.

The following is a synthesis of the above analysis for Canada lynx, using an outcome rating to display the likelihood of lynx persistence in the SRMGA, based primarily on habitat quantity, quality and conditions, existing and potential, under each alternative. The majority of lynx habitat in the SRMGA is found on NFS lands; therefore, habitat conditions on NFS lands are a critical factor in the conservation of lynx in the southern Rockies. Because the NFMA regulations focus on habitat conditions on National Forests within the planning area, Forest Service evaluations are most useful when they partition the effects of ecological conditions on National Forests from other effects. Cumulative effects discussions, at the end of the lynx effects section, are based on these habitat conditions, as well as population status and non-habitat related risks and uncertainties.

The potential outcomes of the likelihood of lynx persistence in the Southern Rocky Mountain Geographic Area are based on an estimate of habitat quantities, conditions and distributions, and how well the alternatives are likely to ensure the maintenance or improvement of lynx habitat components. How each alternative influences lynx productivity, movements, and mortality is discussed in the Summary of Effects to Lynx section above. The analysis for Table 3- 6 is based only on habitat quantity, quality and conditions that would be sufficient to maintain lynx persistence in the SRMGA. The “Outcome” numbers used are described below. There is some uncertainty as to the effects of management actions on lynx in the SRMGA. Due to uncertainties with the population status and the fact that some lynx risk factors are outside the jurisdiction of National Forest management, cumulative factors that influence lynx persistence are discussed separately.

Outcome 0: This outcome level does not ensure the maintenance of broad scale habitat quantity, distributions and conditions that would provide for long term persistence of Canada lynx within the SRMGA, through management direction on federal lands. Long-term, this outcome may result in substantial decreases in the likelihood of lynx persistence, and may eventually result in species extirpation within the SRMGA.

Outcome 1: This outcome level results in a lower likelihood of persistence of Canada lynx, as compared to the baseline of Outcome 3, which is the expected outcome that incorporates the LCAS conservation measures. Primarily, this is due to the lower level of management direction to ensure sufficient habitat quantity, quality, distributions and

conditions within the SRMGA which may decrease the species productivity, or reduce habitat connectivity relative to Outcomes 2 and 3

Outcome 2: This outcome level results in slight decreases in the likelihood of persistence of Canada lynx, as compared to Outcome 3 (which has the applicable conservation measures from the LCAS incorporated and is considered the baseline for the Outcome levels). It provides management requirements that would result in maintenance of habitat of sufficient quantity, quality, and conditions to allow the species to maintain some breeding populations, with some possible gaps in the habitat distribution, or some barriers in landscape connectivity within the SRMGA. These gaps or connectivity barriers may be permanent or long-term and may result in some limitation of interactions among local populations. The outcome is likely to allow the species to maintain productivity and movements, in some areas, but allows for gaps in suitable habitat that may reduce population productivity.

Outcome 3: This outcome level includes the applicable conservation measures necessary to conserve lynx, developed from the Lynx Conservation Assessment and Strategy, which is based on the best available scientific knowledge and recommendations. The USDI Fish and Wildlife Service has analyzed these conservation measures in formal consultation on the existing LRMP's, and concluded that, if these conservation measures are incorporated into the LRMP's and BLM's land use plans, that "the Plans would likely not jeopardize the continued existence of lynx". It provides management direction that would likely result in maintenance of sufficient habitat quantity, quality, distribution and conditions to allow the species to maintain breeding populations within most historic habitats. Permanent or long-term connectivity barriers may result in some limitation of interactions among local populations, but sufficient connectivity will be maintained for long-term persistence. The alternative is likely to maintain lynx productivity and movements, while minimizing mortality. This outcome is the baseline for comparison of the likelihood of lynx persistence in the SRMGA.

Table 3- 6 - Relative Likelihood of Lynx Persistence Outcomes in SRMGA

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative F
Outcomes: Relative Likelihood of Lynx Persistence in the SRMGA	0	3	2	1	2

Rationale for Outcomes:

Alternative A is rated as Outcome 0 because the Biological Assessment done for the Forest Plans in the amendment area resulted in a "Likely to Adversely Affect" determination during the Section 7 consultation process (USDI, 2000b). The alternative, without the Conservation Agreement which agrees to consider the LCAS conservation measures, would not ensure that habitat is maintained in sufficient quantity, quality or

distribution, nor would it ensure maintenance of conditions at the broad scale to support lynx production and provide for lynx movements. The Medicine Bow NF and White River NF included management direction in their revised plans, but there is no consistent approach to lynx habitat management in place across the SRMGA.

Alternative B is rated as Outcome 3 because it includes the conservation measures, recommended by the LCAS, which is based on the most recent science, and provides the basis for broad scale management to conserve lynx. It would add the management direction to the Forest Plans to ensure that broad programmatic direction (regulatory mechanisms) for lynx conservation would be implemented consistently across the SRMGA.

Alternative C is rated as Outcome 2 as it is similar to Alternative B, however, there are two standards (**HU S1** and **VEG S5**) that allow for adverse effects to individual lynx, which lead to a slightly decreased likelihood of persistence as compared to the Proposed Action.

Alternative D is rated as Outcome 1, due to the exceptions to the vegetation standards, the exceptions to the connectivity standard, and the standard **ALL S2**, with the associated uncertainties of how the lynx standards may or may not be implemented at the project level. The All S2 standard could allow adverse effects to habitat in a number of LAUs. This could lead to habitat degradation across the SRMGA. If the linkage or connectivity standards, in particular, are not followed, these exceptions to lynx standards may lead to a lower likelihood of lynx persistence across the SRMGA than Alternatives B and C. Some vegetation management activities excepted under **VEG S5** (see discussion under Denning and Foraging Habitat), along with the **ALL S2** exception to all lynx standards, may allow adverse effects to lynx habitat components and connectivity across the SRMGA.

Alternative F maintains lynx habitat and connectivity better than Alternative D, but not as well as Alternative B. It allows for some negative impacts to individual lynx, but should maintain lynx population persistence long-term.

Cumulative Conclusions

Factors Considered When Determining Cumulative Effects

The population of lynx within the SRMGA may be effectively isolated from the Northern Rockies Geographic Area, which makes it particularly vulnerable to extirpation, as there is likely no immigration from source populations (Ruggiero et al. 2000). The majority of lynx habitat within the SRMGA is on NFS lands. However, not all risk factors for lynx can be influenced by national forest management.

Small, isolated populations have inherently high risk of extirpation due to random events, habitat alteration, competition, and/or other factors (Mace and Lande 1991, Soule 1987). Furthermore, lynx populations at the southern edge of their range have comparatively large home range sizes and low survival of kittens, reinforcing the importance of maintaining suitable habitat and prey populations through time (Ruediger et al. 2000). When a very small population size exists, small habitat degradations can lead to problems for long-term persistence. It is for this reason that a more conservative management approach is recommended in areas with low population levels. However, with small

populations, random events/disturbances can still lead to extirpation, even with conservative management approaches.

The eventual status of the reintroduced lynx population in the SRMGA is still somewhat uncertain. The Colorado Division of Wildlife's reintroduction project has been successful to date, with documented reproduction and recruitment, but its long-term fate remains to be seen.

Additional Factors Considered that are Outside Forest Service Authority

Trapping and predator control are two potential lynx mortality factors for which the Forest Service has no management control. Trapping with leg-hold traps is illegal in Colorado, which reduces the accidental take of lynx by trapping in Colorado. Leg-hold trapping is not illegal in Wyoming; therefore, accidental trapping of lynx could occur. Predator control activities (trapping, shooting and poisoning) on NFS lands in lynx habitat are limited. Predator control activities within lynx habitat on NFS lands must be done in compliance with Section 7 consultation regulations for the Endangered Species Act.

Incidental/illegal shooting mortality has occurred with the recently translocated lynx population in Colorado. Nine lynx mortalities have been documented as definite shootings, and five additional lynx were "probably" shot" (Shenk 2006). At low population levels or in situations where recruitment is low, this mortality can be additive and lead to population declines.

Highway mortalities have resulted in 11 mortalities, possibly 13, in Colorado, since 1999. Providing permeability across highways can be influenced and managed by the Forest Service on NFS lands, but problem areas, at times, are outside of the National Forest jurisdiction.

Summary Conclusion

When all factors are considered cumulatively, including small population size, national forest management direction, other federal land management, private land management, and the entire range of risk factors, the uncertainties of maintaining ecological conditions and sufficient populations to maintain viable populations are increased. Alternative B conservation measures provide the highest likelihood of maintaining lynx population persistence in a well-distributed manner across the SRMGA. Alternative C is similar to B, but does not limit habitat alteration and snow compaction to single LAUs; therefore, it could adversely affect individual lynx. Alternative D includes fewer standards replacing them with guidelines, and many specific exceptions to the standard VEG S5. Alternative D also has the project level exception, ALL S2, which would allow for more deviations from all of the lynx standards. These changes could lead to habitat degradation in lynx foraging habitats across the SRMGA. Alternative D has a lower likelihood of maintaining lynx persistence and recovery than Alternatives B or C. Alternative F allows for more adverse impacts to individual lynx than Alternative B, but should maintain quality lynx habitat and connectivity well enough to maintain lynx population persistence long term.

Management Indicator Species

Affected Environment

The diverse fauna of the national forests in the SRMGA occupies a wide variety of habitats. Spruce-fir is the most common forest type and makes up about 45 percent of all lynx habitat on NFS lands in the SRMGA, most of which is mapped within LAUs. Aspen and lodgepole pine habitat types each make up approximately 20 percent of the SRMGA. Lodgepole pine is found more predominantly in the northern forests of the SRMGA and aspen more predominately in the southwestern forests of the analysis area.

Douglas fir and mixed conifer types within LAUs make up about eight percent of the lynx habitat within the SRMGA. The remaining NFS lands in the SRMGA were grouped together and represent a variety of types generally not considered to be lynx habitat. This category includes a variety of grass and forbs types, ponderosa pine, pinyon-juniper, alpine, lakes, and rock. Some of these types of habitats may be included in some portions of LAUs, as they can be intermingled with patches of lynx habitat.

Data from all forests in the Rocky Mountain Region indicate approximately 77 percent of the spruce-fir is in mature to late successional stages. Seventy percent of the lodgepole pine is in a mature to late successional stage (Mullen et al. 1992. Biological Diversity Assessment – a technical report used in amending the Rocky Mountain Regional Guide).

A list of all MIS from each National Forest considered in this amendment can be found in Appendix G.

Environmental Consequences

Direct and Indirect Effects

Alternative A - No Action

Current management emphasis and other levels of protection for wildlife and wildlife habitats would be maintained under existing Forest Plan direction if Alternative A is implemented. Existing Forest Plans have a series of multiple-use management area prescriptions that describe how management of various areas of a Forest is to be conducted. Under the existing Forest Plans, approximately 20 percent of the Region is being managed to emphasize wildlife. Additional prescriptions exist to provide for management that will maintain or enhance particular ecosystems (e.g., aspen and riparian areas) or non-developmental areas (e.g., wilderness areas). These prescriptions will also benefit wildlife. Finally, various aspects of wildlife and wildlife habitat are considered in the remaining prescriptions, but are not the primary emphasis.

The No Action Alternative would not have any effect to population trend or viability of the current MIS within each Forest Plan, with the exception of Canada lynx. Because there is new information regarding lynx, it is now known that the existing Forest Plans lack direction that would provide for the conservation of lynx in not providing:

- ♦ Protection of densely regenerating young forested stages (winter snowshoe hare habitat)

- ♦ Guidance for maintaining small areas of potential denning structures (coarse woody debris)
- ♦ Limitations on amount of vegetation management activities that result in early successional stages within approximately a watershed scale
- ♦ Limitations on new areas of snow compaction
- ♦ Broad scale planning for landscape connectivity for wide ranging species

Alternative B

A list of Management Indicator Species (MIS) from each Forest Plan in the Amendment Area was gathered (See Appendix G), and the following is the summary list of those MIS that would be likely to occur in lynx habitat, which is where the Proposed Action would apply.

Based on expected changes that would take place in vegetation and human uses, a qualitative assessment was made for each of these species as to whether the effect would be positive, negative, or have none (Table 3- 7). The results would be similar for Alternatives C and D, if the ALL S2 lynx standard exception (in Alternative D) is not taken into account. (See “Other Effects to Lynx Productivity and Movements section above).

Based on the standards and guidelines proposed for the amendment area, the assumptions used for the MIS effects (Table 3- 7) are:

1. Precommercial thinning in young stands may be reduced from historical levels in the higher elevations inhabited by lynx, or it may happen later in stand development, when the stand is no longer providing snowshoe hare habitat. However, fire use is encouraged in the objectives, and that may lead to fire being used (either wild or prescribed) to underburn dense forested stands to create the thinning process naturally. With the ability to precommercially thin stands later (after they no longer provide snowshoe hare habitat), along with the encouragement to use fire to mimic historical patterns and structure, this standard may have no effect on most MIS within the Amendment area. Species that prey upon snowshoe hare would be benefited by this standard. These MIS species include: lynx, marten, and northern goshawk. (See Table 3-7).
2. The grass-forbs stage of forested stands (early seral) would be limited to creating no more than 30 percent of the forested types that are considered lynx habitat. This does not limit the amount of natural grasslands and meadows within LAUs, however, so grassland or early successional species may have more than 30 percent of the LAU in grass-forb habitats. Much of the Amendment Area is naturally “patchy”, with many open grasslands, parks and meadows; therefore, early successional species should not be limiting in most cases. MIS that are dependent on or can be benefited by grasslands, meadows and openings include: elk, mule deer, bighorn sheep and mountain bluebird.
3. Species requiring down and standing dead logs/snags will benefit from both the denning standard, and the standard involving restrictions on salvaging the less than five acre disturbances, such as blowdown, bug mortality, etc. These MIS include:

lynx, marten, black bear, hairy woodpecker, mountain bluebird, northern goshawk, three-toed woodpecker, and boreal toad.

4. Species requiring or benefiting from shrubby or coniferous horizontal cover on the forest floor will benefit from the standard that favors the development of snowshoe hare habitat in aspen and lodgepole pine, and managing livestock grazing to ensure regeneration. MIS in this category include: lynx, marten, snowshoe hare, northern goshawk, and green-tailed towhee.
5. Species requiring mid-late seral stages of shrub-steppe, willow, and riparian habitats would benefit due to the livestock grazing standard. MIS in this category include: lynx, beaver, elk, mule deer, river otter, red-backed vole, Wilson's warbler, green-tailed towhee and boreal toad.
6. Species dependent on mature structural stages of forests would benefit by standards and guidelines that would maintain mature forested stands across the landscape. MIS in this category include: lynx, marten, northern goshawk, three-toed woodpecker, brown creeper, and golden-crowned kinglet.
7. Aspen dependent species would have beneficial effects for the long term. Regeneration of aspen usually results in loss of mature stages for approximately 50-60 years, which would be a negative effect, but maintenance of aspen long term would be beneficial species associated with aspen. MIS in this category include: beaver, black bear, elk, mule deer, northern goshawk, and warbling vireo.
8. Aquatic dependent species would have net beneficial effects due to road reclamation guidelines and requiring designated routes for most non-recreation special use permits or operating plans. One potentially conflicting guideline is to avoid building roads on ridgetops and saddles, which could lead to building new roads on sideslopes, in some cases. MIS in this category include: beaver, river otter, brook trout, brown trout, Colorado River cutthroat trout, rainbow trout, greenback cutthroat trout, Rio Grande cutthroat trout, and boreal toad.
9. Species that need refuge areas (away from human activities) may benefit by the limitations on the expansion of snow compacting activities for winter recreation. Some non-recreation winter uses may be allowed to expand into previously unused areas during the winter, but these uses would be restricted to designated routes. MIS in this category include: lynx, marten, and bighorn sheep.
10. Maintaining habitat and landscape connectivity and linkage areas will benefit lynx, other carnivores and any other wide-ranging or migratory species, such as American marten and big game. Habitat quality and connectivity standards and guidelines associated with a variety of forest management activities (e.g., developed and dispersed recreation areas, special uses, oil and gas, mining, utility corridors, forest roads and trails, livestock grazing) will benefit a variety of bird and small mammal species, including alternate prey species. Maintaining the permeability of these areas to dispersal movements of animals has positive implications for maintaining population viability for many species. MIS in this category include: lynx, marten, black bear, elk and mule deer.

11. Species that are associated with disturbance events that provide either insect prey (e.g. spruce or pine beetle) or newly burned snags would benefit. MIS in this category include: hairy woodpecker, three-toed woodpecker, and mountain bluebird.

Table 3- 7 - Potential Effects to MIS under All Action Alternatives

MIS within amendment Forests that are within lynx habitat	Potential Positive Effects	Potential Negative Effects	Both Positive and Negative Effects	No Effect	Assumptions or rationale for all alternatives, unless noted.
Mammals:					
American marten	X				#1,3, 4, 6, 10
Beaver	X				#5, 7, 8
Black bear	X				#3, 7 (prey), 10
Deer mouse				X	Habitat generalist
Elk	X				#2, 5, 7, 10
Mule deer	X				#2, 5, 7, 10
River otter	X				#5, 8
Bighorn sheep	X				#2, 9
Snowshoe hare	X				#1,3,4,5,6
Canada lynx	X				all
Birds					
American pipit				X	
Hairy woodpecker	X				#3, 11
Mallard				X	No effects to lakes
Merriam's turkey				X	Uncommon in lynx habitats; requirements met in other habitats.
Mountain bluebird	X				#2, 3: assumes additional snags would occur near forest edges.
Northern goshawk	X				#1, 3, 4, 6 and 7: Prey species abundance important; PA will improve and protect prey habitats; #6,7 maintains nesting habitat.
Bald eagle				X	Uncommon in lynx habitat in SRMGA, except fall migration. No effects to lakes.
Three-toed woodpecker	X				#3, 6, 11
Warbling vireo			X		#7 Long term positive, short term could be negative (harvest of aspen to regenerate).
Golden-crowned kinglet	X				#6
Wilson's warbler	X				#5
Red-naped sapsucker	X				#7, 5

MIS within amendment Forests that are within lynx habitat	Potential Positive Effects	Potential Negative Effects	Both Positive and Negative Effects	No Effect	Assumptions or rationale for all alternatives, unless noted.
Ruby-crowned kinglet	X				#3, 6: prefers canopy gaps in mature conifer stands for foraging
Lincoln's sparrow	X				#5
Vesper sparrow	X				#2
Green-tailed towhee	X				#4, 5
Southwestern willow flycatcher	X				#5
Brown creeper	X				#6
Hermit thrush	X				#6
Pygmy nuthatch					
Fish					
Brook trout			X		#8
Brown trout			X		#8
Colorado River cutthroat trout			X		#8
Rainbow trout			X		#8
Greenback cutthroat trout			X		#8
Rio Grande cutthroat trout			X		#8
Aquatic inverts					Not lynx habitat
Herpetofauna					
Boreal toad	X				#3, needs coarse woody debris, #5, 8
Insects					
Aquatic Invertebrates			X		#8

Guidance to encourage management that is consistent with historical vegetation processes (including fire) to the extent practicable is present in most Forest Plans, especially the newer Forest Plans. This direction is consistent with the concepts of ecosystem management, forest health, and the more recent National Fire Plan. The concept is that properly functioning ecosystems inherently will maintain themselves and the plant and animal communities and species that have evolved with them.

Maintenance of suitable acres and juxtaposition of lynx habitat should not have an appreciable effect on amounts of forest management activities. However, maintaining quality lynx foraging habitat in proximity to denning habitat may alter the distribution of forest management activities. Maintaining denning habitat, which is usually in late successional spruce-fir forest and sometimes lodgepole pine, and is characterized by high amounts of coarse woody debris, will benefit a variety of species. These stands support snowshoe hares and red squirrels, both important prey species of northern goshawk and

marten (MIS). These forests also provide habitat for other small mammal species including the red-backed vole. The red-backed vole is a primary prey species for other forest predators including the marten and boreal owl. A variety of bird species, including primary and secondary cavity nesters, will benefit from maintaining these late-successional stands for denning habitat, as well as the less than 5 acre disturbance patches being restricted from salvage harvest. Even though some direction exists in most existing Forest Plans for late-successional forest, snag and down dead components, incorporation of these lynx conservation measures will focus distribution of this habitat within LAUs and across the broader landscape.

The creation and maintenance of quality lynx foraging habitat in proximity to denning habitat through time is consistent with current forest direction for species that benefit from early successional stages. The vegetation management standards that regulate the rate and extent of habitat altering activities should be consistent with most Forest Plans existing direction for maintaining big game hiding cover and habitat capability/effectiveness. Most big game habitat capability/effectiveness models currently in use will show increases in habitat quality either from an increase in foraging areas or a decrease in open roads, or some combination thereof. Hiding cover often is not lacking in the SRMGA. Hence, vegetation management activities will initially create foraging areas for big game, will result in an increase in birds and small mammals that prefer earlier successional stages (e.g., chipmunk, deer mouse, bluebirds), and ultimately will become lynx foraging habitat as young regenerating stands develop and are re-colonized by snowshoe hares. The restriction on precommercial thinning while these young stands are providing snowshoe hare habitat will benefit not only the hares, but the predator species that prey upon hares, such as goshawk, lynx and marten.

Regeneration activities that maintain closed-canopied, single layer lodgepole pine stands may ultimately benefit northern goshawk nesting stands in the long term. (Squires and Ruggiero 1996). Mature spruce-fir and aspen mixed stands are also important to goshawks for nesting and foraging habitat within portions of the SRMGA. These would be provided in a well-distributed manner under the provisions of the proposed action (Alternative B).

Species that need refuge areas (away from human activities), such as wolverine, may benefit by the limitations on the expansion of snow compacting activities for winter recreation. Some non-recreation winter uses may be allowed to expand into previously unused areas during the winter, but these uses would be restricted to designated routes. Some non-recreation winter uses may be allowed to expand into previously unused areas during the winter, but these uses would be restricted to designated routes.

Maintaining habitat and landscape connectivity and linkage areas will benefit lynx and any other wide-ranging species, especially other forest carnivores including American marten, fisher, and wolverine, as well as big game. On a smaller scale, habitat quality and connectivity measures associated with a variety of forest management activities (e.g., developed and dispersed recreation areas, special uses, oil and gas, mining, utility corridors, forest roads and trails, livestock grazing) will benefit a variety of bird and small mammal species. Maintaining the permeability of these areas to dispersal movements of animals has implications for maintaining population viability for many species.

Alternative C

The effects to MIS from Alternative C are the same as Alternative B, with the following differences. Only those standards which are different from Alternative B (Proposed Action) will be discussed.

Alternative C allows for the maximum amount of “currently unsuitable lynx habitat” to be addressed at a larger scale than the LAU, therefore habitat within one LAU or more may exceed 30 percent in a grass/forb seral stage. Therefore, Alternative C may negatively affect individuals of species associated with mature forested stands, but would benefit species associated with early successional stages of vegetation such as grassland or seedling/sapling successional stages.

Alternative C may not maintain down/dead woody forest floor structure as well as Alternative B, as down/dead structure would likely be reduced in many developed or roaded areas. Species associated with forest floor down/dead logs and woody debris would have a slightly reduced habitat capability, as compared to alternative B, near roads and structures under these alternatives. However, population viability would still be maintained overall, because of the minimum of 10 percent of each LAU in denning habitat, which would include down and dead forest floor structure.

These alternatives would maintain down/dead woody forest floor structure better than the No Action alternative.

Alternative C exceptions to the restrictions on precommercial thinning would have minor effects on the overall seedling/sapling stage (densely regenerating) forested habitat, based on the assumption that most private land structures are at lower elevations than lynx habitat, and structures within lynx habitat would likely be a minor amount of habitat. However, there will be some reduction of snowshoe hare habitat (which is an important prey species for many of the MIS species) near structures, which in most cases, is not the high quality (densely regenerating) snowshoe hare habitat. This is based on the assumption that, in general, regeneration harvests have not been planned near summer homes and private land dwellings. This minor reduction in snowshoe hare habitat will have some impacts to all MIS species that use snowshoe hare as a prey source, as compared to Alternative B. However, this alternative protects snowshoe hare habitat, and therefore the associated MIS species, better than the No Action alternative, except for the Medicine Bow which includes snowshoe hare as one of their MIS.

Alternative C would allow the no net increase in designated snow compacting activities to be addressed at larger scales than that of the LAU scale. This may result in some areas becoming unusable or ineffective habitat by some species, such as lynx.

Alternative D

The effects to MIS from Alternative D are the same as Alternative B, with the following differences. Only those standards that are different than Alternative B (Proposed Action) will be discussed.

The several exceptions to the delaying of precommercial thinning standard (**VEG S5**) would lead to the possibility of negative effects to snowshoe hare and species that use the hare as a prey resource. Aspen stands mixed with conifer are generally well used by

snowshoe hares, but the year round use is in most cases dependent on the conifer component. Pure aspen stands in general, do not support snowshoe hare in the winter, due to lack of cover. Snowshoe hare mortality is primarily predation; therefore cover is extremely important to their choice of habitats.

The exception for precommercial thinning in lodgepole pine to develop larger diameter trees for old growth characteristics in the future could lead to negative impacts to snowshoe hare and the species that depend upon snowshoe hare as a prey resource. Precommercial thinning on a densely regenerating site will not necessarily produce the “old growth characteristics” that might be desired, without other site conditions being conducive. Pre-commercial thinning in densely regenerating lodgepole pine stands has been documented to have negative effects on snowshoe hare densities, as these stands provide high quality snowshoe hare habitat for a relatively short amount of time (approximately 20 years out of a 200 year life span), but could be highly critical in maintaining high numbers of hares for dispersal, such as in a “source” populations. As such, they could also provide key areas for lynx to hunt.

Because densely regenerating sapling stages of aspen and lodgepole pine have been determined to be well below historic levels by historic range of variability documents within the SRMGA, additional losses of horizontal cover within these high quality snowshoe hare foraging habitat may have an adverse effect on MIS species that prey upon snowshoe hare (marten, lynx, and northern goshawk).

This alternative would, however, have less impact to snowshoe hare habitat (and its associated predator species) than the current situation (No Action alternative), except for the Medicine Bow and White River National Forests because it would reduce the acreage of stands that could be precommercially thinned.

Alternative D may not maintain down/dead woody forest floor structure as well as Alternative B, as down/dead structure would likely be reduced in many developed or roaded areas. Species associated with forest floor down/dead logs and woody debris would have a slightly reduced habitat capability, as compared to alternative B, near roads and structures under these alternatives. However, population viability would still be maintained overall, because of the minimum of 10 percent of each LAU in denning habitat, which would include down and dead forest floor structure. These alternatives would maintain down/dead woody forest floor structure better than the No Action alternative

Alternative D would allow the no net increase in designated snow compacting activities to be addressed at larger scales than that of the LAU scale. This may result in some areas becoming unusable or ineffective habitat by some species.

Alternative F

The effects to MIS from Alternative F are the same as Alternative B, with the following differences. Only those standards that differ from Alternative B will be discussed.

The fuels treatment exceptions to all of the VEG standards, especially the precommercial thinning standard (VEG S5) would lead to the possibility of negative effects to snowshoe hare and species that use the hare as a prey resource. Snowshoe hare mortality is primarily predation; therefore cover is extremely important to their choice of habitats.

Species associated with forest floor down/dead logs and woody debris would have a slightly reduced habitat capability, as compared to alternative B, as the denning habitat measures are standards in Alternative B and a guideline in Alternative F. This alternative would maintain down/dead woody forest floor structure better than the No Action alternative, however.

Alternative F may allow for more snow compaction within an LAU due to the measures limiting snow compaction becoming a guideline under this alternative. This may indirectly affect species that rely on snowshoe hare as prey, due to a potential increase in competition for snowshoe hare. It may also affect species that use subnivean (underneath the snow) habitats, such as red-backed vole and American marten.

Cumulative Effects To MIS

This analysis focuses on the effects to lynx of past, present and reasonably foreseeable programmatic actions for the life of the Forest Plans, approximately 15 years. Programmatic actions set the sideboards for future development and/or availability.

Southern Rocky Mountains Geographic Area

Cumulative effects were evaluated for the amendment area, and the Southern Rocky Mountain Geographic Area. These boundaries were used to evaluate the cumulative effects of this amendment in addition to other past, present and reasonably foreseeable actions within the amendment area and how this amendment cumulatively would affect lynx and other MIS within the entire Southern Rocky Mountain Geographic area.

Alternative A - No Action

Under the no-action alternative, management direction would not be incorporated into Forest Plans; however, administrative units would still provide for habitat needs for MIS due to existing direction for these species in the Forest Plan that has designated the MIS for a specific forest. These units have addressed the viability of these species in the analysis done for the existing Forest Plans or at project level. Cumulatively, the other past, present and reasonably foreseeable programmatic actions described above would generally have beneficial effects on many terrestrial and aquatic species. These actions include direction that improves security and habitat needs for a variety of species, including lynx.

Alternative B

Alternative B would incorporate management direction into land management plans. Cumulatively, this management direction, in addition to other past present and reasonably foreseeable programmatic direction described above, would have beneficial or no effects on most MIS species. Some species would have both positive and negative effects. See Table 3-7. The MIS that have the potential of both positive and negative effects are: warbling vireo, yellow-bellied sapsucker and all the trout species. Warbling vireo have the potential of negative effects from the encouragement of aspen regeneration, which would temporarily reduce their habitat, but would provide for the aspen habitat long term. The trout species have the potential for positive effects from the road reclamation guidelines and the requirement for designated routes for most non-recreation special use permits or operating plans. However, there is also a potential for negative impacts to trout

species if the guidelines to avoid building roads on ridgetops and saddles leads to building new roads on sideslopes of a trout stream.

Alternative C

The cumulative effects described under Alternative B are similar under this alternative with some exceptions. A slight loss of snowshoe hare habitat may occur because of exceptions to precommercial thinning as compared to Alternative B. It is also possible that mature forest dependent species may be more likely to be negatively affected using multiple LAUs to apply standards for limits on vegetative disturbance (i.e. 30 percent) and snow compacting activities because standards would not be applied at an individual LAU scale. The National Park Service does not do vegetation management such as precommercial thinning.

Alternative D

The cumulative effects described under Alternative B are similar under this alternative with some exceptions. Over time, there may be a greater loss of denning structure habitat because of changes in standards applicable to vegetation management activities as compared to Alternative B. It is possible that snowshoe hare and the species that use it as a prey resource may be more likely to be negatively affected as a result due to the additional exceptions. The National Park Service does not do vegetation management such as precommercial thinning.

Alternative F

The cumulative effects described under Alternative B are similar under this alternative with some exceptions. There may be a greater loss of down woody debris habitat over time, due to the denning habitat direction being in the form of a guideline, and no minimum standard of 10 percent of an LAU in denning habitat. There may be a greater loss of snowshoe hare habitat over time, due to the exceptions to all the vegetation standards for fuels reduction projects, of up to 3 percent beyond the limitations in Alternative B and the LCAS. This would also indirectly affect MIS species that prey upon snowshoe hare.

Threatened, Endangered and Proposed Species

Some of the wildlife, fish and plant species occurring in the amendment area are listed as threatened or endangered, are candidate species, or are otherwise considered sensitive species by the Forest Service. The effects of the proposal to incorporate lynx conservation measures into SRMGA Forest Plans on other threatened, endangered, proposed, and Forest Service sensitive species will be specifically addressed.

The species addressed in the wildlife portion of the Biological Assessment (BA) are as follows: Canada lynx, bald eagle (now delisted), Mexican spotted owl, southwestern willow flycatcher, whooping crane, and Uncompahgre fritillary. The greenback cutthroat trout, and two Federally listed plants, Ousterhout milkvetch and Penland alpine fen mustard, are also analyzed in detail in the Biological Assessment (BA).

As lynx has already been discussed in previous sections, it will not be discussed in detail in this section. The following is a list and a summary of effects for all the threatened,

endangered and proposed wildlife species addressed in the BA for this amendment, which applies only to lynx habitat and lynx linkage areas.

KEY

GMUG - Grand Mesa, Uncompahgre, and Gunnison National Forests

MBR - Medicine Bow-Routt National Forests

RIOG - Rio Grande National Forest

AR - Arapaho/Roosevelt National Forests

PSI - Pike/San Isabel National Forests

SANJ - San Juan National Forest

WR - White River National Forest

K - Species known to occur on National Forest System (NFS) lands.

L - Species or habitat is likely or suspected to occur on NFS lands, but unconfirmed.

P – Potential site for reintroduction of the species has been identified.

N - Species not known or suspected to occur on NFS lands, however it may occur in planning area vicinity. Evaluate whether indirect effects from Forest Service management actions may occur.

Table 3- 8 - Endangered and Threatened Species – Occurrence by Administrative Unit

Status: Endangered – By Administrative Unit							
Species	National Forests						
	GMUG	MBR	RIOG	AR	PSI	SANJ	WR
MAMMALS							
black-footed ferret <i>Mustela nigripes</i>							
BIRDS							
least tern <i>Sternula antillarum</i>		N		N			
pipin plover <i>Charadrius melodus</i>		N		N	N		
whooping crane <i>Grus americana</i>		N		N	N		
southwestern willow flycatcher <i>Empidonax trailii</i> <i>extimus</i>			L			K	
AMPHIBIANS							
Wyoming toad <i>Bufo baxteri</i>		N					

Status: Endangered – By Administrative Unit							
Species	National Forests						
	GMUG	MBR	RIOG	AR	PSI	SANJ	WR
FISH							
bonytail chub <i>Gila elegans</i>	N	N		N		N	N
Colorado pikeminnow <i>Ptychocheilus lucius</i>	N	N		N		N	N
humpback chub <i>Gila cypha</i>	N	N		N		N	N
razorback sucker <i>Xyrauchen texanus</i>	N	N		N			N
pallid sturgeon <i>Scaphirhynchus albus</i>		N		N	N		
INVERTEBRATES							
Uncompahgre fritillary butterfly <i>Boloria acrocneuma</i>	K		K		L	K	L
PLANTS							
Osterhout milkvetch <i>Astragalus osterhoutii</i>		N		K			
Status: Threatened – By Administrative Unit							
Species	National Forests						
	GMUG	MBR	RIOG	ARP	PSI	SANJ	WR
MAMMALS							
Canada lynx <i>Lynx canadensis</i>	K	K	K	K	K	K	K
Preble's meadow jumping mouse <i>Zapus hudsonius preblei</i>		K		K	K		
BIRDS							
Mexican spotted owl <i>Strix occidentalis lucida</i>	L		L	L	K	K	L
bald eagle <i>Haliaeetus leucocephalus</i>	K	K	K	K	K	K	K
FISH							
greenback cutthroat trout <i>Oncorhynchus clarki stomias</i>	K			K	K		K

Status: Endangered – By Administrative Unit							
Species	National Forests						
	GMUG	MBR	RIOG	AR	PSI	SANJ	WR
INVERTEBRATES							
Pawnee montane skipper <i>Hesperia leonardus montana</i>					K		
PLANTS							
<i>Eutrema penlandii</i>					K		K
<i>Sclerocactus glaucus</i>	K						
<i>Spiranthes diluvialis</i>		N		N	L		

Note: Species associated with National Grasslands on the administrative units are not displayed.

For several of the listed species, no suitable habitat occurs within mapped lynx habitat, Lynx Analysis Units (LAUs) or linkage areas. Therefore no further analysis was necessary. They are:

Preble's meadow jumping mouse
 Black-footed ferret
 Wyoming toad
 Pawnee montane skipper
Gaura neomexicana ssp. *coloradensis*
Sclerocactus glaucus
Spiranthes diluvialis.

There will be no water depletions associated with the proposed action therefore; the following species affected by water depletions were not addressed in the BA:

Humpback chub	<i>Gila cypha</i>
Bonytail chub	<i>Gila elegans</i>
Colorado pikeminnow	<i>Ptychocheilus lucius</i>
Razorback sucker	<i>Xyrauchen texanus</i>
Pallid sturgeon	<i>Scaphirhynchus albus</i>
Whooping crane	<i>Grus americana</i>
Least tern	<i>Sternula antillarum</i>
Piping plover	<i>Charadrius melodus</i> .

TEP SPECIES EVALUATED (Other than Lynx)

The following are the threatened (T), endangered (E) and proposed (P) species, other than lynx, that occur or may occur within lynx habitat or linkage areas, or have the possibility of being affected, within the action area, and are therefore evaluated in the BA.

Birds

Southwestern willow flycatcher (E)

Empidonax traillii extimus

Mexican spotted owl (T)

Strix occidentalis lucida

Bald eagle (Delisted June 29, 2007)

Haliaeetus leucocephalus

Fish

Greenback cutthroat trout (T)

Oncorhynchus clarki stomias

Invertebrates

Uncompahgre fritillary butterfly (E)

Bolaria acrocnema

Plants

Penland alpine fen mustard (T)

Eutrema penlandii

Osterhout milkvetch (E)

Astragalus osterhoutii

Summary of Biological Assessment (other than lynx)

No Action: With the exception of lynx, there is no change expected in the effects on listed species from those described in existing Forest Plans. Management Area objectives, standards and guidelines would remain unchanged. Species viability is required by every Forest Plan, and Section 7 consultation with the U.S. Fish and Wildlife Service must occur if any action “may affect” a listed or proposed species. The No Action alternative has been documented, given the new information regarding lynx, to have an “adverse” effect on lynx, as documented in the USFWS Biological Opinion on the Forest Plans in October of 2000, except for the Revised Medicine Bow and White River Plans.

All Action Alternatives:

Species: Bald Eagle (*Haliaeetus leucocephalus*)

Status: Threatened status when this amendment was initiated, delisted June 29, 2007.

Distribution/Habitat: Breeding bald eagles are rare in Colorado and southern Wyoming. Although some nesting does occur, most eagles migrate in summer to northern breeding grounds but return to lower latitudes during the winter. Winter habitat consists of roost trees along larger rivers and other large open bodies of ice-free waters that allow access to fish.

Determination: No effect. The bald eagle occurs primarily in lower elevations, outside of lynx habitats. Some individuals migrate through lynx habitat during fall migration, when high elevation lakes are ice-free. No change in habitat suitability is expected.

Species: Mexican Spotted Owl (*Strix occidentalis lucida*)**Status:** Federal - Threatened

Distribution/Habitat: Historical records include most of the Front Range and Southwest Colorado. The owl may be found in steep-sided canyons with old growth mixed conifer forests in southwestern Colorado. It may also be found in the shady, cool canyons of the piñon-juniper zone. All nests in Colorado found to date occur on cliff ledges or caves along canyon walls. The Pike-San Isabel National Forest is the only SRMGA forest with known occurrences and designated Critical Habitat for the Mexican spotted owl. The Critical Habitat is located outside of lynx habitat. The GMUG and the San Juan have known pairs in the vicinity of the National Forest, but no pairs have been documented on NFS land.

Determination: No effect. Mexican spotted owl nests in lower elevations than lynx habitat, and most foraging occurs in non-lynx habitats.

Species: Southwestern Willow Flycatcher (*Empidonax trailii extimus*)**Status:** Federal –Endangered

The current range as discussed in the draft Recovery Plan includes southern Colorado in portions of the Rio Grande National Forest, south of the Rio Grande River. It also may occur on the San Juan National Forest in some watersheds. The habitat of the subspecies is willow, cottonwood, or tamarisk with slow moving water adjacent or nearby. This subspecies occurs primarily outside of lynx habitat, although there may be some overlap at the 8000-8500 foot elevations. In those areas, there would potentially be beneficial effects, as compared to the No Action alternative, due to the grazing standards and/or guidelines.

Determination: May Effect, Not Likely to Adversely Affect. This determination is based on a beneficial effect, due to the grazing standards that require (Alternative B and C) or suggested guidance (in Alternative D) that willow habitats are to be managed in mid to late seral stages.

Species: Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*)**Status:** Federal - Threatened

Distribution/Habitat: The Greenback cutthroat trout occurs in the well-oxygenated headwaters of mountain streams and lakes on the Pike-San Isabel and Arapaho-Roosevelt National Forests. Due to competition and hybridization with non-native trout, Greenbacks are restricted to only a few small drainages. There are efforts throughout the Greenbacks' range to increase the number of populations.

Determination: No Effect. There is a potential for beneficial effects, due to the guidelines that call for remote monitoring of energy facilities during the winter, instead of plowing; reclamation plans for road closures; and the restriction of public use of project specific roads, and then eventual reclamation of those temporary roads. One guideline that could lead to potential negative effects calls for locating permanent roads away from ridgelines, which could possibly lead to placing roads on sideslopes and could increase sedimentation into creeks. As this is a guideline, if there was a conflict between aquatic

species and this guideline for lynx, other laws and regulations will need to be adhered to as well, such as the Clean Water Act, Regional Watershed Conservation Practices, State Best Management Practices, etc. Because of these laws and policies, the greenback cutthroat habitat is protected in all cases, even under the No Action alternative, therefore, there is no effect to this species.

Species Uncompahgre Fritillary Butterfly (*Boloria acrocne*)

Status: Federal - Endangered

Distribution/Habitat: At present, this species is known to occur only above 12,500 feet on the Uncompahgre National Forest. Females lay their eggs on snow willow (*Salix nivalis*), and the adults can be found in late July. The USFWS species occurrence list shows this species as potentially occurring in several counties within central Colorado.

Determination: No effect. This species may occur within LAUs, but its habitat is in the alpine ecosystem, which is not considered lynx habitat.

Species: Penland alpine fen mustard (*Eutrema penlandii*)

Status: Federal - threatened

Distribution/Habitat: Penland alpine fen mustard (*Eutrema penlandii*) occurs in wet areas in alpine tundra of the Mosquito Range in central Colorado.

Determination: No Effect. No change in habitat suitability is expected.

Species: Osterhout milkvetch (*Astragalus osterhoutii*)

Status: Federal -endangered

Distribution/Habitat: Occurs adjacent to NFS lands, and may occur on NFS lands. Osterhout milkvetch (*Astragalus osterhoutii*) occurs on moderate slopes in sagebrush habitats at 7,400-7,900 feet in central Grand County.

Determination: No Effect. No change in habitat suitability is expected.

Cumulative Effects on TEP species (Other than lynx)

Cumulatively, with NPS and BLM LAU data added in, the SRMGA as a whole contains approximately 7.5 million acres of lynx habitat.

Alternative A, No Action

There would be no change from the existing situation under the No Action Alternative.

Alternatives B, C, D, and F

Alternatives B, C, D and F would incorporate management direction into land management plans. Cumulatively, this management direction, in addition to other past present and reasonably foreseeable programmatic direction described above, would have beneficial or no effects on listed species. Any changes in alternatives would not have any different effects on the listed wildlife and fish species.

Fisheries

Affected Environment and Environmental Consequences

Amending Forest Plans in the Southern Rocky Mountains with this Proposed Action or alternatives is not expected to negatively affect fisheries resources, as much of the lynx habitat is at relatively high elevation, where streams are generally small and of low productivity, and lake fisheries are often cold-water, low productivity, and generally stocked to sustain recreational angling.

Few fishes other than cutthroat trout have historically occupied high elevation streams across lynx range.

Greenback cutthroat trout are found in a few Front Range, headwater streams on the Pike-San Isabel, Arapaho-Roosevelt, Grand Mesa-Uncompahgre-Gunnison, and White River National Forests. Due to a variety of reasons, including introduction of exotic species and habitat modification, its range has been greatly reduced from its historical distribution. It has been designated “threatened” under the Endangered Species Act since 1979. An interagency recovery plan was developed in 1996.

Colorado cutthroat trout are found in headwater streams in the Colorado River drainage including the White River National Forest. As with other native salmonids, introduction of exotics and habitat modification have greatly reduced its range. An interagency conservation agreement and strategy was completed in 2001.

Rio Grande cutthroat trout are found in headwater streams of the Rio Grande River drainage. As with other native trout sub-species, their range has been greatly reduced. An interagency conservation agreement and strategy was completed in 2003.

Populations of desirable non-native trout species inhabit many headwater streams across the Region. These include brook, brown, and rainbow trout. These populations are often well established and provide significant recreation angling. Some populations are maintained by stocking.

At low elevations, the federally endangered Colorado pikeminnow, razorback sucker, bonytail chub and humpback chub are found in the Yampa River system but are not known to occupy habitat on the White River National Forest. Other species on the Regional Forester’s Sensitive Species list that occur at elevations generally below lynx habitat include the mountain sucker, flannel mouth sucker, and blue head sucker and round tail chub.

Generally, the proposed objectives, standards, and guidelines would have a net neutral or beneficial effect on fisheries resources.

Since Clean Water Act, Regional Watershed Conservation Practices Handbook, state Best Management Practices, and Forest Plan standards and guidelines will be adhered to in the implementation of this action; neither the Proposed Action nor any of the action alternatives are expected to have any adverse direct, indirect or cumulative effects on fisheries resources.

Plants

Affected environment

There are 71 Threatened, Endangered, and Sensitive (TES) plant species that may occur in the area affected by this amendment. They include five species designated under the Endangered Species Act (one Endangered, and four Threatened), and 66 species (two of which are also Candidates for federal listing) designated by the Regional Forester as sensitive within the administrative boundaries of Rocky Mountain Region National Forest System (NFS) lands. The majority of these plants are forbs, including a few fern-like plants called moonworts (*Botrychium spp.*). Others include true grasses and grass-like plants, and four willow species (*Salix spp.*). Populations of these TES plants are infrequent and generally have a localized distribution.

One federally-listed Endangered plant may occur on NFS lands within the affected area. Osterhout milkvetch (*Astragalus osterhoutii*) occurs on moderate slopes in sagebrush habitats at 7,400-7,900 feet in central Grand County, Colorado, which is outside of lynx habitat. One federally-listed Threatened plant species was identified as having known populations and habitat in the amendment area. Penland alpine fen mustard (*Eutrema penlandii*) occurs in wet areas in alpine tundra of the Mosquito Range in central Colorado. A second Threatened plant, Uinta Basin hookless cactus (*Sclerocactus glaucus*) occurs in western Colorado on rocky hills and mesas in desert shrub communities, which is outside of lynx habitat. A third Threatened plant species is not known to occur on NFS lands in the Rocky Mountain Region, but could be affected downstream by management of NFS lands. The Ute ladies' tresses orchid (*Spiranthes diluvialis*) occurs on both sides of the Rocky Mountains along streams and on floodplains at elevations generally below the Forest boundaries in Region 2. A fourth Threatened plant species, Colorado butterfly plant (*Gaura neomexicana ssp. coloradoensis*), has never been found on NFS lands, but the Pawnee National Grassland has some potential habitat for reintroduction. This species is known to occur in a few places on other ownerships in the vicinity on sub-irrigated alluvial soils along drainage bottoms.

Two plant species which are Candidates for listing under the Endangered Species Act occur on NFS lands in the Rocky Mountain Region, but in lower-elevation habitats that are not lynx habitat. Pagosa ipomopsis (*Ipomopsis polyantha*) occurs in ponderosa pine forest on Mancos shale in southwestern Colorado, where it may occur on NFS land. Debeque phacelia (*Phacelia scopulina var. submutica*) is a small annual plant that occurs on sparsely vegetated clays in the Piceance Basin in western Colorado, where it is known on NFS lands and other ownerships.

Many of these plants (Uinta Basin hookless cactus, Ute ladies' tresses orchid, Colorado butterfly plant, Pagosa ipomopsis, Debeque phacelia) occur outside of lynx habitat and would not be affected by the proposed amendment unless they occur in linkage areas.

Environmental Consequences

Direct and Indirect

Amending Forest plans in the SRMGA area to protect Canada lynx from adverse impacts due to timber management, wildland fire management, recreation, livestock grazing, and the other activities as outlined in Chapter 1 is not expected to have adverse effects on any Threatened, Endangered, or Sensitive (TES) plants. To the contrary, meeting the stated conservation objectives through the proposed standards and guidelines may have some beneficial effects, especially over the long run.

Examples of standards, guidelines and objectives that may have beneficial effects include:

- ♦ Managing vegetation to be consistent with historical succession and disturbance processes. **(VEG O1)**
- ♦ Using fire to restore ecological processes. **(VEG O3)**
- ♦ Managing livestock grazing in riparian areas to help maintain conditions that would occur under historic disturbance regimes **(GRAZ S4)**.
- ♦ Using integrated pest management practices to manage non-native invasive plants.
- ♦ Concentrating activities in existing developed areas, rather than new areas. **(HU O3)**
- ♦ Restricting precommercial thinning and timber salvage. **(VEG S4, VEG S5)**

Depending on project-specific details, and whether or not TES plants or their habitats are involved, many of the proposed standards and guidelines could lead to on-the-ground project designs that are beneficial to TES plants.

Many proposed standards and guidelines are expected to have no effect on TES plants (e.g., minimal roadside brushing on low-speed and low-volume roads **HU G8**).

Restoring historic succession and disturbance regimes, and using fire to restore ecological processes, should help create a broad array of habitats and niches in various conditions across the landscape. This should be beneficial for TES plant species over the long run.

Livestock grazing restrictions in riparian zones and burned areas should have positive effects for most TES plant species in those areas.

Alternative A - No Action

Current direction for TES plants would remain in place under the no action alternative. Current direction requires site-specific analysis prior to implementing site-specific projects. There would be no direct or indirect effects on these plant species due to selection of this alternative.

Alternative B

The proposed action represents programmatic direction, and therefore, would have no direct effect on TES plant species. Direct effects could occur later, when projects are implemented, and could be beneficial, neutral, or negative. However, these projects will be evaluated for potential effects on TES plants prior to implementation, allowing site-

specific decisions to be made. Most of the effects identified in this present analysis would be indirect effects that would occur later as a result of this programmatic decision.

The goal (desired end result) of the proposed action is to conserve the Canada lynx, and several objectives are identified to meet this goal. None of the objectives run counter to conserving TES plants, though some are more likely to yield positive benefits (e.g., **VEG O1, VEG O3, HU O1, HU O3, LINK O1**), while achieving the bulk of the objectives could bring about either positive or negative effects for TES plants depending on the specifics of project design and implementation. The proposed action identifies **VEG O1** through **O4** for managing vegetation. Other objectives that could influence plant species include **GRAZ O1** and **HU O3** and **O5**.

Many of the standards and guidelines designed to achieve these objectives could have positive effects for TES plants. For example, those intended to restore ecological processes (e.g., **GRAZ S3, GRAZ S4, LINK S2**) seem likely to be beneficial, especially over the long run, and others are also likely to have beneficial effects (e.g., **GRAZ S1, GRAZ S2, HU S3, HU G4, LINK G1**). Vegetation treatments designed to restore historic succession and disturbance regimes, or using fire to restore ecological processes, should contribute to the creation of a broad array of habitats and niches in various conditions across the amendment area, which in turn, should benefit TES plants over the long run.

The guidance for livestock grazing would not have detrimental effects on any specific habitats or ecological communities upon which these TES plant species depend, and may prove beneficial in the long term. Grazing restrictions, especially in riparian zones, would have positive effects. Grazing management in shrub-steppe habitats, riparian areas, and willow carrs would help recreate conditions that occurred under historic disturbance regimes.

Any activity that removes vegetation or soils, or fragments habitat, has the potential to impact TES plant populations or their habitat. Therefore, managing human activities to limit disturbance from special uses, mineral exploration and development, and placement of utility corridors, should reduce the potential for negative impacts to TES plant populations and their habitats.

The bulk of the standards and guidelines could have positive, neutral or negative effects depending on project level specifics, but none are inherently negative for TES plants. For example, **VEG S1, S2, S3, S4, S5, S6 and VEG G1, G2, G3, G4, G5** all could have positive, neutral or negative effects on TES plants depending on the specifics of any given project. Other standards and guidelines (e.g., **LAU S1, HU G8, LINK S1**) seem to be inherently neutral for TES plants.

No adverse effects are expected on Penland alpine fen mustard from proposed project activities. Similarly, no effects are expected on Osterhout milkvetch, Colorado butterfly plant, Uinta Basin hookless cactus, or the Ute ladies' tresses orchid. Habitat for the Pagosa ipomopsis and Debeque phacelia should not be adversely affected by this amendment. However, it is possible that beneficial effects may accrue over time for any of these species that do occur in lynx habitat or linkage areas, as historic succession and disturbance regimes are restored and grazing guidelines are applied.

Alternative C

As with Alternative B, Alternative C represents programmatic direction with no direct effect on TES plant species. Alternative C would have similar effects to Alternative B. Indirect effects likely would be mostly beneficial to TES plant species and their habitats.

Alternative D

As with Alternatives B and C, Alternative D represents programmatic direction with no direct effect on TES plant species. Indirect effects likely would be mostly beneficial to TES plant species and their habitats.

Alternative F

As with Alternatives B, C and D, Alternative F represents programmatic direction with no direct effect on TES plant species. Indirect effects likely would be mostly beneficial to TES plant species and their habitats.

Cumulative Effects

The lynx amendment, in combination with other past programmatic decisions over the past two decades and reasonably foreseeable programmatic proposals, would have a beneficial effect on TES plant species, by helping to restore historic succession and disturbance regimes, using fire to restore ecological processes, and incorporating landscape considerations at the project level for all alternatives except the No Action Alternative.

However, as Plans are amended and revised under the 2008 National Forest Management Act planning rule (36 CFR 219), the current sensitive species policy will no longer apply. Projects could still be designed to benefit these species, but special considerations would no longer be required. Under the 2008 planning rule, species-of-concern and species-of-interest will be identified in each Plan as part of the approach to addressing species diversity. Species that are currently identified as sensitive species may or may not be identified in one of those two new categories. Under the National Forest Management Act, projects must be consistent with the Plan. At this time, it is unknown what Plan direction will be developed, or for which species, and therefore what the likely effects would be on sensitive plant species.

Forest Resources - Timber Management

Affected Environment

General Characteristics of Forest Resources in the Southern Rockies Geographic Area

The majority of lynx habitat in the Southern Rockies consists of mesic coniferous forests that characteristically have cold, snowy winters and vegetation composition, structure and extent which provide a prey base of snowshoe hare and suitable denning habitat (Quinn and Parker 1987; Koehler and Brittell 1990; Koehler 1990; Koehler and Aubrey 1994; Mowat et al. 2000; McKelvey et al. 2000 Ruggiero et al. 2000). Forest tree cover types that typify lynx habitat in the Southern Rockies include Engelmann spruce-subalpine fir, lodgepole pine, and to a lesser extent, quaking aspen and the Douglas-fir-dominated mixed conifer. Lynx habitat does not include xeric forests, typified where ponderosa pine, lodgepole pine, or Douglas-fir are the climax species. Table 3- 9 displays acres by cover type within LAUs by National Forest in the Southern Rockies covered in this analysis. Current mapping of the lodgepole pine and Douglas-fir cover types does not always differentiate between mesic and xeric conditions. Approximately half of the lodgepole pine and Douglas-fir within LAUs displayed in Table 3- 9 is not considered lynx habitat. Site determinations are needed to distinguish lynx habitat from non-habitat in these cover types.

Table 3- 9 - Cover Type within LAUs

Administrative Unit	Spruce-Fir Acres	Lodgepole Pine Acres	Aspen Acres	Douglas-fir Acres
Grand Mesa-Uncompahgre-Gunnison NFs	667,331	266,225	523,433	29,234
Medicine Bow-Routt NFs	413,558	496,039	223,355	2,763
Rio Grande NF	559,252	28,124	245,259	183,538
Arapaho-Roosevelt NFs	248,742	411,046	26,296	4,066
Pike-San Isabel NFs	290,047	168,346	182,591	122,899
San Juan NFs	478,633	1,186	237,121	135,014
White River NFs	642,538	254,215	420,858	68,586
TOTAL	3,300,101	1,625,181	1,858,913	546,100

Management activities such as timber harvest and thinning have contributed to the character of the landscape across the Southern Rocky Mountains. Many of the stands less than 80 years of age have originated from harvest activities. The extent of the landscape modified by timber management activities is considerably smaller than the area affected by fire, insects and windthrow. Wildfire historically has been the major force determining forest structure, composition and landscape patterns in the Southern Rocky Mountains (Arno 1976, 1980; Perry and Lotan 1979; Lotan, Brown, and Neuenschwander 1984; Arno and Fischer 1995; Antos and Habek 1981). Other disturbances such as insects (particularly spruce beetle and mountain pine beetle) and windthrow events also had large roles in determining species, horizontal and vertical structure, and age characteristics on the landscape.

The vast majority of conifer stands in the Southern Rocky Mountains are over 80 years old (Alexander, 1987). Forest Survey data from 1983 for Colorado outside designated Wilderness showed eight percent of the spruce-fir cover types, nine percent of the lodgepole pine and seven percent of the Douglas-fir were less than 80 years old (Green and Van Hooser, 1983). The extensive mature forest may lack habitat preferred by snowshoe hares while providing large extents of suitable denning habitat for the lynx. Snowshoe hares prefer stands that have large components of relatively dense, small-diameter trees with crowns extending to the snow and available for the hare to browse during winter months (LCAS, 2000). Snowshoe hare habitat is typified by trees over 5 feet tall and with crown base heights of 10 feet or less. Once the crown base height exceeds 10 feet, the hare cannot reach the foliage during most winters. Hare habitat occurs in 15 to 40 year old regeneration patches and stands of Engelmann spruce, true fir, lodgepole pine, and occasionally Douglas-fir and white fir, and multistory mature spruce/fir forests. Timber harvest and wildfire are the primary disturbance agents that provide young, dense stands of conifer regeneration. The ongoing mountain pine beetle epidemic will also produce future young, dense lodgepole pine stands.

Table 3- 10 displays acres suitable for commercial timber production within suitable lynx habitat by National Forest in the Southern Rockies covered in this analysis. The suitable timber in lynx habitat is approximately 38% Engelmann spruce-subalpine fir, 22% lodgepole pine, 28% quaking aspen, 3% Douglas-fir-dominated mixed conifer, and 9% other vegetation cover types. The mapped suitable lynx habitat encompasses approximately 64% of the lands suitable for timber production. However, not all the lodgepole pine cover type is suitable lynx habitat. Approximately 50% of the lands suitable for timber production are estimated to actually be suitable lynx habitat.

The timber management program for the National Forests in the Southern Rockies utilizes a variety of silvicultural tools to accomplish the objectives of providing a sustained supply of wood fiber to the local and national economies, maintaining forest health and vigor and meeting other resource objectives.

Table 3- 10 - Timber Production in Suitable Lynx Habitat

Administrative Unit	Acres Suitable for Timber Production	Total Acres Timber Production
Grand Mesa-Uncompahgre-Gunnison NFS	387,835	550,131
Medicine Bow-Routt NFs	423,123	539,702
Rio Grande NF	249,547	298,100
Arapaho-Roosevelt NFs	166,228	188,906
Pike-San Isabel NFs	190,161	581,550
San Juan NF	196,674	375,092
White River NF	273,748	425,000
TOTAL	1,887,316	2,958,481

Management of spruce-fir forests usually occurs with individual tree and group selection methods or shelterwood methods. Precommercial thinning is not used extensively in spruce-fir in the Southern Rockies, but provides some opportunities to modify species composition and density. Precommercial thinning is used to reduce stocking of regeneration in the gaps provided by selection harvests or in the understory following shelterwood harvest. Commercial thinning and other intermediate harvests are used to remove trees recently dead or at risk of dying from competition, insects and disease or to maintain overall stand vigor.

Lodgepole pine forests are usually managed under the even-aged regulation system using clearcutting. Occasionally seed tree or single-step shelterwood methods are used. Lodgepole regenerates well with the use of these methods due to its ecological niche as an early seral species with low shade tolerance. Seedling stocking rates often are over 1000 seedlings per acre and can range over 10,000 seedlings per acre (Lotan and Perry, 1983). Precommercial thinning is a very cost-effective method to gain a commercial product from heavily stocked lodgepole pine stands. It also provides the ability to increase proportions of other species in the post-thinning stand and maintains the trees' ability to respond to future thinning with increased growth (Johnstone, 1985). The majority of precommercial thinning in the Southern Rockies is done in lodgepole pine. Commercial thinning is used to reduce mountain pine beetle risk in larger diameter stands as well as to provide micro sites for additional regeneration.

Douglas-fir and white fir are managed using both even-aged and uneven-aged methods. Individual tree selection, group selection, shelterwood and seed tree harvest methods are all used. Clearcutting is rare and only used when aspen and/or lodgepole pine are the major components of the pre-harvest stand. Precommercial thinning and/or stocking control are used to maintain overall stand vigor and concentrate growth on more desirable individual trees. Recently, thinning has focused on reducing hazardous fuels by decreasing crown bulk density and increasing crown base height.

Aspen forests are managed using the even-aged regulation system with clearcutting and coppice regeneration methods. These methods provide the sprout stimulation and full sunlight needed for ample regeneration of the species. Sprout densities after harvest have been measured at 31,000 stems per acre (Crouch, 1983). This provides rapid reoccupation of the site. Precommercial thinning is rarely used in aspen due to its ability to thin itself very quickly and effectively (Jones, 1976). Commercial thinning is also rare due to

aspen's susceptibility to logging damage. Commercial harvest of aspen is limited to the San Juan, White River and Grand Mesa, Uncompahgre and Gunnison National Forests.

Salvage of dead or dying trees occurs in all conifer cover types, depending on market conditions, public safety concerns and forest health risks. Standing dead spruce and lodgepole pine are often quite sought after for house logs. Aspen has a limited market as salvage, due to its relatively quick deterioration after death.

Environmental Consequences

Direct and Indirect Effects

Alternatives B, C, D and F all add standards and guidelines to the eight Forest Plans that would conserve the Canada lynx while providing for other multiple use objectives to varying extents. Alternative A is the No Action alternative, which would not add additional standards to the Forest Plans. The Medicine Bow and White River Forest Plan Revisions incorporated the LCAS such that there are only minor differences between Alternatives A and B for those two forests.

Standards and Guidelines in Alternatives B, C, D, and F have the potential to affect forest vegetation and timber management operations. The standards and guidelines presented in the alternatives may affect the following components of the forest vegetation and timber management programs:

1. Ability to achieve timber management objectives on suitable timber lands.
2. Ability to respond to insect and disease concerns.
3. Ability to precommercially thin stands to enhance growth potential, improve forest health, and reduce hazardous fuels.

The comparison criteria are:

1. Flexibility to achieve timber management objectives on suitable timber lands.
2. Flexibility to respond to insect and/or disease concerns.
3. Acres precommercially thinned and percent of baseline.

VEG S1 limits vegetation management activities that reduce suitable lynx habitat in LAUs where more than 30 percent of the lynx habitat is in unsuitable condition. This standard applies to Alternatives B, C, D, and F and the Medicine Bow and White River National Forests under Alternative A. The mortality associated with the ongoing mountain pine beetle epidemic may cause some LAUs to exceed 30% of the lynx habitat in unsuitable condition. Salvage harvest of the dead timber would be allowed in most situations; however timber management of live trees could be limited. This standard may result in deferring timber management in some LAUs. Timber harvest may need to be more concentrated in other areas to compensate for areas where timber management is deferred.

VEG S2 limits timber harvest and salvage sales such that they do not change more than 15 percent of lynx habitat within a LAU to unsuitable condition within a 10-year period. This standard applies to Alternatives B and F and the Medicine Bow and White River

National Forests under Alternative A. Unsuitable lynx habitat caused by beetles, fire, and other natural disturbances does not count toward this 15% threshold. This standard is not expected to have any effect timber management since it is very unlikely that timber management would change more than 15 percent of lynx habitat within a LAU to unsuitable condition within a 10-year period.

VEG S3 limits vegetation management activities in LAUs with less than 10 percent denning habitat. This standard would potentially reduce timber harvest in some LAUs. This standard applies to Alternatives B, C, D and the Medicine Bow and White River National Forests under Alternative A. This standard may modify some projects resulting in reduced ability to achieve other objectives including vegetation diversity, forest health, and timber production.

VEG S4 limits salvage harvest when disturbances are less than 5 acres. This standard applies to Alternatives B, C, and the Medicine Bow and White River National Forests under Alternative A. This standard would reduce salvage opportunities and could prevent proactive efforts to reduce beetle infestations.

Table 3- 11 - Acres of Bark Beetle Infestation

Administrative Unit	2001 Acres		2004 Acres		2006 Acres	
	Spruce Beetle	Mtn Pine Beetle	Spruce Beetle	Mtn Pine Beetle	Spruce Beetle	Mtn Pine Beetle
Grand Mesa-Uncompahgre-Gunnison NFs	432	2,841	939	3,386	2,850	750
Medicine Bow-Routt NFs	4,119	23,048	53,775	163,226	51,348	303,945
Rio Grande NF	273	9,025	156	5,520	13,223	3,877
Arapaho-Roosevelt NFs	6	24,114	10	99,076	5,540	154,385
Pike-San Isabel NFs	0	52,192	188	25,433	381	13,648
San Juan NF	153	1,135	7,376	0	20,472	142
White River NF	2,321	12,192	627	65,143	4,090	100,046
TOTAL	7,304	124,547	63,071	361,784	97,904	576,793

The acres of National Forest system lands currently supporting epidemic populations of spruce and mountain pine beetle continues to increase. Spruce beetle increased over 1200 percent (spruce beetle infestations are difficult to detect using aerial surveys) and mountain pine beetle in lodgepole pine increased nearly 400 percent in the past 5 years. The acres with current beetle infestations are not cumulative. Once all the trees in an area have been killed, the area is no longer considered to be supporting the epidemic populations. As of the 2006 aerial forest health survey, over 1,000,000 cumulative acres of lodgepole pine have been affected by mountain pine beetle and another 300,000 cumulative acres of spruce-fir have been affected by the spruce beetle. Weather, the scale of these disturbances, and other factors prevented reducing the current epidemic; however, this standard could exacerbate existing and/or future forest health concerns.

VEG S5 limits precommercial thinning. This standard, like the other standards, does not apply to non-lynx habitat such as xeric forests, typified where ponderosa pine, lodgepole pine, or Douglas-fir are the climax species. The restrictions associated with this standard

vary between alternatives. The standard would apply to most lynx habitat on the Medicine Bow and White River National Forests, but would not apply to the other national forests under Alternative A (no action). The standard would apply to most lynx habitat on all forests with some exceptions such as within 200 feet of buildings under Alternatives B and C. The standard would apply to most lynx habitat on all forests with exceptions for hazardous fuel reduction projects within WUI under Alternatives D and F.

This standard would reduce precommercial thinning opportunities to influence species composition, growth, and resilience to insects and disease. The standard under Alternatives B and C and the Medicine Bow and White River under Alternative A would also reduce opportunities to reduce hazardous fuel. This standard would reduce ability to achieve some objectives including vegetation diversity, forest health, and timber production.

Table 3- 13 displays the likely acres of precommercial thinning for each administrative unit for each alternative. The acres estimated acres thinned was based on discussion with each Forest's timber program manager (Bob Vermillion, Grand Mesa-Uncompahgre-Gunnison National Forests; Jim Myers, Medicine Bow-Routt National Forests; Bruce Short, Rio Grande National Forest; Dan Len, Arapaho-Roosevelt National Forests; Gary Roper, Pike-San Isabel National Forests; Dave Dallison, San Juan National Forest; and Jan Burke, White River National Forest).

This standard is intended to retain snowshoe hare habitat where dense stands are limiting. The on-going bark beetle epidemic is expected to result in extensive snowshoe hare habitat by 2020 when this standard may no longer be needed.

Diameter reduction would be greatest in those stands with the highest densities and the reduction would be cumulative over time, that is, the degree of reduction would increase relative to thinned stands as time progressed. Johnstone (1985) reported an 89 percent larger mean diameter and a 131 percent larger five-year periodic diameter increment 25 years after thinning a 22 year old stand at a density of 494 stems/hectare (200 stems/acre) compared to a density of 7,907 stems/hectare (3,200 stems/acre). He also found that 80 year old stands stocked at 4,000 stems/hectare (1,620 stems /acre) at age 20 on an average quality site had 47 percent of the stand volume in sawlog-sized trees. When stocking at age 20 increased to 10,000 stems/hectare (4,050 stems/acre), sawlog volume at age 80 was only five percent of the total stand volume, a reduction of 89 percent.

Precommercial thinning within lynx habitat has occurred primarily in lodgepole pine and to a lesser extent in spruce-fir, Douglas-fir, white fir and occasionally aspen cover types on the national forests in the Southern Rockies in the past. The reductions in sawtimber volume for forest cover types without precommercial thinning are not as dramatic as lodgepole pine, due to their better self-thinning tendencies. However, species distribution within mixed species stands such as spruce-fir will have the tendency to move toward a greater proportion of true fir species since they are the more shade tolerant species. True fir, including subalpine fir and white fir, is less desirable for wood fiber production. True fir trees are more susceptible to root disease and defoliators than the more shade intolerant species, which could exacerbate the ongoing forest health concerns.

Reductions in precommercial thinning would reduce the Long Term Sustained Yield (LTSY) on the Forests. The effect on LTSY would vary with species, site quality,

rotation length, final product, etc. The precommercial thinning programs in lynx habitat have historically been concentrated in young lodgepole pine stands. Approximately half of this lodgepole pine is seral to spruce-fir and considered lynx habitat. Future volume reductions and forest health concerns resulting from precommercial thinning restrictions would be greatest in the seral lodgepole pine stands. Using an average reduced yield of 1,800 cubic feet per acre, the potential affect on LTSY (differences from Alternative A) are estimated in Table 3-12. These potential reductions would occur in future decades and not during the current planning period.

Table 3- 12 - Forests Estimated LTSY Volume Reductions from Alternative A

Administrative Unit	Volume Reduction Alts B & C	Percent LTSY Alts B & C	Volume Reduction Alts D & F	Percent LTSY Alts D & F
Grand Mesa-Uncompahgre-Gunnison	9,000 CCF	6.4%	4,500 CCF	3.2%
Medicine Bow-Routt	12,600 CCF	3.5%	8,100 CCF	2.2%
Rio Grande	1,980 CCF	0.7%	1,800 CCF	0.6%
Arapaho-Roosevelt	4,500 CCF	3.4%	1,800 CCF	1.4%
Pike-San Isabel	1,800 CCF	3.4%	1,800 CCF	3.4%
San Juan	0 CCF	0%	0 CCF	0%
White River	0 CCF	0%	0 CCF	0%

The effect of the sawtimber volume reduction on actual harvest volumes is relatively small compared to potential effects on desired conditions such as species diversity, tree diameter, forest health, and hazardous fuel reduction.

Shaw (2002) states that delaying thinning to age 50 (when measured height to diameter ratios are 80-100) will result in significant fuel loading and post-harvest wind/snow damage. In his research, live crown ratios on co-dominant crown classes at age 50 drop from an average of 76 percent on thinned stands to 50 percent on unthinned. Elimination of thinning at a young age will likely deter stand progression to large stand structure, probably not moving beyond a 3C Vegetation Structural Stage.

Substantial information exists that indicates inability of lodgepole pine to respond to thinning once the live crown ratio is reduced to 30 percent or less (Johnstone, 1985). Delaying precommercial thinning until lodgepole pine the stand no longer produces hare habitat would have limited beneficial effects on diameter growth and merchantable volume attainment; dramatically increase thinning costs; and potentially exacerbate fuel loading.

VEG S6 limits vegetation management activities in multi-story mature and late-successional forests. This standard does not apply to individual tree and group selection management methods. This standard would apply primarily to spruce-fir forests under Alternatives B, C, and F. The standard would limit most timber harvests to individual tree or group selection methods.

VEG G1-G11 are guidelines rather than standards, which makes it difficult to estimate their potential effects. Adjustments can be made to guidelines if the project design is an effective means of meeting the purpose of the guideline and maintains or contributes to the attainment of the relevant desired conditions and objectives. The programmatic

analysis of this FEIS cannot estimate likely differences between alternatives based on **VEG G1-G11**. The guidelines are therefore not addressed in the following

Alternative A - No Action

This alternative would continue current forest resource management direction contained in the Forest Plans for the San Juan; Rio Grande; Pike and San Isabel; Grand Mesa, Uncompahgre, and Gunnison; Arapaho and Roosevelt; White River and Medicine Bow and Routt National Forests. The range of stand culture activities, including regeneration harvest, salvage harvest of insect or disease-killed, blowdown and fire-killed trees as well as precommercial thinning, would continue at Forest Plan or funded levels.

This alternative would provide a high level of flexibility to achieve timber management objectives on suitable timber lands and respond to insect and/or disease concerns. The baseline annual precommercial thinning program for the Forests is 4,700 acres. Stand vigor would be maintained in the precommercially thinned acreage, reducing future losses to insects and disease pathogens and maintaining future management options. This alternative allows the most flexibility for forest vegetation and timber management for all forests except the Medicine Bow and White River National Forests, which incorporated the LCAS into their revised Forest Plans.

Alternative B

Alternative B is the most restrictive of the alternatives for forest vegetation and timber management. Effects of implementing each of the standards and guidelines follow.

VEG S1 may result in timber harvest being more concentrated in some areas to compensate for areas where timber management is deferred to meet this standard.

The thresholds that trigger restrictions in **VEG S2** is not expected, therefore there would be no foreseeable effects due to this standard.

Implementation of **VEG S3** may result in individual LAUs that restrict the acres that could be harvested or salvaged using even-aged methods that reduce coarse woody debris. There may be a minor effect on achieving some project objectives, but little or no effect would be expected on forest health or timber harvests.

VEG S4 would reduce salvage opportunities and could prevent proactive efforts to reduce beetle infestations while the affected areas are less than five acres. The standard has the potential to substantially increase the size of insect infestations resulting from blowdown and initial infestations and could result in large tree mortality and increases in fuel loads.

VEG S5 would substantially limit precommercial thinning within lynx habitat for an indefinite period. A reduction of approximately 1,700 acres of precommercial thinning compared to baseline would occur annually (Table 3- 13). Height and diameter growth in all conifer species would be adversely affected by lack of precommercial thinning in regenerating stands. For those management areas where commercial timber production is a goal, reduced production of sawlog-sized material (7 inches DBH or more) would occur. Lodgepole pine would be affected to the greatest degree since this species does not differentiate by height to the extent that other species do, which can result in stands that

stagnate at pole and small sawtimber size. This standard has the potential to have adverse effects on the health of future forests if it persists beyond 2020.

VEG S6 would restrict even-aged regeneration harvest in most spruce-fir stands. This standard combined with VEG S5 would shift species distribution to a greater proportion of subalpine fir, which is less desirable for wood fiber production. Subalpine fir trees are more susceptible to root disease and defoliators than the less shade tolerant lodgepole pine and spruce. There would be potential effects on desired conditions such as species diversity, tree diameter, forest health, and hazardous fuel reduction.

This alternative would provide a moderate level of flexibility to achieve timber management objectives on suitable timber lands and a low-moderate level of flexibility to respond to insect and/or disease concerns. Annual precommercial thinning program for the Forests would be approximately 3,040 acres, which is 64 percent of the baseline level.

Alternative C

Alternative C is similar to Alternative B in most aspects that potentially affect forest vegetation and timber management. There are minor differences between Alternative B and C related to research studies and fire use and **VEG S2** is replaced with **VEG G7**, however, **VEG S2** is not expected to have any foreseeable effects on vegetation or timber management.

This alternative would provide a moderate level of flexibility to achieve timber management objectives on suitable timber lands and a low-moderate level of flexibility to respond to insect and/or disease concerns. Annual precommercial thinning program for the Forests would be approximately 3,040 acres, which is 64 percent of the baseline level.

Alternative D

VEG S1 may result in timber harvest being more concentrated in some areas to compensate for areas where timber management is deferred to meet this standard.

The thresholds that trigger restrictions in **VEG G7** are not expected, therefore there would be no foreseeable effects due to this standard.

Implementation of **VEG S3** may result in individual LAUs that restrict the acres that could be harvested or salvaged using even-aged methods that reduce coarse woody debris. There may be a minor effect on achieving some project objectives, but little or no effect would be expected on forest health or timber harvests.

VEG G8 replaces **VEG S4** that is part of Alternatives B and C. The guideline provides more flexibility for salvage opportunities than the standard. The guideline has the potential to increase the size of insect infestations resulting from blowdown and initial infestations if it creates confusion regarding salvage. Potential confusion could result in this guideline being treated similar to a standard. If denning habitat has not been mapped and field verified there is potential that salvage of wind thrown spruce could be delayed and result in a spruce beetle epidemic. However, there is sufficient uncertainty associated with the effect of this guideline that the effects cannot be estimated. The effects would, however, be less than the effects associated with Alternatives B and C as well as the effects of Alternative A on the Medicine Bow and White River National Forests.

VEG S5 in Alternative D would limit precommercial thinning within lynx habitat for an indefinite period, but provides exceptions for WUI areas compared to Alternatives B and C. A reduction of approximately 1,000 acres of precommercial thinning would occur annually (Table 3- 13) compared to the baseline level. Height and diameter growth in all conifer species would be adversely affected by lack of precommercial thinning in regenerating stands. For those management areas where commercial timber production is a goal, reduced production of sawlog-sized material (7 inches DBH or more) would occur. Lodgepole pine would be affected to the greatest degree since this species does not differentiate by height to the extent that other species do, which can result in stands that stagnate at pole and small sawtimber size. This standard has the potential to have adverse affects on the health of future forests if it persists beyond 2020.

VEG G6 replaces with **VEG S6** that is part of Alternatives B and C. The guideline provides more flexibility for even-aged management in spruce-fir stands than the standard.

This alternative would provide a moderate-high level of flexibility to achieve timber management objectives on suitable timber lands and a moderate level of flexibility to respond to insect and/or disease concerns. Annual precommercial thinning program for the Forests would be approximately 3,750 acres, which is 80 percent of the baseline level.

Alternative F

VEG S1 may result in timber harvest being more concentrated in some areas to compensate for areas where timber management is deferred to meet this standard.

The thresholds that trigger restrictions in **VEG S2** is not expected, therefore there would be no foreseeable affects due to this standard.

VEG G11 replaces **VEG S3** that is part of Alternatives B, C, and D. The use of a guideline rather than a standard to achieve coarse woody debris objectives would result in no expected effect expected on forest health or timber harvests associated with this guideline.

VEG G11 replaces **VEG S4** that is part of Alternatives B and C. The guideline provides considerably more flexibility for salvage opportunities than the standard. The guideline is expected to provide flexibility to respond to insect and/or disease concerns.

The effects on responding to insect and/or disease concerns are expected to be minor and less than the effects associated with Alternatives B, C, or D as well as the effects of Alternative A on the Medicine Bow and White River National Forests.

VEG S5 in Alternative F is similar to Alternative D and would limit precommercial thinning within lynx habitat for an indefinite period, but it also provides exceptions for WUI areas compared to Alternatives B and C. A reduction of approximately 1,000 acres of precommercial thinning would occur annually (Table 3- 13) compared to the baseline level. Height and diameter growth in all conifer species would be adversely affected by lack of precommercial thinning in regenerating stands. For those management areas where commercial timber production is a goal, reduced production of sawlog-sized material (7 inches DBH or more) would occur. Lodgepole pine would be affected to the greatest degree since this species does not differentiate by height to the extent that other

species do, which can result in stands that stagnate at pole and small sawtimber size. This standard has the potential to have adverse affects on the health of future forests if it persists beyond 2020.

VEG S6 would restrict even-aged regeneration harvest in most spruce-fir stands for WUI areas. This standard combined with **VEG S5** would shift species distribution to a greater proportion of subalpine fir, which is less desirable for wood fiber production. Subalpine fir trees are more susceptible to root disease and defoliators than the less shade tolerant lodgepole pine and spruce. There would be potential effects on desired conditions such as species diversity, tree diameter, forest health, and hazardous fuel reduction.

This alternative would provide a moderate-high level of flexibility to achieve timber management objectives on suitable timber lands and a moderate-high level of flexibility to respond to insect and/or disease concerns. Annual precommercial thinning program for the Forests would be approximately 3,750 acres, which is 80 percent of the baseline level.

Cumulatively, the precommercial thinning program would be reduced with corresponding reductions in growth, and ultimately, tree size in regenerating stands. Long Term Sustained Yield harvest would be reduced on the Grand Mesa, Uncompahgre, Gunnison, Medicine Bow and Routt National Forests under the action alternatives. The reductions in potential growth are related to delays in thinning of lodgepole pine. More stands that are presently not providing either foraging or denning habitat for the lynx would have regeneration harvests to provide additional snowshoe hare habitat for lynx foraging. Small disturbances by wind, insects or disease would increase the possibility of becoming more intense or extensive, with corresponding loss of live trees from the stands. No overall reduction in salvage practices are anticipated under any alternative.

Summary of Effects

Table 3- 13 - Acres of Precommercial Thinning

ADMINISTRATIVE UNIT	Average Annual Acres of Thinning				
	Alt A	Alt B	Alt C	Alt D	Alt F
Grand Mesa-Uncompahgre-Gunnison NFs	500	0	0	250	250
Medicine Bow-Routt NFs	2,200	1,500	1,500	1,750	1,750
Rio Grande NF	150	40	40	50	50
Arapaho-Roosevelt NFs	500	250	250	400	400
Pike-San Isabel NFs	600	500	500	500	500
San Juan NF	700	700	700	700	700
White River NF	50	50	50	100	100
TOTAL	4,700	3,040	3,040	3,750	3,750

Table 3- 14 - Comparison on Vegetation and Timber Management Criteria

Criteria	Alt. A	Alt. B	Alt. C	Alt. D	Alt. F
Timber Management Flexibility	High	Mod.	Mod.	Mod.- High	Mod.- High
Response to Insect and Disease Concerns	High	Low- Mod.	Low- Mod.	Mod.	Mod.- High
Precommercial Thinning Acres	4,700	3,040	3,040	3,750	3,750
Percent of Baseline	100%	64%	64%	80%	80%

Livestock Grazing Management

Affected Environment

This project area contains approximately 4.26 million acres of overlap between active livestock grazing allotments and suitable lynx habitat. Active livestock grazing allotments are those where a Term Grazing Permit is in effect and where authorized livestock grazing use of the allotment is expected to occur during most years. Depending on the classification of the allotment and on the Term Grazing Permit language, this permitted use may consist of either cattle or sheep, with a few allotments being permitted for both kinds of livestock. Horses may also be permitted, and in a few circumstances, bison will also be authorized. In general, the season of use in areas identified as lynx habitat may occur between early June and late September, although this varies by allotment depending on elevation, plant communities, and management requirements.

Permitted livestock grazing is managed according to Forest Plan Objectives, Standards, and Guidelines. Objectives generally provide for ensuring that livestock grazing activities are conducted in a manner that will provide for the meeting or moving toward desired conditions that are normally focused on mid to later seral stages and historic ranges of variability. Standards and guidelines provide the constraints to livestock management to ensure that the short-term effects are within tolerances that will ensure meeting the long-term objectives. Examples of standards and guidelines for livestock management include allowable use standards, residual stubble height standards, and restrictions on season long grazing. Annual management, including appropriate standards and guidelines, is specified in the Annual Operating Instructions.

Table 3-15 shows the relationship (by acres) of livestock grazing activities on active allotments and lynx habitat.

Of the total potential overlap acreage, approximately 1.35 million acres is considered to be lynx denning habitat. Lynx denning habitat is typified by relatively dense conifer stands that are generally neither suitable nor capable for livestock grazing and as a result, are little used or affected by livestock management activities. In addition, of the total potential overlap acreage, approximately 0.9 million acres is considered to be lynx winter forage habitat. Within this winter forage habitat acreage, there is a potential for livestock grazing to affect lynx habitat, primarily by affecting prey species' forage quality or quantity and shrub cover. However, livestock grazing is generally of relatively short duration and low intensity in these areas and is managed according to specified standards. This would be expected to continue to result in a high quality of habitat and forage availability for prey species. The remaining portion of the total acreage overlap consists of "other" lynx habitat.

Table 3- 15 - Acres by Forest of Lynx Habitat Type in Active Allotments by LAU

National Forest	Lynx Winter Forage/Denning NFS Acres in Active Allots	Lynx Winter Forage/Non-Denning Acres in Active Allots	Other Lynx Foraging Habitat NFS Acres in Active Allots	Total NFS Acres of Suitable Lynx Habitat in Active Allots	Currently Unsuitable Lynx Habitat NFS Acres in Active Allots	Non-Lynx Habitat NFS Acres in Active Allots
Arapaho-Roosevelt	51,818	225,237	6,180	283,235	9,898	43,199
Pike-San Isabel	82,753	83,891	77,894	244,538	2,578	177,633
Grand Mesa-Uncompahgre-Gunnison	471,457	180,615	634,458	1,286,530	13,170	652,578
Medicine Bow-Routt	171,912	129,096	838,629	1,139,637	24,761	343,800
Rio Grande	101,831	47,618	100,098	249,547	48,324	24,809
San Juan	230,229	70,943	239,133	540,305	52,635	231,643
White River	236,175	158,359	118,530	513,064	8,331	624,129
TOTAL	1,346,175	895,759	2,014,922	4,256,856	159,697	2,097,791

There is relatively limited potential for conflict between permitted livestock grazing and lynx or lynx habitat. For the most part, the two species prefer and utilize distinctly different parts of the environment. In general, lynx prefer the denser conifer types for denning, with hunting activity occurring primarily in conifer types of varying density and structure. Lynx foraging activities may also occur in the aspen/alder, willow, and sagebrush/grassland types with use of these areas occurring primarily as a search for alternate prey species. Within these cover types, livestock management that is designed to ensure that there is an adequate quantity and quality of residual forage species for the alternative prey species, e.g. grass species, forbs, and palatable shrub species such as willow, along with adequate shrub or tree cover, will meet the needs of both the lynx and its prey species. Forest Plans currently provide for such management through allowable use standards, residual vegetation standards, and objectives for managing riparian shrubs to meet certain seral stage mixes or canopy coverage. Not all Forest Plans specifically focus on the needs of lynx and lynx habitat although the objectives, standards, and guidelines do in fact generally meet the needs of lynx.

Cover types most likely to experience an interaction between livestock grazing activities and lynx habitat are shown in Table 3- 16, below. Not all Forests have detailed mapping available regarding these specific cover types, so the information provided may actually be an under-representation for some types.

Table 3- 16- Acres of Cover Type within Lynx Habitat by National Forest

National Forest	Aspen/Alder	Willow	Sagebrush
Arapaho- Roosevelt	26,296	19,776	208
Pike-San Isabel	182,591	50,557	4,222
Grand Mesa-Uncompahgre-Gunnison	515,623	21,053	504
Medicine Bow - Routt	223,355	26,491	31,006
Rio Grande	245,259	12,177	829
San Juan	237,121	4,379	1,489
White River	420,858	13,882	42,763
TOTAL	1,851,103	148,315	81,021

Environmental Consequences

For evaluation purposes associated with livestock grazing activities, all alternatives treat the LAUs and the Linkage Areas in the same general manner with regard to objectives, standards and guidelines. Therefore, there is no measurable difference in the effects of alternatives relative to designation as LAU or Linkage Area.

Alternative A - No Action

The No Action Alternative for the planning area will have no direct or indirect effects on current livestock grazing management practices on NFS Lands. The no action alternative would continue to provide for current livestock grazing management practices, as specified in Forest Plans, to remain in effect with no change. All Forest Plans contain objectives, standards, and guidelines that address to varying degrees the inter-relationship between lynx and livestock grazing. For the most part, there is either adequate direction contained in the Forest Plans, or where such language is lacking or insufficient, existing management at the allotment or project level is such that there is minimal to no apparent conflict. However, it is clear that most of the Forest Plans would benefit from having clear objectives, standards, and guidelines that specifically address the lynx/livestock relationship. There are no cumulative effects on rangeland management resources or livestock grazing under Alternative A.

Action Alternatives B, C, D, and F

The proposed action alternative (B), and action Alternatives C, D, and F are similar with regard to their relationship with livestock grazing. While there are minor differences in wording between the alternatives, the effect of this wording on management practices, and therefore on the lynx or lynx habitat, would be minor. These alternatives have the potential for only minimal direct or indirect effects on current livestock grazing management practices on NFS lands. For the most part, existing direction and current practices already are implementing management that is equivalent to that provided in the four action alternatives. Effects to livestock management practices from any of the four alternatives would be expected to occur only in specific localized situations where current management is not meeting standards or where a change in current management would be needed to resolve a site-specific concern.

The proposed action, as well as the other action alternatives, will have only minimal effect on livestock grazing operations, consisting primarily of better defining objectives and management practices that are required to ensure maintenance or enhancement of lynx and their habitats. In specific instances where there is a potential for negative interactions with livestock, this may result in the need to intensify livestock management. In most instances, this would likely consist of alterations in the timing, intensity, duration, or frequency of livestock use in the specific area. In a very few instances, structural improvements such as fencing may be required to ensure proper livestock management.

There are no known cumulative effects on rangeland management resources under the action alternatives. In very localized and specific instances where monitoring determines that additional management constraints or structural improvements may be needed, there could be additional costs for the livestock permit holder and the Forest Service. Over the range of the Southern Rockies project, these effects would be expected to be very minor.

Fuels, Fire and Fire Ecology

Background

In April 1999, the General Accounting Office (GAO) published a report entitled *Western National Forests: a Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats* (GAO/RCED-99-65). In the report, the GAO asserts, "The most extensive and serious problem related to the health of national forests in the interior West is the over-accumulation of vegetation."

The Forest Service responded to the GAO report by developing, "Protecting People and Sustaining Resources in Fire-adapted Ecosystems: a Cohesive Strategy to Reduce Over-Accumulated Vegetation". Approved on October 13, 2000, the Cohesive Strategy provides an approach to achieve improved forest and grassland resilience by reducing fuel loadings in fire-prone forests in order to protect people and sustain resources. The strategy focuses treatment on high-risk areas, rather than least-cost acres.

The cohesive strategy establishes a framework that restores and maintains ecosystem health in fire-adapted ecosystems for priority areas across the interior West. In accomplishing this, it is intended to:

- ♦ Improve the resilience and sustainability of forests and grasslands at risk,
- ♦ Conserve priority watersheds, species and biodiversity,
- ♦ Reduce wildland fire costs, losses, and damages, and
- ♦ Better ensure public and firefighter safety.

The priorities established in the cohesive strategy are:

Wildland-urban interface. Wildland-urban interface areas include those areas where flammable wildland fuels are adjacent to homes and communities.

Readily accessible municipal watersheds. Water is the most critical resource in many western states. Watersheds impacted by uncharacteristic wildfire effects are less resilient to disturbance and unable to recover as quickly as those that remain within the range of ecological conditions characteristic of the fire regime under which they developed.

Threatened and endangered species habitat. Dwindling habitat for many threatened and endangered species will eventually be impacted by wildland fire. The severity and extent of fire could eventually push declining populations beyond recovery.

Maintenance of existing low risk Condition Class 1 areas.

Treatments discussed in the Cohesive Strategy include thinning, some harvest, other mechanical biomass removal treatments, and prescribed burning. It also recognizes that reducing risk on a scale that makes a difference is potentially expensive and will take time and collaborative planning to implement.

Affected Environment

Fire Regimes (Adapted from Brown and Smith, 2000)

"Fire regime" refers to the nature of fire occurring over long periods and the prominent immediate effects of fire that generally characterize an ecosystem. Descriptions of fire regimes are general and broad because of the enormous variability of fire over time and space (Whelan, 1995). The fire regime concept brings a degree of order to a complicated body of fire behavior and fire ecology knowledge. It provides a simplifying means of communicating about the role of fire. (Brown and Smith, 2000).

Classifications of fire regimes can be based on the characteristics of the fire itself or on the effects produced by the fire (Agee, 1993). Fire regimes have been described by factors such as fire frequency, fire periodicity, fire intensity, size of fire, pattern on the landscape, season of burn, and depth of burn (Kilgore, 1987). The natural role of fire can be understood and communicated through the concept of fire regimes. Additionally, significant changes in the role of fire due to management actions or possible shifts in climate can be readily described by shifts in fire regimes.

Five combinations of fire frequency, expressed as fire return interval in fire severity, are defined in the Cohesive Strategy and are referenced in the HFRA (Healthy Forests Restoration Act) - Public Law 108-148 and this analysis. They are:

Groups I and II include fire return intervals in the 0 – 35 year range. Group I includes Ponderosa pine, other long needle pine species, and dry site Douglas fir. Group II includes the drier grassland types, tall grass prairie, and some Pacific chaparral ecosystems.

Groups III and IV include fire return intervals in the 35-100+ year range. Group III includes interior dry site shrub communities such as sagebrush and chaparral ecosystems. Group IV includes lodgepole pine and jack pine.

Group V is the long interval (infrequent), stand replacement fire regime and includes temperate rain forest, boreal forest, and high elevation conifer species.

The fire regime classifications utilized in this analysis are based upon fire severity as detailed in Brown and Smith (2000) and are as follows.

1. Understory fire regime (applies to forests and woodlands)--Fires are generally nonlethal to the dominant vegetation and do not substantially change the structure of the dominant vegetation. Approximately 80 percent or more of the aboveground dominant vegetation survives fires. This includes Fire Regime I from the Cohesive Strategy
2. Stand-replacement fire regime (applies to forests, woodlands, shrublands, and grasslands)-Fires kill aboveground parts of the dominant vegetation, changing the aboveground structure substantially. Approximately 80 percent or more of the aboveground dominant vegetation either is consumed or dies as a result of fires. This includes Fire Regime II, IV and V from the Cohesive Strategy
3. Mixed severity fire regime (applies to forests and woodlands)--Severity of fire either causes selective mortality in dominant vegetation, depending on different tree species'

susceptibility to fire, or varies between understory and stand-replacement. This includes Fire Regime III from the Cohesive Strategy.

4. Nonfire regime--Little or no occurrence of natural fire.

The understory and mixed severity fire regimes apply only to forest and woodland vegetation types. The mixed severity fire regime can arise in three ways:

1. Many trees are killed by mostly surface fire but many survive, usually of fire resistant species and relatively large size.
2. Severity within individual fires varies between understory burning and stand-replacement, which creates a fine-grained pattern of young and older trees. It occurs because of fluctuations in weather during fires, diurnal changes in burning conditions, and variation in topography, fuels, and stand structure within burns. Highly dissected terrain is conducive to this fire regime.
3. Fire severity varies over time with individual fires alternating between understory burns and stand-replacement.

Fire Regime Characteristics

Fire regime characteristics (fire severity, fire frequency, fire size and pattern, and fuels and fire behavior) are described as follows.

Understory

The Understory fire regime is characterized by frequent (mean intervals between 5 and 30 years), low intensity fires that perpetuated open stands of trees whose lower branches were killed by fire. In gentle topography these fires may have been quite large, while in rugged mountainous terrain, the understory regime was often confined to the more open, drier south facing slopes.

Mixed Severity

Mean fire intervals for mixed severity fire regimes were generally longer than those of understory fire regimes and shorter than those in stand-replacement fire regimes. However, some individual fire intervals were short (<30 years), while the maximum intervals could be quite long (>100 years) (Brown and Smith (2000).

Mixed fire regimes may consist of a combination of understory and stand-replacement fires that reflect a temporal change in the character of the fire. Understory fires at short intervals between stand replacing events occurring at much longer intervals.

Mixed severity fire regimes may also be characterized by fires that killed a large proportion of fire-susceptible species in the overstory), but spared many of the fire-resistant trees. Any given location within a mixed fire regime could experience some stand-replacement fires and some non-lethal fires along with a number of fires that burned at mixed severities.

Pre-1900 fires often covered large areas. The uneven burning pattern in mixed fire regimes was probably enhanced by mosaic patterns of stand structure and fuels resulting from previous mixed burning. Thus, past burn mosaics tended to increase the probability that subsequent fires would also burn in a mixed pattern. Complex mountainous

topography also contributed to variable fuels and burning conditions, which favored non-uniform fire behavior.

Stand Replacement

Stand-replacing fires kill most overstory trees, although the pattern of these fires on the landscape varies with topography, fuels, and burning conditions. Wind-driven crown fires may burn extensive areas uniformly in stand-replacing fire events. However, a major proportion of stand-replacement can be caused by lethal surface fire. Under different conditions, a complex landscape mosaic of replacement burning from crown fire and lethal surface fire is interwoven with areas of lighter burning or no burning. Patchy burning patterns may be accentuated by rugged mountainous topography containing contrasting site types, microclimates, and vegetation. On gentle topography and more uniform landscapes, such as high plateaus, stand-replacement fires tend to be more uniform or at least to burn in large-scale patches.

Stand-replacement fires generally occur at long average intervals, ranging from about 70 years in some lower elevation Rocky Mountain lodgepole pine forests subject to extreme winds, to 300 to 400 years in some inland subalpine types. Often the range of actual intervals is broad since the fires themselves depend on combinations of chance factors such as drought, ignitions, and high winds.

Cover Types (Adapted from Brown and Smith, 2000)

As wildland fire historically played a major role in determining forest structure and composition, and landscape patterns in the Central and Southern Rocky Mountains, each of the forest types in the following sections will be characterized by fire regime (understory, mixed, stand-replacement), post fire plant communities with emphasis on temporal changes in vegetation and fuels (pre-1900 and post-1900) and general description of fuel conditions.

Fire-adapted strategies provide competitive advantage to many tree species in lynx habitat. Early successional species such, lodgepole pine (Lotan, Brown and Neuenschwander 1985), and quaking aspen (Beetle 1974; DeByle 1976; Loope and Gruell 1973), have adapted to fire as a major disturbance agent in lynx habitat.

Some areas that historically had understory or mixed severity fire regimes have shifted to a stand-replacement fire regime. The primary causative factors behind fire regime changes are effective fire prevention and suppression strategies, selection and regeneration harvests, domestic livestock grazing, and the introduction of exotic plants” (Quigley et al. 1996). Additionally, changing land use patterns and attempts to exclude fire have succeeded in greatly reducing the scope of fire on the landscape (Agee 1993).

Aspen

Fire Regime Classification

Quaking aspen is widely distributed throughout the Central and Southern Rockies. It is best developed in the central and southwestern areas of Colorado and southern Wyoming. It is found most frequently as pure stands or in association with conifers such as Engelmann spruce, lodgepole pine, ponderosa pine and Douglas-fir.

Fire has been the most important disturbance factor influencing change in structural stages and composition, and minimizing competition by conifer species. Pure aspen stands are susceptible to mortality of above ground stems from low intensity surface fires. However, aspen stands do not ignite easily and specific fuel, weather and site conditions are necessary before a fire can ignite and spread.

Generally, fires in young aspen stands are low intensity surface fires unless there is high fuel loading. Older stands are more susceptible to higher intensity fires due to increased fuel loadings and the presence of conifer invasion. Aspen stands are best characterized by the stand replacement fire regime.

Post-fire Plant Communities

Aspen is well adapted to fire. Even though aspen is vulnerable to fire due to thin bark, it has the ability to regenerate vegetatively by adventitious shoots or suckers that arise on its long lateral roots.

Pre- 1900 Succession--Before settlement by Euro-Americans, large expanses of western aspen and aspen parkland existed in both the Canadian and American West. Aspen regenerated well after fire. Settlement of the West in the late 1800s and early 1900s increased fire frequency because of land clearing fires, slash burning, and railway traffic (Murphy 1985).

In the Rocky Mountains, low intensity fires caused thinning and encouraged all-aged stands whereas high intensity fires resulted in new even-aged stands. In early post fire communities aspen may be dominant but replacement of seral aspen by conifers is gradual and may take 200 to 400 years or more (Bartos et al. 1983), depending on the potential for establishment and growth of conifers.

Post 1900 Succession-- Following the implementation of rigorous fire protection programs, lack of fire has threatened the continued existence of aspen in the West (Brown and DeByle 1989; Peterson and Peterson 1992) changing fire frequencies. Without the occurrence of disturbance, aspen clones mature in about 80 to 100 years. The dying back of the stands favors the establishment of shade-tolerant conifers. Aspen stands may be replaced by conifers in the absence of high intensity fires that would kill the conifer regeneration.

Engelmann Spruce – Subalpine Fir Forests

Fire Regime Classification

Engelmann spruce and Subalpine fir are widely distributed in Colorado and Wyoming and generally occur as the highest elevation forest type, normally extending to timberline. Spruce-fir forests include bristlecone pine, lodgepole pine, Douglas-fir, corkbark fir and aspen, but the forest environment is dominated by Engelmann spruce and Subalpine fir.

Engelmann spruce and Subalpine fir appear in the lower, drier temperate zones as well as the Subalpine regions. The forests are associated with fescue grasslands, aspen, lodgepole pine, Douglas-fir, and ponderosa pine at lower elevations and the various alpine series at higher elevations. These species tend to maintain themselves in stable communities until changed by an external force, such as fire. After fire, spruce and fir are replaced by

lodgepole pine, aspen, or grassy parks, which slowly trend towards climax spruce-fir if left undisturbed.

In general spruce-fir forests are best characterized by the Stand Replacement fire regime. Mean fire return intervals range from 100-400 years. In some limited geographic locations the spruce fir forest may be considered to be included in the non-fire regime due to topographic location and local climatic conditions.

Postfire Plant Communities

Pre-1900 Succession-- In the Central and Southern Rocky Mountains, spruce is often the dominant subalpine forest cover and other major disturbances-spruce beetle epidemics, extensive snow avalanches, and areas of wind-thrown forest--interact with stand-replacement fires in complex temporal and spatial patterns (Baker and Veblen 1990; Veblen et al. 1994).

Pre-1900 fires added structural and compositional diversity to the spruce-fir forest. Burned areas often remained unforested for extended periods due to the harsh microclimate (Arno and Hammerly 1984).

Post-1900 Succession--Little is known about possible human-induced changes in successional patterns throughout this high-elevation type. Logging has occurred in some sizeable areas of the type and has to a limited extent been a substitute for stand-replacement fire. In other areas fire suppression may have effectively reduced the landscape component made up of young postfire communities. For example, Gruell (1980) published many photographs taken at subalpine sites in northwestern Wyoming in the late 1800s and early 1900s and compared them with modern retakes. Most of these comparisons show that mature forest is noticeably more extensive today. Presumably the slow postfire recovery period resulted in large areas being unforested at any given time. However given the long fire return intervals it is unlikely that suppression actions have had a significant impact on the current conditions.

In some areas large outbreaks of spruce bark beetle and root rot in subalpine fir have also resulted in heavy loadings of large woody fuels, which will support future stand-replacement fires (Veblen et al. 1994). Data presented by Brown and others (1994) suggest that maintaining natural fire cycles in these high-elevation forests is difficult because the forests only burn when fire danger elsewhere is unacceptably high as a result of extreme drought.

Mixed Conifer

Fire Regime Classification

The mixed conifer forests are composed of Douglas-fir and limber pine. Major associated species are ponderosa pine, lodgepole pine, and Engelmann spruce-Subalpine fir. Occasionally, Douglas-fir forms the lowest coniferous zone adjacent to pinion-juniper, grasslands and big sagebrush. Most often, however, it tends to form a belt at mid-elevations between Ponderosa pine, and lodgepole pine or Engelmann spruce – Subalpine fir. Although Douglas-fir is the dominant overstory species, it may be far from uniform; often occurring intermixed with other conifers such as Ponderosa pine, lodgepole pine, and Engelmann spruce-Subalpine fir. Quaking aspen may be a significant component in

some stands. White fir is a large component in the southern portion of the amendment area. In northern Colorado, Douglas-fir exists in pure or nearly pure stands.

These forests commonly develop dense stands with accumulations of ladder fuels and they often occupy steep slopes on cool aspects. The forest floor fuels are primarily a compact duff layer that does not support low intensity surface fires. However, when down woody or ladder fuels accumulates and severe burning conditions arise, they can support a stand-replacing surface or crown fire. Such fires occurred at intervals averaging between 70 and 200 years.

In the amendment area mixed conifer can be characterized by both the Mixed and Stand Replacement fire regimes. The relative amounts of these types in mixed and stand-replacement fire regimes are unknown (Brown et al. 1994).

Postfire Plant Communities

Pre-1900 Succession-- The factors that determine whether one of these forests will have a mixed or stand-replacement regime is not well known. Relatively frequent stand-replacement fires kept much of the landscape in open areas (seral grasslands or shrublands) and favored seral shrub species (such as serviceberry, willow, and bitterbrush) and aspen.

Post-1900 Succession --Photo comparison and fire history studies suggest that fire exclusion has allowed a greater proportion of these forests to develop as dense stands. The spatial continuity of these stands may allow insect and disease epidemics and stand-replacement fires to become larger than in the past (Arno and Brown 1991; Byler and Zimmer-Grove 1991; Gruel 1983). In the southern portion of the amendment area increases in white fir have added a significant ladder fuel component to stand that historically had a low susceptibility to crown fire initiation due to low surface fuel loading.

Lodgepole pine

Fire Regime Classification

Lodgepole pine is typically an early-seral tree species. Most lodgepole pine forests in the Rocky Mountains were established as a result of fire (Lotan, Brown, and Neuenschwander 1985).

Lodgepole pine is well-adapted to fire. It is an aggressive seral species that readily establishes itself on disturbed areas, including burn areas (Mason 1915; Smithers 1961). Stocking can be as high as 10,000-40,000 stems per acres. Although thin-barked, lodgepole pine is fairly susceptible to fire. Serotinous (closed) cone habit enables it to regenerate large areas after disturbance. Cone serotiny is common in the Rocky Mountains.

Frequent low-intensity fires may thin lodgepole pine stands without doing serious damage (Lotan, Brown, Neuenschwander 1985). These low-intensity fires not only removed much of the fire-intolerant species, but also reduced lodgepole pine stocking, thus influencing the structure of the forest.

In the amendment area lodgepole pine can be characterized by both the Mixed and Stand Replacement fire regimes. Mean return intervals can range from 35 to greater than 200 years.

Postfire Plant Communities

Pre-1900 Succession-- In parts of its geographic distribution, lodgepole pine forests burned in a mixed fire regime, primarily where fine surface fuels and dry climate allowed lower intensity fires to occur. Much of the lodgepole pine type, however, is resistant to crown fire initiation except when there is an accumulation of down woody, ladder, and crown fuels. When fuel loadings are sufficient, the resulting fire intensity can support either a stand-replacing surface or crown fire.

Brown (1975) illustrated how fuel loadings are indirectly linked to stand age. Young dense stands containing ladder fuels of associated spruce and fir and accumulated downfall from a former, beetle killed or fire-killed overstory have high potential to support a stand-replacement fire. Conversely, young pole-size stands of pure lodgepole pine (with sparse lower limbs) arising after a burn that removed most large fuels have low potential to initiate crown fire but can sustain crown fire spread. When a lodgepole pine stand becomes mature or overmature, tree growth and vigor declines markedly, and the likelihood of a mountain pine beetle epidemic increases. Such epidemics kill many trees that begin to fall within a few years; then, within 10 to 15 years, large amounts of dead woody fuels accumulate that greatly add to the potential of stand-replacement fire.

Post-1900 Succession -- Although some studies indicate that attempts to exclude fire have had relatively little effect in this fire regime, especially in areas with long mean return intervals (Barrett et al. 1991; Johnson et al. 1990; Kilgore 1987), the possibility exists that suppression could have appreciable effects where fires have been largely excluded from areas with shorter mean fire return intervals.

Fires are critical to maintenance of biological diversity in this type. Many early seral species, including herbs, shrubs, and aspen, depend on occasional fires to remain as components of the lodgepole pine type (Habeck and Mutch 1973; Kay 1993). Black-backed Woodpeckers, many invertebrates, herbivores, small mammals, birds, and even some aquatic organisms depend upon fires for creation of seral communities, snag patches, and beneficial nutrient cycling (Agee 1993; Despain 1990).

Stand-replacement fire regimes in lodgepole pine forests can be influenced by management actions. For example, fuel breaks can be developed near critical property boundaries and to protect resorts and other facilities (Anderson and Brown 1988; Kalabokidis and Omi 1998; Schmidt and Wakimoto 1988). Wildland fire use programs coupled with prescribed stand-replacement fires could help develop landscape fuel mosaics that limit the ultimate size of wildfires (Weber and Taylor 1992; Zimmerman et al. 1990).

Fuels (Adapted from Brown and Smith, 2000)

The word "fuels" refers to live and dead vegetation that can potentially contribute to combustion. Fuel quantities can vary from a small portion to all of the aboveground biomass depending on a number of fuel properties especially particle size, moisture content, and arrangement. Although vegetation biomass increases predictably with time

because of perpetual photosynthesis, changes in fuel biomass over time can be highly irregular due to the trade off between annual increment and decay and properties affecting fuel availability.

In the Understory fire regime during periods of high fire frequency, fuels were primarily herbaceous material and forest floor litter. After fire suppression became effective, forest floor duff and live fuels such as shrubs and conifer regeneration accumulated.

Measurements in recent decades (Brown 1970; Brown and Bevins 1986; Sackett 1979) show that litter typically ranges from 0.6 to 1.4 tons/acre (1.3 to 3.1 t/ha) and the entire forest floor of litter and duff averages about 12 tons/acre (27 t/ha) in both Arizona and Northern Rocky Mountain areas.

With fire suppression, accumulated fuels support higher intensity fire including torching and crowning behavior and longer periods of burnout. The increased burn severity results in greater mortality to plants and soil organisms. Heavy surface fuels accumulations can result in higher surface fire intensities that contribute to a increased potential for crown fire initiation.

Aspen stands are generally only flammable in the spring, late summer, and fall when they are leafless due to the drying effect of sun and wind on the leaf litter. Furthermore, in the fall the herbaceous plant and shrub component of the understory is dead and dried out, forming a continuous layer of loosely organized fine fuel.

In the Mixed Severity fire regime, during the presettlement period fuels were probably quite variable spatially and temporally. At a given time, some segments of the vegetative mosaic would be patches of postfire regeneration that had arisen where the last fire killed much of the overstory. Fuel loadings in these patches might increase dramatically as dead trees and limbs fell into a developing patch of saplings. If these regenerated patches burned again, the resulting "double burn" might be an area cleared of most living and dead fuel and thereafter more likely to support non-lethal underburning in the next fire.

Average fuel loadings determined from extensive forest surveys in the Northern Rocky Mountain National Forests (Brown and Bevins 1986; Brown and See 1981) indicate that quantities of duff and downed woody material differ between mixed and stand-replacement fire regimes.

Unlike understory and mixed fire regimes, fuels play a critical role in limiting the spread of fire in stand-replacement fire regimes. Accumulation of duff and down woody fuels increases the persistence of burning. This is important for keeping smoldering on a site until a wind event occurs (Brown and See 1981). Typically a certain level of fuel is required to allow fire to spread. This may be the result of dead and down fuels--from insect epidemics, windstorms, or a previous fire--or of extensive ladder fuels. In contrast, stands with few down or ladder fuels often fail to support fire (Brown 1975; Despain 1990). In lodgepole pine, dead and down woody fuel loadings of 15 to 20 tons/acre (34 to 45 t/ha) are generally near the lower threshold of what will support a stand-replacement through moderate-intensity surface fire (Fischer 1981). Ladder fuels and heavier loadings of down and dead woody fuels contribute to torching, and with winds a running crown fire may evolve.

Crown Fire Hazard

The primary stand attributes that influence crown fire initiation and spread are surface fuel loading, canopy base height and canopy bulk density. These attributes can be directly managed by vegetation treatments. Silvicultural systems can be designed to manage stands to reduce crown fire hazard but if desired stand attributes are not stated the desired stand structure or species composition may not be achieved (Graham et al. 1999).

Initiation and sustained spread of crown fires is dependent on surface fuels and crown fuels. Rothermel (1972 and 1991) presents separate method for surface fire behavior and crown fire behavior but not a transition between them. Rothermel's (1991) crown fire model does not include the effect of canopy bulk density on fire spread and is based upon observations of seven fires that he believed to have been wind driven. Van Wagner's (1977) model of transition to crown fire provides the links between surface and crown fire models. It requires estimates of crown base height and canopy bulk density (Reinhardt et al.).

Initiation and sustained spread of crown fires is dependent on surface fuels and crown fuels. The initiation of crown fire behavior is a function of the surface fire intensity and the canopy fuel characteristics of Canopy Base Height (CBH) and Foliar Moisture Content (FMC). When the surface fire intensity attains or exceeds the critical surface intensity for crown combustion fire can propagate vertically through the canopy. The ability of a crown fire to spread is a function of the surface rate of spread and the Canopy Bulk Density (CBD).

Environmental Consequences

Standards and Guidelines in Alternatives B, C , D and F that have the potential to affect wildland fire management operations or hazardous fuels treatments are:

- ♦ **ALL S1, VEG S1**(Alternative B, C , D and F only)
- ♦ **S2**(Alternative B and F only)
- ♦ **VEG S3** Alternative B, C and D only)
- ♦ **VEG S4** (Alternative B and C only)
- ♦ **VEG S5** (Alternative B, C, D and F only)
- ♦ **VEG S6** (Alternative B, C and F only)
- ♦ **VEG G1**(Alternative B, C , D and F only)
- ♦ **VEG G2, VEG G3**(Alternative B, C and D only)
- ♦ **VEG G4 and VEG G5**(Alternatives B, C ,D and F only)
- ♦ **VEG G6** (Alternative D only)
- ♦ **VEG G7** (Alternative C and D only)
- ♦ **VEG G8** (Alternative D only)
- ♦ **VEG G10 and VEG G11** (Alternative F only) .

Standards and Guidelines in the revised White River National Forest Plan (WR) that have potential to affect wildland fire management options are **WRS1, WRS2, WRS3, WRS4, WRS5, WRG1, WRG9 and WRG11**.

In turn, the standards and guidelines presented in the alternatives, developed to address the risk factors, may affect the following components of the wildland fire management program:

- ♦ Ability to conduct vegetation treatments to create defensible fuels profiles in the Wildland Urban Interface (WUI).
- ♦ Ability to conduct vegetation treatments to create defensible fuels profiles in support of the Fire Use (wildland fire use and prescribed fire) Program.
- ♦ Ability to implement fire use activities.
- ♦ Suppression and Firefighter/Public Safety.

The indicators for these program elements are the degree of limitations the standards and guideline place on the program elements. The alternatives will be evaluated on the degree of limitations placed on:

- ♦ Mechanical Fuels Treatments with product utilization both in the WUI and Non Wildland Urban Interface.
- ♦ Mechanical Fuels Treatments without product utilization both in the WUI and Non Wildland Urban Interface.
- ♦ Fire Hazard Reduction Thinning.
- ♦ Fire Use Activities.

The HFRA (Healthy Forests Restoration Act) - Public Law 108-148, defines Wildland Urban Interface as an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan; or in the case of any area for which a community wildfire protection plan (CWPP) is not in effect—

- (i) an area extending 1/2-mile from the boundary of an at-risk community;
- (ii) an area within 1 1/2 miles of the boundary of an at-risk community, including any land that—
 - (I) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community;
 - (II) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or
 - (III) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; and (iii) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at-risk community.

The term “at-risk community” is defined as (i) an interface community as defined in the notice entitled “Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire” issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat. 1009) (66 Fed. Reg. 753, January 4, 2001); or (ii) a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land; in which conditions are conducive to a large-scale wildland fire

disturbance event; and for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.

The ease of control of wildland fire is directly related to fire behavior. Fire behavior is a primary consideration for public and firefighter safety. Factors that contribute to fire behavior that are unchangeable include weather, topography, and vegetation. Factors that can be changed to ease the difficulty of control of a wildland fire are keeping fires on the ground rather than crown fires, opening up the canopy so that water and retardant can reach the ground fuels and provide for ease of fire-line construction.

Fire behavior alteration is accomplished through thinning by removing ladder fuels and reducing stand densities. For reducing hazardous fuels, the priorities are to reduce surface and ladder fuels, raise the bottom of the live canopy and reduce stand density. Hazardous Fuels reduction treatments alter the characteristics that influence crown fire initiation and spread.

Thinning is a technique for managing density and composition of stands. Fire hazard reduction thinning contributes to the primary purposes of fuels treatments: decreased probability of crown fires, reduced area burned by unwanted fires, decreased severity of impacts, enhanced fire suppression effectiveness and safety, reduced suppression cost and enhanced managers' ability to implement fire use (both hazard reduction and habitat improvement). Even if thinning contributed nothing directly moderating fire behavior, it could indirectly contribute by providing better access and removing obstacles to safe or effective fire control and by providing a strategic base for fire-line construction

One objective of some fuel treatment projects is to efficiently and safely treat portions of the landscape to achieve desirable conditions at both specific locations and for the landscape as a whole. Depending on how treatments are placed on the landscape, there can be fire reduction benefits outside the treated areas on the subsequent spread rate, size and severity of wildfires and on the ease of suppression. The locations of treatments on the landscape can contribute to the development of a defensible fuels profile. A defensible fuels profile relies on strategically located strips or blocks of land where forest canopy and fuels, both living and dead, have been modified to affect fire behavior. Defensible fuels profile or components of the profile (fuel breaks) can be critical to reducing the threat of crown fires to communities at risk, or the successful implementation of fire use actions.

Certain principles are applied in the consideration of how these specific areas may contribute to improvement of conditions at the landscape level. These include the creation of fuel breaks at points in the landscape where fire control efforts can be conducted safely, decreasing areas of contiguous high hazard fuels; and providing buffers between areas of high and low importance for avoiding high intensity fires. Some landscape settings can be critical to the development of defensible fuels profiles. If some vegetation management tools (fire use, biomass removal, salvage and other harvests) are limited some of these critical landscape settings may not be treated. This lack of treatment could eliminate wildland fire use options (fire can not be maintained within Maximum Manageable Area) or compromise firefighter safety through the inability to reduce the wildland fire threat adjacent to communities at risk.

There are multiple purposes for hazardous fuels treatment in the wildland urban interface, one of which is reducing the threat to structures. Fuel treatment projects around and within communities are performed to reduce fire hazard, and thus reduce the potential damage to community resources and increase the safety of the public and firefighters. Fires burning through a community can damage and destroy homes and other structures, and damage other public and private property, such as vehicles, fences, utility poles and wires and other urban infrastructure. Additional damage is done to the urban infrastructure by secondary fire impacts such as erosion moving soils into ditches, storm drainage systems, and on to roads. Finally, wildfires burning natural elements in and surrounding communities can cause the same kind of undesirable environmental impacts as in uninhabited natural areas: loss of habitat, damage to watershed conditions, negative aesthetic effects and damage to timber resources.

Fuel treatments in and near urban areas are performed to modify burning conditions using the same principles as applied to wildland areas. The goals of the treatments are to achieve some combination of (a) reducing flammability, (b) reducing fire intensity, (c) reduce the potential for creating firebrands and crown fires, and (d) increasing firefighter safety and effectiveness. The amount of land to be treated around communities to reduce the threat to communities depends on the current structure of the vegetation, fuel loadings, topographic location, fire regime type and firefighting concerns such as access.

In order to effectively reduce the threat to a community located in a high fire hazard environment, it is usually necessary to perform treatments at a range of distances from homes. Treatments at some distance from the developed portion of a community (a few to several miles) can reduce the direct threat to communities by being located in areas where the topography, wind conditions, and fuels between there and the community create the potential for spread to the community, or where a large or intense fire may cause indirect damage to the community (water sources or erosion hazard).

Treatments near developed portions of a community can add to reducing the threat to community infrastructure or local environmental resources. They can increase the safety of escape routes for residents and access routes for firefighters. Reducing spotting potential and production of fire brands in this zone can reduce the risk to structures, especially if the zones of treatment are wider than the spotting distances possible at critical weather levels (i.e. 97th percentile weather).

Fuels treatments in the WUI recognizes that its ultimate success is based on several factors outside the control of the national forests. These factors are as follows:

- ♦ Clearance between the actual fuels and the residence or personal property is the responsibility of the property owner, in accordance with state law.
- ♦ Design and choice of construction materials for the residence or structure is the owner's responsibility.
- ♦ Even though all preventive measures to protect the structures are in place, the actual fire behavior under severe conditions that threaten the home or structure could still be outside the control of the Forest Service.

Finally, research by (Cohen 1995) has shown that structures with typical ignition characteristics (wood sided, wood framed, asphalt composition roof) are at risk of catching on fire from one of three sources. First is the direct exposure to intense flames

from a nearby source, which could be intensely burning vegetation or another structure. His research shows that the structures may be at risk if the flame front is no more than 100 feet away. Second, constructions may be ignited from less intense sources against or very near the side of the structure. This can occur if a ground fire or firebrands ignite firewood or other flammable material next to the structure. Third, firebrands falling directly on roofs can ignite the structure if the roof is flammable or if flammable debris is present.

Treatments of fuels within the structure ignition zone (with 200 feet of structures) only are not sufficient to reduce the threat to neighborhoods and individual structures. During fire events in mixed severity and stand replacement fire regimes, firebrands may be carried long distances, and fires that start in and around homes can ignite structures. As there is no mechanism to require homeowners to engage in efforts to reduce the threat adjacent to their homes, they will continue to be at risk without management of the surrounding fuels. Fire prevention programs and Community Fire Safe Councils are valuable tools in communicating to the public the need for clearing and maintaining fuels away residences and structures, assisting residences in coordinating local hazard reduction efforts, and educating individuals on less flammable building designs and construction materials.

As a measure of the potential effects in the wildland urban interface, the communities at risk from wildland fire, as identified by the states of Wyoming and Colorado, and published in the Federal Register (Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire; August 17, 2001) were evaluated against lynx habitat within one and three miles. For this analysis the amount of lynx habitat within the WUI is described as a range from one to three miles surrounding identified communities-at-risk, as under HFRA the WUI is defined as a variable distance ranging from a one-half mile to an undetermined distance as defined in a CWPP.

The acres within the one mile analysis area are shown in Table 3- 17 and when the analysis zone is increased to three miles in Table 3-18 the amount of lynx habitat adjacent to communities at risk increases almost seven fold. Again the Grand Mesa Uncompahgre and Gunnison contains the most lynx habitat within three miles of Communities at Risk, followed by the White River National Forest. The Medicine Bow National Forest has the least amount of lynx habitat within three miles of communities at risk. The amount of lynx habitat within three miles of Communities at Risk is significant considering that lynx habitat is primarily in stand replacing fire regimes that are capable of supporting high intensity fires which are capable of single day spread greatly in excess of three miles. These results do not reflect the amount of lynx habitat adjacent to other communities of interest or groups of homes or other structures that were not included in the Federal Register listing. It would be expected that the amount of habitat adjacent to communities of interest or groups of homes or other structures would add between 10 to 20 percent to the acreage shown.

Lynx habitat within one mile of listed communities at risk is less than four percent of the total lynx habitat within the amendment area. The Grand Mesa Uncompahgre and Gunnison National Forests contains the most lynx habitat within one mile of Communities at Risk, followed by the White River National Forest. The Routt National Forest has the least amount of lynx habitat within one mile of Communities at Risk.

Table 3- 17 - Acres of Lynx Habitat within One Mile of Listed Communities at Risk

Within One Mile	Lynx Denning NFS Acres	Lynx Winter Forage NFS Acres	Other Lynx Habitat NFS Acres	Currently Unsuitable Lynx Habitat NFS Acres	Total
Arapaho-Roosevelt	7,843	16,131	3,151	3,655	30,780
Grand Mesa- Uncompahgre-Gunnison	28,755	9,185	39,026	548	77,514
Medicine Bow	509	356	2,799	34	3,698
Pike-San Isabel	22,673	4,159	5,812	398	33,043
Rio Grande	8,194	6,988	12,163	2,632	29,977
Routt	1	24	701	6	733
San Juan	7,096	2,954	7,938	210	18,198
White River	44,494	20,106	3,546	3,348	71,494
Total	119,565	59,903	179,468	10,831	265,437

When the analysis zone is increased to three miles (Table 3-18), the amount of lynx habitat adjacent to communities at risk increases almost seven fold. Again the Grand Mesa Uncompahgre and Gunnison contains the most lynx habitat within three miles of Communities at Risk, followed by the White River National Forest. The Medicine Bow National Forest has the least amount of lynx habitat within three miles of communities at risk. The amount of lynx habitat within three miles of Communities at Risk is significant considering that lynx habitat is primarily in stand replacing fire regimes that are capable of supporting high intensity fires which are capable of single day spread greatly in excess of three miles.

Table 3- 18 - Acres of Lynx Habitat within Three Miles of Listed Communities at Risk

Within Three Miles	Lynx Denning NFS Acres	Lynx Winter Forage NFS Acres	Other Lynx Habitat NFS Acres	Currently Unsuitable Lynx Habitat NFS Acres	Total
Arapaho-Roosevelt	75,853	118,868	31,373	25,253	251,347
Grand Mesa- Uncompahgre-Gunnison	176,708	47,528	199,038	6,693	429,967
Medicine Bow	9,413	7,107	32,869	2,174	51,563
Pike-San Isabel	193,399	28,272	44,369	2,859	268,899
Rio Grande	83,444	44,745	91,736	18,949	238,874
Routt	4,031	4,199	42,852	2,398	53,480
San Juan	74,574	34,018	83,801	4,358	196,751
White River	146,377	105,899	15,932	9,495	277,703
Total	763,799	390,636	541,970	72,179	1,768,584

Lynx habitat within three miles of listed communities at risk is less than 25 percent of the total lynx habitat within the amendment area. Linkage areas within the lower montane zones were not evaluated in this analysis.

Finney (2001) has demonstrated that fuels treatment effectiveness can be “optimized” while treating approximately 20 percent of the landscape in a strategically placed pattern of overlapping treatments. Randomly placed treatments required treating a significantly larger percentage (2 to 3 times) of the landscape to achieve the same degree of alteration in landscape fire behavior.

A variety of limiting factors including: 1) management incompatibility (wilderness or other designated areas); 2) physically unsuited (slope, erosive soils), or 3) location or current fuels profile does not contribute to hazard will also limit the amount of treatments possible.

In Fiscal Years 2002- 2006 (October 1, 2002 to September 30, 2006), the Forests in the amendment area treated approximately 307,000 acres for hazardous fuels reduction.

Table 3- 19 displays the average annual accomplishment by Fire Regime for the forests within the amendment area. The Forests have treated less than 9,000 acres per year for hazardous fuels reduction activities in Fire Regimes IV and V.

Table 3- 19 - Five Year (FY 2002-2006) Average Annual Acres of Hazardous Fuels Treatments by Fire Regime for Amendment Area

Fire Regime	WUI Actual Acres Treated	Non-WUI Actual Acres Treated	Total Actual Acres Treated	WUI Percent of Actual Acres Treated	Non-WUI Percent of Actual Acres Treated	Fire Regime % of Total Acres Treated
I	11,234	7,285	18,518	61%	39%	30%
II	5,090	5,606	10,696	48%	52%	17%
III	9,658	8,519	18,177	53%	47%	30%
IV	4,199	1,517	5,716	73%	27%	9%
V	860	1,531	2,392	36%	64%	4%
Unknown	4,285	1,705	5,990	72%	28%	10%
Total	35,327	26,163	61,490	57%	43%	100%

Approximately 60 percent of the treatment acres were located within the wildland urban interface. Most significant is the fact that almost 80 percent hazardous fuels reduction treatments in the Amendment area occurred in Fire Regimes 1, 2 or 3. Lynx habitat is primarily Fire Regimes 4 and 5. Less than 15 percent of treatments occurred in Fire Regimes 4 and 5.

Table 3-20 displays the average annual accomplishment by Fire Regime, treatment method and WUI status for the forests within the amendment area. Prescribed Fire was utilized on almost 60 percent of the acres, while mechanical treatments were utilized on only 40 percent of the acres.

Mechanical Treatments in Fire Regimes IV and V in the WUI average less than 4,000 acres per year. Fire treatments in Fire Regime IV and V average over 3,000 acres per year.

Using the Five-Year Annual Treatment Average (Table 3-x2) as an estimate of future treatments over 46,000 acres of treatments would be conducted in Fire Regimes IV and V within the WUI within a 10 year period. At this level, the annual treatment would cumulatively affect approximately 0.7 percent of the identified lynx habitat during a 10 year period. At current treatment levels only the Arapaho Roosevelt appears to exceed the cumulative three percent threshold established in Alternative F.

Although most future treatments will be targeted towards lower elevation ponderosa pine, Gambel oak, Douglas-fir and dry type lodgepole pine (Wildland Urban Interface and Fire Regime I, II and III, condition class 2 and 3) to address the priorities for hazardous fuels treatments contained in “A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan”, the current mountain pine beetle epidemic (Table 3- 11) could result in accelerated treatments in lynx habitat (Fire Regime IV and V). However, most accelerated treatments in lynx habitat will still most likely occur adjacent to communities at risk, communities of interest, or in locations critical for the development of defensible fuels profiles that are necessary to reduce the threat to communities.

Consistent with firefighter and public safety and protection of property and other resources, all wildland fires receive an appropriate management response. Appropriate management response is based on objectives; environmental and fuel conditions; constraints; safety; and ability to accomplish objectives. The range of management responses available varies by forest. Wildland Fire Use, based on Federal Fire Policy direction is a management action equal to wildfire suppression and thus constitutes an emergency action.

At current time the only forests within the SRMGA with fire management plans that allow wildland fire use are the Arapaho Roosevelt; Grand Mesa, Uncompahgre and Gunnison; Medicine Bow, Routt; San Juan; Rio Grande; and White River National Forests.

The San Isabel National Forest is in the process of evaluating areas suitable for wildland fire use. The appropriate management response to wildland fire is not directly influenced by the proposed standards in any of the alternatives. However, the degree to which vegetation management is limited by the standards will indirectly influence strategies and tactics by their influence the vegetation on the extent and intensity of wildfires.

Table 3- 20 - Five Year (FY 2002-2006) Average Annual Hazardous Fuels Treatments by Fire Regime and WUI Status

UNIT	Fire Regime	Fire		Fire Total	Mechanical		Mechanical Total	Grand Total	Total	Total
		Non WUI	WUI		Non WUI	WUI			Non WUI	WUI
Arapaho-Roosevelt NF	I	3,287	896	4,183	50	202	252	4,435	3,337	1,098
	II	0	278	278	0	1,039	1,039	1,317	0	1,317
	III	0	504	504	0	1,222	1,222	1,726	0	1,726
	IV	186	465	651	17	1,641	1,658	2,309	203	2,106
	V	0	0	0	0	46	46	46	0	46
	Unknown	0	3	3	0	85	85	88	0	88
Arapaho-Roosevelt NF Total		3,473	2,146	5,618	67	4,234	4,302	9,921	3,540	6,381
Grand Mesa-Unc-Gunn NF	I	779	1,283	2,062	228	1,324	1,552	3,614	1,007	2,607
	II	681	798	1,479	318	275	593	2,072	999	1,073
	III	184	597	781	546	221	767	1,548	730	818
	IV	6	48	54	6	102	108	162	12	150
	V	0	2	2	0	29	29	31	0	31
	Unknown	0	0	0	0	0	0	0	0	0
Grand Mesa-Unc-Gunn NF Total		1,650	2,728	4,378	1,098	1,951	3,049	7,427	2,748	4,679
Medicine Bow-Routt NF	I	0	0	0	14	14	28	28	14	14
	II	1,410	615	2,025	0	21	21	2,046	1,410	636
	III	129	616	745	106	985	1,091	1,836	235	1,601
	IV	9	19	28	76	490	566	594	85	509
	V	1,179	28	1,207	28	53	81	1,288	1,207	81
	Unknown	0	0	0	0	0	0	0	0	0
Medicine Bow-Routt NF Total		2,728	1,278	4,005	224	1,563	1,787	5,792	2,951	2,841
Pike-San Isabel NF	I	2,214	1,913	4,127	96	3,724	3,820	7,947	2,310	5,637
	II	1,162	378	1,540	409	768	1,177	2,717	1,571	1,146
	III	462	1,563	2,025	965	2,168	3,133	5,158	1,427	3,731
	IV	753	70	823	465	1,335	1,800	2,623	1,218	1,405
	V	0	33	33	0	3	3	36	0	36

UNIT	Fire Regime	Fire		Fire Total	Mechanical		Mechanical Total	Grand Total	Total	Total
		Non WUI	WUI		Non WUI	WUI			Non WUI	WUI
	Unknown	0	0	0	0	0	0	0	0	0
Pike-San Isabel NF Total		4,591	3,957	8,548	1,935	7,998	9,933	18,481	6,526	11,955
Rio Grande NF	I	239	8	247	204	574	778	1,025	443	582
	II	412	115	527	0	103	103	630	412	218
	III	873	82	955	284	1,122	1,406	2,361	1,157	1,204
	IV	0	0	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0	0	0
	Unknown	0	0	0	0	0	0	0	0	0
Rio Grande NF Total		1,524	205	1,729	488	1,799	2,287	4,016	2,012	2,004
San Juan NF	I	128	678	806	0	1,054	1,054	1,860	128	1,732
	II	562	517	1,079	182	253	435	1,514	744	770
	III	0	0	0	0	0	0	0	0	0
	IV	124	3	127	0	3	3	130	124	6
	V	0	0	0	0	0	0	0	0	0
	Unknown	1,294	1,414	2,708	203	1,892	2,095	4,803	1,497	3,306
San Juan NF Total		2,107	2,612	4,720	385	3,202	3,587	8,307	2,493	5,814
White River NF	I	5	26	31	0	73	73	104	5	99
	II	600	0	600	0	109	109	709	600	109
	III	4,846	464	5,310	0	114	114	5,424	4,846	578
	IV	0	0	0	0	23	23	23	0	23
	V	16	112	128	5	104	109	237	21	216
	Unknown	0	0	0	0	0	0	0	0	0
White River NF Total		5,467	602	6,069	5	423	428	6,497	5,472	1,025
Total	I	6,652	4,804	11,456	592	6,965	7,557	19,013	7,244	11,769
	II	4,827	2,701	7,528	909	2,568	3,477	11,005	5,736	5,268
	III	6,494	3,826	10,320	1,901	5,832	7,733	18,053	8,395	9,658
	IV	1,078	605	1,683	564	3,594	4,158	5,841	1,642	4,199
	V	1,195	175	1,370	33	235	268	1,638	1,228	410

UNIT	Fire Regime	Fire		Fire Total	Mechanical		Mechanical Total	Grand Total	Total	Total
		Non WUI	WUI		Non WUI	WUI			Non WUI	WUI
	Unknown	1,294	1,417	2,710	203	1,977	2,180	4,891	1,497	3,394
Total		21,540	13,528	35,068	4,202	21,171	25,373	60,441	25,742	34,699

Table 3- 21 - Estimate of Ten Year Cumulative Fuels Treatments - Fire Regimes IV and V - WUI only

National Forest	Total NFS Lynx habitat Acres	Alt F Veg S1, S2, S5 and S6 - 3% Limit - Acres	5 Year Average Annual Treatment - All Fire Regimes - Acres	5 Year Average Annual Treatment - Fire Regimes IV and V - WUI and Non WUI - Acres	5 Year Average Annual Treatment Fire Regimes IV and V - WUI Only - Acres	Estimate of Ten Year Cumulative Fuels Treatments - Fire Regimes IV and V - WUI only - Acres
Arapaho-Roosevelt	690,082	20,702	9,920	2,354	2,151	21,510
GMUG	1,641,664	49,250	7,426	192	181	1,810
Medicine Bow-Routt	1,192,466	35,774	5,791	1,883	81	810
Pike-San Isabel	826,156	24,785	18,483	2,660	1,442	14,420
Rio Grande	1,035,420	31,063	4,016	0	0	0
San Juan	1,048,567	31,457	8,306	130	6	60
White River	1,142,794	34,284	6,497	260	239	2,390
Total	7,577,149	227,314	60,439	7,479	4,100	41,000

Environmental Effects

Direct and Indirect Effects

As the main effect of the alternatives relates to the limitations placed on activities, the alternatives were compared based upon the degree of limitations (Table 3-22). Alternative B is the most restrictive and Alternative D is the least restrictive regarding hazardous fuels reduction activities. The effects on Wildland Fire Use for all alternatives are contingent on whether wildland fire use is allowed on a forest.

Table 3- 22 - Comparison of Alternatives – Degree of Activity Limitation

Alternative	Mechanical Fuels Treatment with Utilization		Mechanical Fuels Treatment Without Utilization		Fire Hazard Reduction Thinning	Fire Use Restricted	
	WUI	Non-WUI	WUI	Non-WUI		Prescribed Fire	Wildland Fire Use
A – No Action	Uncertain ¹	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain
White River Revised Forest Plan (Alt A)	Conditional WR S1 WRS2 WRS3 WRG11 Limited WRS4 – Salvage Harvest Not allowed when affected area is smaller than 5 acres.	Conditional ALL S1 VEG S1 VEG S2 VEG S3 Limited VEG S4 – Salvage Harvest Not allowed when affected area is smaller than 5 acres.	Conditional WR S1 WRS2 WRS3 WRG11	Conditional WR S1 WRS2 WRS3 WRG11	Full WRS5 Pre-commercial thinning and Fire Hazard Reduction Thinning is not permitted.	Conditional WR S1 WR S3	Uncertain Plan is silent on applicability of standards and guidelines to wildland fires use except for WRG9.

¹ Uncertain – Under the no action alternative formal consultation on individual projects within LAUs may or may not result in restrictions depending on the status of inventories within the LAUs. Current management emphasis and direction for fire use and fuels reduction activities are maintained under current Forest Plan direction.

Alternative	Mechanical Fuels Treatment with Utilization		Mechanical Fuels Treatment Without Utilization		Fire Hazard Reduction Thinning	Fire Use Restricted	
	WUI	Non-WUI	WUI	Non-WUI		Prescribed Fire	Wildland Fire Use
B	Conditional ² ALL S1 VEG S1 VEG S2 VEG S3 Limited VEG S4 – Salvage Harvest Not allowed except within the structure ignition zone.	Conditional ALL S1 VEG S1 VEG S2 VEG S3 Limited VEG S4 – Salvage Harvest Not allowed when affected area is smaller than 5 acres.	Conditional ALL 1 S1 VEG S1 VEG S3	Conditional ALL S1 VEG S1 VEG S3	Full ³ VEG S5 Pre-commercial thinning and Fire Hazard Reduction Thinning is not permitted except within the structure ignition zone Conditional ALL S1	Conditional ALL S1 VEG S1 VEG S3	None ⁴

² Conditional – Whether an activity is restricted or not depends upon whether the thresholds listed are met or exceeded within an LAU.

³ Full - The activity is not permitted unless specifically allowed as a listed exception.

⁴ None – Activity is not limited by standards or guidelines.

Alternative	Mechanical Fuels Treatment with Utilization		Mechanical Fuels Treatment Without Utilization		Fire Hazard Reduction Thinning	Fire Use Restricted	
	WUI	Non-WUI	WUI	Non-WUI		Prescribed Fire	Wildland Fire Use
C	Conditional ALL S1 VEG S1 VEG S2 VEG S3	Conditional ALL S1 VEG S1 VEG S2 VEG S3 Limited VEG S4 – Salvage Harvest Not allowed except within the structure ignition zone, critical landscape settings or to facilitate fire use practices.	Conditional ALL S1 VEG S1 VEG S3	Conditional ALL S1 VEG S1 VEG S3	Conditional ALL S1 Limited ⁵ VEG S5 Pre-commercial thinning is restricted Fire Hazard Reduction Thinning is not permitted except within the structure ignition zone critical landscape settings or to facilitate fire use practices.	Conditional ALL S1 VEG S3	None
	None Hazardous fuels reduction activities identified are permitted by exception.	None Hazardous fuels reduction activities identified are permitted by exception.	None Hazardous fuels reduction activities identified are permitted by exception.	None Hazardous fuels reduction activities identified are permitted by exception.	None VEG S5 Vegetation Management Practices that reduce snowshoe hare habitat are restricted. Thinning and other vegetation	Conditional VEG S3 VEG S5 Prescribed fire that is a hazardous fuels reduction activity identified or restores ecological processes is	None

⁵ Limited – Although allowed the activity is restricted in either intensity or extent.

Alternative	Mechanical Fuels Treatment with Utilization		Mechanical Fuels Treatment Without Utilization		Fire Hazard Reduction Thinning	Fire Use Restricted	
	WUI	Non-WUI	WUI	Non-WUI		Prescribed Fire	Wildland Fire Use
					management practices that are a hazardous fuels reduction activity identified through a collaborative process are permitted.	permitted. Prescribed fire for other resource objectives may be restricted.	
D	Conditional VEG S1 VEG S2 VEG S3 Limited VEG g S4 – Salvage Harvest allowed only within 200 feet of dwellings and open roads	Conditional VEG S1 VEG S2 VEG S3 Limited VEG G8. Salvage harvest allowed as documented in NEPA decisions.	Conditional VEG S1 VEG S3	Conditional VEG S1 VEG S3	None VEG S5 Pre-commercial thinning is restricted. Fire Hazard Reduction Thinning within the structure ignition zone and landscape settings critical for the creation of defensible fuels profiles is permitted by exception.	Conditional VEG S3	None
F	Conditional VEG S1 VEG S2 VEG S5 VEG S6 Vegetation	Conditional VEG S1 VEG S2 Full VEG S6 Vegetation	Conditional VEG S1 VEG S2 VEG S5 VEG S6 Vegetation	Conditional VEG S1 VEG S2 Full VEG S6 Vegetation	Conditional VEG S5 Pre-commercial thinning is restricted. except in the WUI	Conditional ALL S1 VEG S1 VEG S2 VEG S6 Prescribed Fire	None

Alternative	Mechanical Fuels Treatment with Utilization		Mechanical Fuels Treatment Without Utilization		Fire Hazard Reduction Thinning	Fire Use Restricted	
	WUI	Non-WUI	WUI	Non-WUI		Prescribed Fire	Wildland Fire Use
	Management practices and activities that reduce snowshoe hare habitat in multistory mature and late successional forests would be allowed in the WUI subject to a 3% cumulative limit	Management practices and activities that reduce snowshoe hare habitat in multistory mature and late successional forests would not be permitted except in the WUI. Uneven-aged management systems which are allowed are unlikely to achieve fuels reduction objectives.	Management practices and activities that reduce snowshoe hare habitat in multistory mature and late successional forests would be allowed in the WUI subject to a 3% cumulative limit	Management practices and activities that reduce snowshoe hare habitat in multistory mature and late successional forests would not be permitted except in the WUI. Uneven-aged management systems which are allowed are unlikely to achieve fuels reduction objectives	subject to a 3% cumulative limit	treatments that reduce snowshoe hare habitat in multistory mature and late successional forests would be allowed in the WUI subject to a 3% cumulative limit Full VEG S6 Prescribed Fire treatments that reduce snowshoe hare habitat in multistory mature and late successional forests would not be permitted except in the WUI.	

Alternative A – No Action

Under the no action alternative the impacts on mechanical fuels treatments and fire use applications is uncertain. Formal consultation on individual projects within LAUs may or may not result in restrictions depending on the status of inventories within the LAUs. Current management emphasis and direction for fire use and fuels reduction activities are maintained under current Forest Plan direction.

The effects of the Standards and Guidelines contained in the Revised White River and Medicine Bow Forest Plans are similar to the potential effects under Alternative B. All hazardous fuels reduction activities including wildland fire use may be restricted or limited. The Revised White River and Medicine Bow Forest Plans do not include the restrictions on management in late successional Engelmann spruce-fir similar to VEG S6.

Alternative B

Under Alternative B all hazardous fuels reduction activities except for wildland fire use may be restricted or limited.

All vegetation management activities, except for wildland fire use, may be restricted in linkage areas (**ALL S1**). All practices and activities must maintain habitat connectivity regardless of hazardous fuels reduction goals, including the reduction of threat to communities. This may be problematic as the linkage areas include some lower elevation areas including dry type lodgepole pine, Douglas-fir, and Ponderosa Pine/gamble oak. These cover types would normally not be affected by the other standards and guidelines, as they are generally not considered suitable lynx habitat. These lower elevation cover types are also more likely to receive a hazardous fuels reduction treatment rather than higher elevation moist lodgepole pine and Engelmann spruce-subalpine fir.

Standard **VEG S1** can directly limit vegetation management activities if the threshold of 30 percent unsuitable habitat within an LAU is reached or exceeded and a broad scale assessment was not completed. Mechanical fuels treatments and prescribed fire may be restricted by this standard. Wildland Fire Use Activities are accepted.

Timber management practices, including those with hazardous fuels reduction goals may be restricted if more than 15 percent of lynx habitat is changed to an unsuitable condition within a 10 year period (**VEG S2**).

Salvage (< 5 acre affected areas) and precommercial thinning are allowed only within the structure ignition zone. Salvage of small affected areas outside the structure ignition zone may be restricted if denning habitat has been mapped and is less than 10 percent (**VEG S3 and S4**). Precommercial thinning for fire hazard reduction and in support of wildland fire use is not allowed unless the stands no longer provide snowshoe hare cover (**VEG S5**). Other vegetation management practices may be restricted in areas with high potential to become denning habitat if denning habitat is less than 10 percent of a LAU (**VEG S3**).

All management practices are limited in mature and late successional, multi-layered Engelmann spruce-subalpine fir stands, except for practices and activities within the structure ignition zone and wildland fire use actions (**VEG S6**). This may have an effect on hazardous fuels reduction activities to a limited degree. Only a limited amount of

mechanical treatments are anticipated in Engelmann spruce-subalpine fir (most hazardous fuels treatments are anticipated in dry type lodgepole pine, Douglas-fir, ponderosa pine, and brush habitat types). However, prescribed fire applications, even those in support of wildland fire use, could be restricted under this standard.

Alternative C

Under **Alternative C** all hazardous fuels reduction activities except for wildland fire use may be restricted or limited. The levels of restrictions are reduced significantly for most activities over those in **Alternative B**.

However, as in Alternative B, all vegetation management activities, except for wildland fire use, may be restricted in linkage areas (**ALL S1**). All practices and activities must maintain habitat connectivity regardless of hazardous fuels reduction goals, including the reduction of threat to communities. This may be problematic as the linkage areas include some lower elevation areas including dry type lodgepole pine, Douglas-fir, and Ponderosa Pine/Gamble oak. These cover types would normally not be affected by the other standards and guidelines, as they are generally not considered suitable lynx habitat. These lower elevation cover types are also more likely to be a higher priority for hazardous fuels reduction treatment rather than higher elevation moist lodgepole pine and Engelmann spruce-subalpine fir.

Standard **VEG S1** can directly limit vegetation management activities if the threshold of 30 percent unsuitable habitat within an LAU is reached or exceeded and a broad scale assessment was not completed. Mechanical fuels treatments may be restricted by this standard. Fire Use Activities are allowed.

In **Alternative C**, the limitations of **VEG S2** are not included. **VEG G7** addresses the limitation on timber management practices. As a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document. Use of timber management practices that would result in more than 15 percent unsuitable habitat being created within an LAU within a 10 year period can be approved in the environmental documentation. This guideline allows for manager latitude in utilizing timber management practices for fire hazard reduction including activities in the structure ignition zone and landscape settings critical for the development of defensible fuels profiles even if the 15 percent threshold is exceeded after analysis and consultation.

Under **Alternative C** the limitations on salvage harvest and precommercial thinning (**VEG S4 and VEG S5**) are significantly reduced as they relate to hazardous fuels reduction activities. Salvage and precommercial thinning are permitted in landscape settings critical for the creation of defensible fuels profiles to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat. This allows hazardous fuels treatments in areas outside of the structure ignition zone. Fire Use activities are not restricted by these standards. Other vegetation management practices may be restricted in areas with high potential to become denning habitat if denning habitat is less than 10 percent of a LAU (**VEG S3**).

All hazardous fuels reduction management practices are permitted in late successional, multi-layered Engelmann spruce-subalpine fir stands (**VEG S6**). Under this alternative landscape settings critical for the creation of **defensible fuels profiles** to reduce the wildland fire threat to communities and associated infrastructure, developments and municipal watersheds; or to facilitate fire use practices and activities that restore ecological processes, or that maintain or improve lynx habitat are included in the exception in addition to the structure ignition zone. This includes prescribed fire applications, even though not explicitly stated in the standard.

Alternative D

Under **Alternative D** all hazardous fuels reduction activities are permitted by exception. This is the least restrictive to hazardous fuels reduction activities of the action alternatives.

In contrast to **Alternatives B and C**, fire use activities and hazardous fuels reduction activities are not restricted in linkage areas. The exceptions to **ALL S1** are expanded to include prescribed fire applications and all hazardous fuels reduction activities, when the activity has been identified through a process such as described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan. (USDA Forest Service 2001) This allows managers the most flexibility in addressing the threats to communities and associated values.

Under **Alternative D** exceptions to **VEG S1, VEG S3 and VEG S5** have also been expanded to include all hazardous fuels reduction activities, when the activity has been identified through a process such as described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (USDA Forest Service 2001).

The restrictions on salvage harvest in **VEG S4** are not included in Alternative D. **VEG G8** addresses salvage harvest of area smaller than five acres. As a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document. This guideline allows for manager latitude in utilizing salvage harvest for fire hazard reduction, including activities in the structure ignition zone and landscape settings critical for the development of defensible fuels profiles.

In Alternative D the restrictions on management in late successional Engelmann spruce-fir in **VEG S6** are not included. **VEG G6** addresses management activities in late successional Engelmann spruce-fir. As a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document.

Alternative F – Preferred Alternative

Under **Alternative F** all hazardous fuels reduction activities except for Wildland Fire Use are restricted to varying degrees. In the Non-WUI hazardous fuels reduction activities are subject to the limitations stated in **VEG S1, VEG S2** which restrict hazardous fuels reduction after stated thresholds are reached., while in the WUI treatments are allowed subject to a three percent cumulative treatment limit.

Under **VEG S5** precommercial thinning activities are not permitted in the Non –WUI, while precommercial thinning activities in the WUI are allowed subject to a three percent cumulative treatment limit.

In Alternative F the restrictions on management in multi-story mature or late successional forests **VEG S6** are included. Hazardous fuels reduction activities including prescribed fire that regenerate forested stands in the Non-WUI are not permitted while activities in the WUI are allowed subject to a three percent cumulative treatment limit. Uneven-aged management systems which are allowed are unlikely to achieve hazardous fuels reduction objectives (see Tables 3-20 and 3-21).

In contrast to **Alternatives D**, prescribed fire activities and hazardous fuels reduction activities are restricted in linkage areas (**ALL S1**).

Under **Alternative F** exceptions to **VEG S1**, **VEG S2**, **VEG S5** and **VEG S6** are now only applicable to hazardous fuels reduction activities in the WUI subject to a three percent cumulative treatment limit.

The restrictions on salvage harvest in **VEG S4** and denning habitat are not included in Alternative F. **VEG G11** addresses denning habitat. As a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document. This guideline allows for manager latitude in utilizing vegetation management practices and activities for fire hazard reduction, including activities in the structure ignition zone and landscape settings critical for the development of defensible fuels profiles.

Comparison of Individual Standards and Guidelines:

Standard **ALL S1** only varies under **Alternative D**. In **Alternatives B, C and F** all vegetation management practices and activities, including those with hazardous fuels reduction goals may be restricted if habitat connectivity cannot be maintained. Wildland Fire Use is not restricted in **Alternatives B, C and F**. **Alternative D** includes an exception that permits prescribed fire applications and hazardous fuels reduction activities, when the activity has been identified through a process such as described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan. (USDA Forest Service 2001) As the linkage areas include lower elevation dry type lodgepole pine, Douglas-fir and ponderosa pine, **Alternative D** allows managers the most flexibility in addressing the threats to communities and associated values. The Revised White River Forest Plan does not include **ALL S1**. **WRG1** is similar in intent to **ALL S1**; however, as a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document

Standard **VEG S1** varies significantly between alternatives. **WRS1** is directly comparable to **VEG S1**. It can directly limit vegetation management activities if the threshold of 30 percent unsuitable habitat within an LAU is reached or exceeded and a broad scale assessment was not completed. Only mechanical fuels treatments may be restricted by this standard. Wildland Fire Use Activities are allowed in all alternatives. Prescribed fire activities are allowed only in **Alternatives C and D**. All hazardous fuels reduction activities identified through a process such as described in A Collaborative

Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (USDA Forest Service 2001) are permitted in **Alternative D**. If the thresholds specified are reached fuels reduction efforts will be curtailed in **Alternatives B, C**, and the Revised White River Forest Plan regardless of the critical nature of the work (wildland urban interface) or location. This can compromise firefighter and public safety. At the current time, no LAUs are close to exceeding the 30 percent threshold, so the probability of this standard having a significant impact on fuels treatments is small. Additionally, if a broad scale assessment of historic levels of habitat is conducted, this standard will no longer apply. In **Alternative F** hazardous fuels activities in the WUI may be allowed subject to a cumulative treatment limit of three percent even if 30 percent of the LAU is on a stand initiation stage that does not yet provide winter snowshoe hare habitat.

Standard **VEG S2** only applies to timber management practices such as timber harvest and salvage sales. **WRS3** is comparable to **VEG S2**. It can directly limit timber management activities if the threshold of 15 percent unsuitable habitat created within an LAU within a 10-year period is reached or exceeded.

However, this standard does not limit the use of mechanical fuels treatment methods that do not involve the recovery of economic value (product removal). Mechanical fuels treatments such as piling and burning, mastication, chipping and crushing, and fire use activities could still be utilized to accomplish fuels reduction objectives. Appropriated funds would have to be utilized to conduct fuels reduction projects. At the current time, no LAUs are close to exceeding the 15 percent threshold, so the probability of this standard having a significant impact on fuels treatments is small.

In **Alternatives C and D**, the limitations of **VEG S2** are not included. The limitations on timber management practices are addressed by **VEG G7**. As a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document. Use of timber management practices that would result in more than 15 percent unsuitable habitat being created within an LAU within a 10 year period can be approved in the environmental documentation. This guideline allows for manager latitude in utilizing timber management practices for fire hazard reduction including activities in the structure ignition zone, and landscape settings critical for the development of defensible fuels profiles, even if the 15 percent threshold is exceeded after analysis and consultation. **WRS3** is the most restrictive, as it is not limited to just timber management activities. The limits in **WRS3** may be triggered by the cumulative effects of any management actions including prescribed fire. **WRS3** is silent on its applicability to wildland fire use actions.

In **Alternative F** hazardous fuels activities that use timber management practices to regenerate forested stands in the WUI may be allowed subject to a cumulative treatment limit of three percent even if 15 percent of the LAU has been regenerated in a ten-year period.

Under **Alternatives B and C**, Standard **VEG S3** limits all vegetation management activities except for wildland fire use in LAUs with less than 10 percent denning habitat in stands that have the highest potential for developing denning habitat structure. If the thresholds specified are reached, fuels reduction activities could be limited in stands with

characteristics that are or would soon be conducive to crown fire initiation. This could affect the ability to conduct fuels treatments in the wildland urban interface and create defensible fuels profiles, or it could result in constraints on prescribed fire applications that will increase costs or even the ability to conduct the prescribed fire due to safety concerns or operational infeasibility. At the current time, denning habitat in all LAUs within the amendment area greatly exceeds the 10 percent threshold, and the probability of this standard limiting fuels treatment activities is low. All hazardous fuels reduction activities identified through a process such as described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (USDA Forest Service 2001) are permitted in **Alternative D**.

WRS2 is comparable to **VEG S3** in Alternative B except that it is silent on its applicability to wildland fire use and therefore could be interpreted to potentially limit wildland fire use activities also if the thresholds specified are exceeded.

VEG S3 is not included in **Alternative F**, but **VEG G11** addresses denning habitat. This guideline allows for manager latitude in utilizing salvage harvest for fire hazard reduction.

Standard **VEG S4** limits the use of salvage harvest of areas smaller than five acres under Alternatives B and C. Concentrations of mortality and wind throw can create conditions favorable to crown fire initiation. The size of the area of high fuel loading is not as critical to crown fire initiation as is the ability to generate sufficient surface fire intensity for transition into the canopy. Location of fuels concentrations in the wildland urban interface would be of primary concern with landscape settings critical to the creation of defensible fuels profiles. However, this standard does not limit the use of mechanical fuels treatment methods that do not involve the recovery of economic value (product removal). Mechanical fuels treatments such as piling and burning, mastication, chipping and crushing, and fire use activities could still be utilized to accomplish fuels reduction objectives.

Alternative C provides for an exception in **VEG S4** allowing salvage harvest within 200 feet of a dwelling and/or associated outbuildings. This allows for the use of commercial salvage harvest within the structure ignition zone but does not allow for salvage harvest in the remainder of the wildland urban interface zone. The fire regimes associated with lynx habitat are capable of supporting high intensity stand replacing fire events that are capable of extreme rates of spread and long range spotting. A distance of 200 feet includes much of the structure ignition zone and may contribute to a defensible space around the structure, but it does not address the remainder of the hazard within the wildland urban interface. Additionally, limiting treatments to a distance of 200 feet may not be sufficient to establish a defensible space around the structure. The distance required for a defensible space varies by site (slope, aspect) and vegetation (species, height) characteristics. Appropriated funds would be required to treat additional areas.

Although there are almost infinite combinations of potential fuels, weather and topographic conditions that could be modeled for fire behavior within the amendment area, several examples can be used to illustrate the magnitude of the fire use issues. Using a single group of lodgepole pine trees on relatively flat terrain as a spotting source and

90th percentile weather data, the BEHAVE model calculates a spotting distance of 0.2 miles (1056 feet) (Hood, 2001). This spotting distance far exceeds the 200-foot distance proposed in the standards and guidelines.

Under wildfire conditions, the fire intensity and spotting distances can be extreme. On the Bobcat fire (2000), on the Arapaho Roosevelt National Forest, fire spread rates in lodgepole pine, over one mile an hour, were reported. Flame lengths were reported to be from 100-150 feet above the treetops at the main fire front. Spotting was reported to be from one-half to one mile ahead of the fire front. Under these conditions, fire crews could do little to stop the advance of the fire. Safety of the firefighters and the public became the primary concern (Close 2000). Other wildland fires in the mixed and stand replacement fire regimes, that comprise most lynx habitat, have exhibited greater rates of spread and spotting distances.

In **Alternative D**, **VEG S4** is not included, but **VEG G8** addresses salvage harvest of areas smaller than five acres. As a guideline, exceptions can be proposed and approved in the appropriate environmental analysis document. This guideline allows for manager latitude in utilizing salvage harvest for fire hazard reduction including activities in the structure ignition zone, and landscape settings critical for the development of defensible fuels profiles.

VEG S4 is not included in **Alternative F**, but **VEG G11** addresses denning habitat. This guideline allows for manager latitude in utilizing salvage harvest for fire hazard reduction.

WRS4 is comparable to **VEG S4** in Alternative B. However, **WRS4** does not include exceptions for public safety and access on roads and trails, the structure ignition zone, wildfire suppression, or for personal use firewood collection, and therefore is more restrictive than Alternatives B, C and D.

VEG S5 as written for **Alternatives B and C** limits the use of precommercial thinning. It is less restrictive under **Alternative D**. The degree of restriction varies between the alternatives. Although some units may refer to fire hazard reduction thinning as precommercial thinning when working with small diameter trees, the objectives of the thinning are quite different. Fire hazard reduction thinning is conducted to achieve objectives such as creating defensible space or defensible fuels profiles, decreasing the probability of crown fires, reducing the area burned by unwanted fires, decreasing the severity of impacts, enhancing fire suppression effectiveness and safety, reducing suppression cost, and enhancing managers ability to implement fire use which includes prescribed fire for both hazard reduction and habitat improvement. Precommercial thinning is performed to concentrate growth on more desirable trees. Funding for fire hazard reduction thinning is from hazardous fuels appropriations.

Alternative B prohibits precommercial thinning unless the stands no longer provide snowshoe hare habitat. Fire hazard reduction thinning is not permitted unless stands no longer provide snowshoe hare habitat. Only fire hazard reduction thinning in the structure ignition zone (within 200 feet of dwellings or other structures) is permitted by exception. The inability to conduct thinning can affect the units' ability to create defensible space or defensible fuels profiles. This can have effects on public and fire fighter safety, private property values, and the ability to conduct fire use. Some landscape settings can be

critical to the development of defensible fuels profiles. Precommercial thinning restrictions would preclude treating these critical landscape settings. This lack of treatment could eliminate wildland fire use options (fire can not be maintained within Maximum Manageable Area) or compromise firefighter safety though the inability to reduce the wildland fire threat adjacent to communities at risk. The impacts of this standard on wildland fire use are uncertain. The instances where wildland fire use or prescribed fire would be limited due to an inability to thin are very site specific and difficult to estimate at a programmatic level.

Alternative C provides additional exceptions to allow the use of precommercial thinning and vegetation management activities and practices that reduce snowshoe hare habitat under certain conditions. The exceptions in Alternative C would have no appreciable effect on the amount of thinning that provides secondary benefits of fire hazard reduction.

Alternative D permits Fire Hazard Reduction Thinning to be conducted within the structure ignition zone and in landscape setting critical for the development of defensible fuels profiles. This alternative allows for thinning to within 200 feet of dwellings and other structures, which will create defensible space to be tailored to the specific site conditions and vegetation, and increase the effectiveness of the treatments. This alternative allows managers to conduct fire hazard reduction thinning to create defensible fuels profiles. Fire use activities will not be affected as thinning of critical landscape settings may occur. Firefighter and public safety is not adversely affected in this alternative.

Most fire hazard reduction thinning would occur in the mixed conifer cover types, which are found on the Southern forests (Pike San Isabel, Rio Grande, Arapaho Roosevelt and San Juan). There may be some needed in lodgepole but not as much as the mixed conifer type. It is estimated that only minor amounts would be needed in Engelmann spruce-subalpine fir cover types for fuel breaks, structure ignition zones, and some limited landscape settings critical to the development of defensible fuels profiles.

Limiting the exceptions to just fire hazard reduction thinning would reduce the amount of fire hazard reduction accomplished as secondary benefits of thinning for growth redistribution.

VEG S5, as written for Alternative D, affects vegetation management practices that reduce snowshoe hare habitat. The impact to hazardous fuels reduction activities is minimal, as the standards include exceptions for fire use practices and activities and all hazardous fuels reduction activities identified through a process such as described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (USDA Forest Service 2001). Activities with secondary hazardous fuels reduction benefits would still be regulated by this standard under this alternative. In that regard, this alternative is more restrictive than Alternatives B and C, which only address precommercial thinning activities.

WRS5 is comparable to **VEG S5** in Alternative B. However, **WRS5** does not include exceptions for the structure ignition zone, wildfire suppression, or wildland fire use, and therefore is more restrictive than Alternatives B, C and D.

Alternative F allows hazardous fuels activities that use precommercial thinning as a tool in the WUI subject to a cumulative treatment limit of three percent even if they reduce snowshoe hare habitat. Hazardous Fuels treatment in the Non-WUI would be subject to the limitations of the standard.

VEG S6 is included only in Alternatives B, C and F. In Alternative D, it is replaced with **VEG G6**. Under **VEG S6**, all management practices are limited in mature and late successional, multi-layered Engelmann spruce-subalpine fir stands except for practices and activities within the structure ignition zone and wildland fire use actions. This may have an effect on hazardous fuels reduction activities to a limited degree. Only a limited amount of mechanical treatments are anticipated in Engelmann spruce-subalpine fir (most hazardous fuels treatments are anticipated in dry type lodgepole pine, Douglas-fir, ponderosa pine, and brush habitat types). However, prescribed fire applications, even those in support of wildland fire use could be restricted under this standard.

In Alternative C, additional provisions are incorporated to allow activities in landscape settings critical for the creation of defensible fuels profiles.

The revised White River Forest Plan does not contain a standard that is similar in intent to **VEG S6**.

In Alternative F hazardous fuels activities that regenerate forested stands in the WUI may be allowed subject to a cumulative treatment limit of three percent even if they reduce snowshoe hare habitat. Hazardous Fuels treatment in the Non-WUI would be subject to the limitations of the standard

VEG G1, G2, G3 and **G4** do not vary between Alternatives B, C and D. **WRG2** is comparable to **VEG G1**, and **WRG3** is comparable to **VEG G3**. **VEG G1** and **G2** both can result in vegetation and fuels conditions on the grounds that are suitable for crown fire initiating and spread. **VEG G1** places an emphasis on recruiting high-density small diameter conifers. High-density conifer stands are more susceptible to crown fire spread. **VEG G2** promotes the retention of coarse woody debris for potential denning habitat. High surface fuel loadings contribute to surface fuels intensities. When the surface fire intensities equal or exceed the critical threshold, crown fire can initiate. However, as guidelines, deviations are acceptable if documented in an environmental decision document following consultation with USFWS.

VEG G1 in Alternative F encourages recruiting high-density small diameter species where such habitat is lacking. However, as a guideline, deviations are acceptable if documented in an environmental decision document following consultation with USFWS.

VEG G3 encourages vegetation management activities that would provide for the retention or restoration of denning habitat on landscape setting with a low probability of loss from stand replacing fire events. The effects of this guideline on fire suppression actions and hazardous fuels reduction treatments are negligible. **WR S2** is comparable in intent to **VEG G3**, except as a standard exceptions are not permitted without a site specific plan amendment. **VEG G3** is not included in Alternative F, it is replaced by **VEG G11** which addresses denning habitat. This guideline allows for manager latitude in utilizing salvage harvest for fire hazard reduction. However, as a guideline, deviations are

acceptable if documented in an environmental decision document following consultation with USFWS.

VEG G4 limits the construction of permanent firebreaks and permanent travel routes that would facilitate snow compacting activities. The effects of this alternative are negligible. Firebreaks are seldom constructed in the amendment area and fuel break construction is not limited. Permanent travel routes are seldom constructed under current suppression direction. **WRG9** is comparable to **VEG G4**, except that it includes temporary access roads and machine fire lines in the management activities to be minimized or avoided; however, as worded **WRG9** should not result in unnecessary restrictions being placed on wildland fire management. **VEG G4** in Alternative F discourages the creation of permanent travel routes that would facilitate snow compaction and the construction of permanent firebreaks. However, as a guideline, deviations are acceptable if documented in an environmental decision document following consultation with USFWS

VEG G6 is only included in Alternative D. It encourages the development of multi-layered Engelmann spruce-subalpine fir stands in LAUs without adequate winter snowshoe hare habitat. As a guideline, most conflicts with hazardous fuels reduction actions can be mitigated within the project decision. However, as a guideline, deviations are acceptable if documented in an environmental decision document following consultation with USFWS

VEG G10 is only included in Alternative F. It encourages the design of fuels treatment projects in the WUI with consideration of standards **VEG S1, S2, S5** and **S6** to promote lynx conservation. However, as a guideline, deviations are acceptable if documented in an environmental decision document following consultation with USFWS

VEG G11 is only included in Alternative F. It addresses retention and development of denning habitat in LAUs. However, as a guideline, deviations are acceptable if documented in an environmental decision document following consultation with USFWS.

Cumulative Effects

Under the National Fire Plan and A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (USDA Forest Service 2001), and the Healthy Forests Initiative fire suppression would continue, but the Forest Service would continue, but the Forest Service would implement fuel treatments targeting the highest risk communities and forest ecosystems. This amounts to areas close to where people live with an understory or mixed-severity fire regime.

Alternative A

The National Fire Plan and Healthy Forest Initiative have identified the need to treat hazardous fuels. Other programmatic decisions (e.g. Roads Policy, Roadless Rule, and Energy Implementation Plan) have minimal effect on the ability to reduce fuels where necessary.

Alternatives B and C

The management direction, in addition to other programmatic decisions may restrict fuel treatments in stands that could develop denning structure. This could affect the ability to treat hazardous fuels, especially adjacent to communities in some situations. Alternative C would not affect the ability to treat hazardous fuels adjacent to communities, including the use of prescribed fire; but could further limit or restrict opportunities outside the WUI. This could affect some opportunities to modify fire patterns.

Alternatives D and F

The management direction, in addition to other programmatic decisions would not affect the ability to treat hazardous fuels adjacent to communities; but could further limit or restrict opportunities outside the WUI. This could affect some opportunities to modify fire patterns.

Recreation

Affected Environment

Introduction

This section discusses the on-going recreation use of the National Forests in the SRMGA and the effects of the proposed actions on that use and the users. Analysis focuses on recreation within Lynx habitat and Lynx Analysis Units (LAUs). Downhill ski areas are discussed separately. Seven National Forests are included in this discussion. The amendments would apply to the lynx habitat in the LAUs, which is about 51 percent of the 14.6 million acres of National Forests System lands within the seven National Forests.

The recreation issue is how winter recreation can be harmonized with creating and maintaining desired lynx habitat. The analysis of the alternatives focuses on impacts to the quality or quantity of recreation opportunities and the subsequent recreation experiences of the visitors to the National Forests, particularly in the winter. To describe the effects of the alternatives in a way that addresses the issues the following measures were used: recreation opportunities being provided in miles of designated or groomed trails, recreation participation by winter recreation activity in the number of forest visits, total forest recreation visits, the quality of the recreation experience especially focusing on the negative effects of crowding and user group conflicts.

The recreation setting includes the forests of Colorado and southern Wyoming. These forests have outstanding recreation opportunities along with the most scenic wild lands in the United States. These forests provided for some 38 million-forest visits in 2001. Winter recreation is as popular as summer recreation in the Southern Rocky Mountains. The majority of winter recreation use on public lands is snowmobiling, cross-country skiing, and services provided by outfitters and guides.

Recreation User Groups and Activities

The actions proposed in the Lynx amendment for the southern Rockies would affect primary winter recreation participants and to a much lesser extent summer recreation participants. For the purposes of this analysis the winter recreation participants are broken out into the following three groups: motorized (snowmobile riders), non-motorized (cross-country skiers, snowshoe users), and outfitted and guided winter users.

Most visitors to the National Forests drive on forest roads and enjoy the scenery, stopping occasionally to enjoy specific views. The proposed actions are not expected to have much effect on this kind of recreation use. The activities that may be most affected by the Lynx Amendment are shown on Table 3- 23. Each forest in the region provides a mix of recreation opportunities and, while the percent of participation in these activities varies between forests, there are strong similarities as well. By using the following limited sample as an estimate of existing use, potential forest visits that may be affected can be approximated. For example, winter recreation activities without downhill skiing in the

SRMGA accounted for 589,945 National Forests visits in 2001 for the four of the seven Forests that had statistical data available at the time. Mathematically projecting use occurring on the other three Forests that did not have visitor statistical data available at the time would predict the recreational winter use over the entire seven Forests would be: $7 / 4 \times 589,945 = 1.03$ million projected snowmobile/cross-country skiing/snowshoeing visits in 2001. This calculation assumes that the weighted average used for the four Forests shown in Table 3- 23 can be extrapolated over the other three Forests not included in this table due to lack of data. Percent of specific activities are compared to total recreation use and total visits participating in the activity.

Table 3- 23 - Recreation Activity Participation

Activity	Percent Participation San Juan NF ¹ .	Percent Participation Rio Grande ¹	Percent Participation Arapaho-Roosevelt ¹	Percent Participation White River ²	Percent of Participation (Weighted Average)	National Forest Visits (Millions)
Snowmobile travel	2	17	3	3.4	4.73	1.89
Cross-country skiing, snowshoeing	4	11	14	6.3	11.56	4.336

¹ National Visitor Use Monitoring 2001

² National Visitor Use Monitoring 2002

Existing Levels and Patterns of Use

Outdoor recreation is a significant part of the quality of life for people living in the Southern Rocky Mountain Region. One quarter of the residents participate in winter recreation activities in the larger Rocky Mountain Region, totaling some 3.6 million participants. The Rocky Mountain Region also receives a significant amount of outdoor recreation based tourism from across the country.

Motorized Winter Use

Snowmobile use is generally a family and club recreation activity with some more advanced participants involved in high risk “high marking” on very steep snow slopes and racing. Most snowmobile users go to a site on the National Forest within a few hours from home, park and unload the snowmobile, and then ride on signed and groomed snowmobile trails until they find an open area to get off the trail and play.

As of 2004, there were 32,741 registered snowmobiles in Colorado. A recent survey of snowmobile users found that 24 percent considered well-groomed trails to be very important to extremely important. However, it is important to note that 14 percent did not consider well-groomed trails to be important. So while groomed trails are a significant part of the recreation experience for the majority of users, some users do not place any significance on groomed trails. Also important is the ability to ride freely in open areas off trails. Most snowmobilers consider open play areas to be very important to extremely important. Over all, this aspect was rated more important than well-groomed trails.

These users are concerned about riding in areas that avoid conflict with other trail users and 53 percent surveyed also considered opportunities to snowmobile in areas and trails that have few people on trails or open areas as very important. So crowding is an important consideration to the user group.

Grooming a system of trails provides easy high-speed access to adjacent forested areas. These groomed trails concentrate use and there is a constant high level of use on weekends. Groomed trails facilitate access to remote areas of the forests, including in some cases areas above timberline. If trails are not groomed, they become difficult to travel over, and act as a barrier to use in remote areas.

Growth rate of snowmobile use in Colorado can be best represented by snowmobile registrations. This is a growth rate of about 70 percent per decade about 3 times faster than the population growth. The growth rate is expected to slow but use is anticipated to continue to grow over the planning period. The growth rate of this use is very different in Wyoming. The resident total snowmobile registrations were 17,989 in 1999, and are considered to be static. However the growth rate of non-resident use from 1998 to 1999 grew 32 percent (Wyoming State Parks). This is a large increase and is not expected to be a sustained rate of growth over the planning horizon.

Non-motorized Winter Recreation Use

Non-motorized winter users make up a large segment of winter recreation visitors. There is an estimated 4.4 million National Forest visits in which the primary activities were cross-country skiing, including track, touring and backcountry skiing and snowshoeing.

In general, these non-motorized participants drive to a site on the National Forest within a few hours from home and ski or snowshoe on signed, groomed and un-groomed trails. Some seek an open area to get off the trail and play. Important requirements are adequate parking areas, signed, and in some cases, groomed trails and unstructured open play areas. The groomed trail network allows users to disperse into the forest for off-trail opportunities or to enjoy ski skating and traditional techniques without having to cope with the irregularities in the trail. Without grooming these snow trails become rough and difficult to travel, and for some users provide an unsatisfactory recreation experience. Designated trails focus use on the trails, instead of each user finding their own route. Most trails presently experience moderate levels of use on weekends. Presently the backcountry trail system in SRMGA is fairly limited with adequate parking areas which result in concentration of use at popular locations.

Relationship Issues between the motorized and non-motorized User Groups

Many snowshoers and skiers find a machine packed (groomed) trail attractive, although the use of snow machines on those trails may be a hazard to both the skier and the rider. Conflicts may arise between user groups beyond that of potential hazard. Many non-motorized users find the sound and smell of snow machines, and in some cases even their presence, as detracting from the quality of their recreation experience. There can also be some conflict between snowshoe users and skiers because of the very different speeds involved and the negative impacts that snow shoes can have on ski trails. This can also result in the need, or desire, for separate trail systems.

Snowmobile clubs have been very well organized in Colorado and Wyoming. They have worked with State Government and the Federal land managers to develop an extensive system of groomed and signed trail networks and associated parking areas. Backcountry or Nordic skiers have not been as well organized and have not developed extensive systems of backcountry trails. Privately run Nordic centers have grown in numbers, providing abundant opportunities for very well groomed cross-country skiing.

Groomed or Designated Routes

The data in Table 3- 24 are estimates of the total groomed or designated winter routes, within the LAUs, in and out of lynx habitat for all the National Forests in the analysis area. This table does not indicate areas specifically identified and designated for winter use activities, such as tubing, snowmobiling, or other winter recreation activities. This table provides an estimate of the baseline mileage of groomed or designated over-the-snow routes, presently totaling 4,823 miles.

Table 3- 24 - Southern Rockies Lynx Amendment Estimated Designated and Groomed Winter Routes

National Forest	Total Designated Routes (Miles)	Total Groomed Routes (Miles)	Total Groomed or Designated Routes In Lynx Habitat within LAUs (miles)	Total Groomed or Designated Routes in LAUs (miles)
Arapaho-Roosevelt	652	145	130	149
Pike-San Isabel	1,239	163	750	1,097
Rio Grande	314	167	196	319
Medicine Bow-Routt	1,105	404	361	546
San Juan	1,431	353	654	933
Grand Mesa-Uncompahgre-Gunnison	2,345	418	950	1,501
White River	1,920	879	115	278
TOTAL	9,006	2,529	3,156	4,823

Outfitted and Guided Winter Recreation Use

Outfitters and guides provide an important service to the public seeking a wide variety of recreational opportunities on public lands. Special use permits authorize recreation services provided by outfitters. A majority of permits issued are for summer activities, although there are many permits issued to outfitters who operate during the winter. Winter outfitters and guides provide an important service to those visitors lacking the

skills and equipment to participate in winter activities and provide jobs and income to many small rural western communities. Some of the winter services provided by outfitters are snowmobiling, cross-country or helicopter skiing, and late winter/early spring big game hunting.

Table 3- 25 displays the total number of recreation special use permits and agreements issued by each of the National Forests in the SRMGA. There are a total of 949 recreation special use permits and agreements in the Southern Rockies. A total of 14 snow play areas and a total of 912 outfitter and guide permits within the SRMGA are authorized during winter in lynx habitat.

Across the region the number of overall outfitter and guide permits and level of outfitter and guide use has remained relatively steady over the past ten years. Most forests have reached the total allowable allocation for summer use and in some cases winter use as well. As a result, new permits or more service days have only been issued when existing permits expired, were revoked, or otherwise ceased to exist, or when permitted outfitters voluntarily decreased their service days.

Winter use, particularly in Colorado, has also had a great amount of outfitted user activities, such as snowmobiling, cross-country skiing, snowshoeing and dog sledding. These uses have grown over the past ten years. The category of winter trips provided by outfitters and guides is also reaching capacity limits and not expected to result in significant increases in overall outfitter and guide use across the region.

Table 3- 25 - Forest recreation special use permits and agreements

National Forest	Resort Permits	Outfitter & Guide Permits	Snow Play	Total
Arapaho-Roosevelt	3	100	0	103
Pike-San Isabel	1	136	2	139
Rio Grande	4	61	4	69
Medicine Bow	2	75	1	78
Routt	2	75	1	78
San Juan	0	140	1	141
Grand Mesa-Uncompahgre-Gunnison	4	165	5	174
White River	7	160	0	167
Totals	23	912	14	949

Projections of Future Use

The recreation use occurring in the Southern Rockies is strongly affected by the changing demographics of the region. Population growth is the greatest indicator of future growth in the participation of these user groups. Colorado is expected to grow over the next twenty-five years by over two million inhabitants, an increase of 50 percent of today's

population. Wyoming is expected to grow by 183,000 inhabitants, a growth of 35 percent of today's population. Growth in winter and summer outdoor recreation is expected to grow by at least this amount.

Participation rates in some activities are growing at rates faster than population growth rates (see Table 3- 26, below). Data was produced using the projected index provided by the recreation researchers.

Table 3- 26 - Projected winter sports growth in the Rocky Mountain Region

Activities	Percent change from base year (2000).		
	Year 2010	Year 2015	Year 2025
Cross Country Skiing	31%	41%	88%
Snowmobiling	6%	10%	16%

Data (Source: Outdoor Recreation in American Life, Ken Cordell Principal Investigator, Sagamore Publishing, 1999 Table V1.3, V1.4, V1.5, pages 236-328)

Environmental Consequences

Direct and Indirect Affects

Alternative A - No Action

Under the No Action Alternative, winter access and use and expansions of outfitting and guide operations on National Forest system lands would be managed under existing Forest Plans. Decisions related to access and issuance of outfitter permits would continue to be made at the local level through forest, resource, and project land management planning.

Grooming of winter trails would continue, and increase as demand and funding provide the means to maintain and expand the system. This means that the amount of groomed or designated routes in lynx habitat could increase above current levels. Groomed trails facilitate access to open areas in presently remote parts of the forests that maybe used for snow play.

Table 3- 27 displays the predicted growth rates of groomed and designated trails snow compaction, and recreation use in Colorado, Wyoming, and the Southern Rockies. In summary, snowmobile use is anticipated to increase by 20 percent, cross-country skiing and snowshoe use by 80 percent, and groomed trails use by 20 percent. The quality of the recreation experience would remain high as new facilities are developed to provide for the increased use. The total miles of new groomed and designated trails within the lynx habitat are projected to increase by 1,578 miles to a total system of 4,734 miles by 2025.

Public demand for winter outfitter services is predicted to continue. Growth in outfitter business and the number of permittees would follow current rates of slowed growth due to capacity issues.

Table 3- 27 - Projections of Future Recreation Use and Expansion of Groomed and Designated Trails in Lynx Habitat

	Year 2000	Year 2010	Year 2015	Year 2025
COLORADO				
Residents who Snowmobile Growth rate in percent	0	20	30	50
Households	13,636	16,363	17,727	20,454
Non-Residents who Snowmobile Growth rate in percent	0	6	10	16
Households	7,400	7,844	8,140	8,584
Cross country skiing	0	15	25	35
WYOMING				
Forest Snowmobile RVDs	216,000	248,400	248,400	291,600
SOUTHERN ROCKIES				
National Forest Visits Growth rate in percent	0	20	30	50
Visits (Million)	37.7	45.24	49.01	56.55
Snowmobile visits Growth rate in percent	0	20	30	50
Visits (Million)	1.89	2.268	2.457	2.835
Cross country Ski Visits Growth Rate in percent	0	31	41	88
Visits (Millions)	4.33	5.629	6.495	7.794
Expected Groomed Trails in Lynx Habitat Growth rate in percent)	0	20	30	50
Total expected growth in designated Routes (miles)	3,156	3,787	4,103	4,734

Forest Plan standards and guidelines would continue to guide and limit recreation both in summer and in winter. At the present time, no forests have reached a total carry capacity limit for winter and summer recreation in areas outside of Wilderness, so for the planning period, no restrictions in recreation growth is expected from the existing Forest Plans.

Alternative B

Under the Proposed Action, winter access and use, and outfitter/guide operations on NFS lands would be managed under amended resource management plans. New standards would affect the availability and amount of winter trail access in lynx habitat. Expansion of groomed or designated routes would be restricted.

About 3,156 miles (See Table 3- 24) of designated and groomed winter routes would be available for use. The opportunity to increase the total groomed and designated over-the-snow routes that consolidate recreation use and improve lynx habitat could occur by LAU.

Limiting increases in groomed and designated over the snow trails would keep the trail system at its present size and reduce potential increased trail development of the system as it responds to increased use. An estimated 2,100 miles of projected additional trails would not be designated over the planning period. In many areas vegetation and topography limit the physical capacity to increase trails, as is the case on the White River National Forest. Grooming can expand into the existing designated trail system. The present system would need to accommodate the expected increase in use. This would result in approximately 20 percent more interactions between users. Increased use and interactions may result in crowding and consequently decrease the quality of the recreation experience, as well as increase the probability of accidents occurring on the more crowded trail systems. This decrease in the quality of the recreation opportunity is not expected to reduce overall participation in the activity.

Winter recreational non-motorized users should anticipate encountering more conflicts with motorized users as overall participation increases. The non-motorized users would have little opportunities to develop new systems of groomed or designated trails and the existing trail systems, which in some areas are already crowded, would become more crowded as the number of users increases. This would result in a decrease in the quality of the recreation experience but not the participation in this activity.

New authorizations, expansion of existing outfitter operations, issuance of permits, or other agreement instruments would be limited to existing authorized groomed and designated routes and areas. Individuals and families would not be restricted from using new areas or routes open to winter motorized use, but grooming or designation of new routes may be restricted as previously described. Some areas may reach capacity and this use would be capped at some point.

Summer recreation would for the most part be unaffected, except for driving for pleasure. Traffic volume may increase by 50 percent, not upgrading existing roads in lynx habitat may result in some congestion and less desirable road conditions. This may cause a decrease in the quality of the driving recreation experience.

Alternative C

Winter access and use, and outfitter/guide operations on NFS lands would be managed under amended resource management plans. New standards would affect the availability and amount of winter trail access in lynx habitat. Expansion of groomed and designated routes would be restricted.

About 3,156 miles (See Table 3- 24) of designated and groomed winter routes would be available for use with lynx habitats in the LAUs.

The effects of the limitation to increase groomed and designated over the snow trails would be similar to Alternative B. In addition, a combination of immediately adjacent LAUs can be used to offset effects of adding miles to the system. This provides the flexibility for land management agencies trying to accommodate increasing demands for winter recreation opportunities.

Alternative D

Summer recreation would be unaffected. Winter recreation effects would be somewhat less than Alternative C, with direction provided as guidelines versus standards.

Alternative F

Summer recreation would be unaffected. Winter recreation effects would be somewhat less than Alternative C, with direction provided as guidelines versus standards (such as HU S1 listed under Alternatives B and C versus HU G10 listed under this alternative).

Cumulative effects Alternatives A, B, C, D and F,

The following summarizes past, present and reasonably foreseeable programmatic actions that may cumulatively affect winter recreation.

Colorado Interstate 70 expansion

In Colorado, traffic congestion is discouraging urban Front Range population centers from using the National Forests for recreation both in the winter and the summer. The planned expansion of I-70 would make it easier to visit the National Forests and would increase recreation use on the National Forests. While not discussed in the projections of future use section, the effect of this major project was considered to the extent that transportation systems would not be a limiting factor to use in the future.

Yellowstone and Rocky Mountain National Parks

A decrease or ban in snowmobiles access in these National Parks is anticipated to result in an increase in snowmobile use in other areas when these users are displaced. An increase in snowmobile use is anticipated for the Medicine-bow Routt National Forests. Increased visitation by displaced snowmobile users could result in crowding on existing trail systems, with a decrease in visitor satisfaction with their recreation experience, and increased conflict with non-motorized users.

Ski Areas

Affected Environment

Due to a variety of factors, the Southern Rocky Mountains Geographic Area is uniquely well suited to the development of ski areas. Due to its continental climate and relatively high elevations, this area experiences long, cold winters accompanied by reliable snow that is relatively dry and remains soft due to the infrequency of freeze-thaw and rain events. Additionally, due to their expanse, these mountains contain numerous sites that possess the terrain features, such as slope, aspect, and vertical relief that make them well suited for ski area development. Historic settlement patterns have created the basic infrastructure and population base to support the development and successful operation of ski based resorts.

The region's unique history provided the final ingredient for ski area development in the Southern Rocky Mountains, entrepreneurial expertise. Camp Hale, the World War II training base for the U.S. Army's 10th Mountain Division, is located in the center of this area. Several soldiers in the 10th Mountain Division had a keen interest in skiing and knowledge in ski area development. These individuals recognized how well suited the Southern Rocky Mountains were for the development of ski areas. Following the end of the war, they returned to this area and provided the entrepreneurial effort and expertise needed to capitalize on this area's characteristics favoring ski area development.

As a result of the combination of factors discussed above, numerous ski areas were developed and operated in the Southern Rocky Mountains. At this time, 12 ski areas are permitted to operate on 33,189 acres of NFS lands on the Arapaho, Roosevelt, Grand Mesa, Uncompahgre, Gunnison, Routt, Medicine Bow, Rio Grande, San Isabel and San Juan National Forests. They include world-renowned resorts such as Steamboat and Winter Park as well as smaller locally important ski areas like Wolf Creek and Ski Cooper. The White River National Forest administers 11 ski areas, including several of the largest resorts in Colorado. In the 1999-00-ski season, these 25 ski areas generated almost eight million skier visits and paid \$9.4 million in land use fees to the U.S. Treasury. Table 3-28 displays the number of acres of NFS lands under permit, skier visits, and land use fees paid by individual ski areas during the 1999/00 ski season.

There is considerable diversity in the ski areas and resorts on NFS lands in the Southern Rocky Mountain Geographic Area. Some are purely ski areas operating only in the late fall winter and early spring while others are four season resorts that operate most of the year.

Ski areas and resorts include developments such as ski trails, tramways, and ancillary facilities such as restaurants, maintenance buildings, snow making ponds, and parking lots.

Table 3- 28 - 1990-2002 Ski Season Information by Ski Area

National Forest	Ski Area	Permitted Acres	99/00 Skier Visits	99/00 Land Use Fee (x1000)
Arapaho-Roosevelt	Berthoud Pass	1,708	16,870	\$8.6
	Eldora	480	229,785	\$35.0
	Loveland	3,620	264,532	\$165.3
	Winter Park Mary Jane	7,107	902,827	\$605.9
Gunnison	Crested Butte	4,908	414,642	\$207.1
Grand Mesa	Powderhorn	1,430	71,941	\$14.9
Uncompahgre	Telluride	3,460	309,737	\$135.6
Medicine Bow	Snowy Range	945	20,000	\$19.3
Pike-San Isabel	Cuchara	342	32,154	\$4.6
	Monarch	670	127,215	\$75.7
	Ski Cooper	920	60,171	\$21.5
Rio Grande	Wolf Creek	1,581	114,802	\$89.8
Routt	Steamboat	3,486	1,024,832	\$849.3
San Juan	Durango Mtn. Resort	2,432	235,000	\$137.6
White River	Sunlight			\$12.3
	Snowmass	2390	72,004	\$880.1
	Aspen Mtn.	4997	747,304	\$61.0
	Buttermilk	255	304,498	\$135.6
	Aspen	833	148,018	\$122.6
	Highland	1620	167,390	\$3,212.4
	Vail Mtn.	12226	1,568,192	\$841.4
	Beaver Creek	3801	815,350	\$1300.7
	Keystone	8376	1,021,069	\$1959.1
	Breckenridge	5553	1,470,961	\$133.1
	A-Basin	1913	328,251	\$782.7
	Copper Mtn.	7551	1,046,242	
TOTAL	25 ski areas	82,704	7,689,279	\$9,441.2

Ski areas that operated only during the ski season are generally of smaller scale than four season resorts and development of private land at or adjacent to their base areas is less common and extensive.

Four season resorts are usually more highly developed with skiing and snowboarding occurring in the winter and spring, and hiking and mountain biking occurring in the

summer. These resorts are also associated with development on private land at or adjacent to their base areas. These developments frequently include commercial and private lodging, restaurants, bars, retail shops, golf courses, other recreational amenities, and an associated road network.

Each Forest Plan for the National Forests in the Geographic Area includes management area prescriptions specific to existing and potential ski based resorts. The 1B Management Area Prescription provides direction for the management of existing and potential winter sports sites on the GMUG, Medicine Bow, and San Juan National Forests. On the Pike/San Isabel National Forests the 1B-1 Management Area Prescription provides direction for existing winter sports sites, while the 1B-2 Management Area Prescription provides direction for potential winter sports sites. On the Arapaho/Roosevelt, Routt and Rio Grande National Forests, the 8.22 Management Area Prescription provides direction for both existing and potential ski based resorts/winter sports site the 8.25 Management Area provides direction for existing and potential ski resorts/winter sports sites. On the White River National Forest It should be noted that each of these management area prescriptions differ, but not in any significant manner.

Environmental Consequences

Alternative A - No Action

Existing and potential ski based resorts would continue to be managed according to the direction in existing Forest Plans.

Alternatives B, C, and D

Standards and guidelines would add to, but would not conflict with, the management direction for potential ski based resorts and winter sports sites that is currently in the Forest Plans. This new direction, with minor exceptions, would only apply to the development of new ski areas and to expansions of existing ski areas and would not affect existing ski area facilities or constrain ski area activities that are consistent with historic operations. Winter recreation affects would be somewhat less under Alternative D, with direction provided as guidelines versus standards.

ALL S1 would require ski area operations that may be within lynx linkage areas to maintain or restore the connectivity of lynx habitat. It should be noted that this is the only instance where existing ski areas may be affected by this alternative. Implementing this standard may result in the need to develop additional terrain in order to achieve desired trail capacity with associated increases in development and operational costs.

Under Alternative B, standard **HU S2** would require that when developing or expanding ski areas, trails, access roads and lift termini, to maintain and provide lynx diurnal security habitat if it is identified as a need. Similar direction is provided for Alternatives C and D with guideline **HU G11**. The effect of these requirements may be to reduce the potential efficiency of how these developments function as compared with developments designed to optimize efficiency focusing on ski operations. The costs of constructing developments to protect potential diurnal security habitat and maintaining connectivity,

as well as associated operational costs, may be greater than for developments designed to optimize the efficiency of skiing operations.

HU G1 would encourage that adequately sized inter-trail islands, including retention of coarse woody material to maintain snowshoe hare habitat, be provided in new ski areas and expanded portions of existing ski areas. The effect of this may be to reduce the trail capacity that might be provided from an area, as compared to a trail system designed to optimize the potential skiing opportunities of the area. This may also result in increasing the cost of developing trail capacity since more terrain would need to be included in the development to provide a given amount of trail capacity.

Guideline **HU G2** would encourage that in new ski areas or in expanded portions of existing ski areas nocturnal foraging opportunities for lynx are provided, consistent with ski area operational needs. This may be achieved through operational constraints designed to provide foraging opportunities as well as reasonable opportunities for ski area management activities such as grooming and snowmaking. These constraints may complicate the coordination and scheduling of these operations with corresponding increases in their cost. Constraints on nighttime grooming may require more daytime grooming when ski areas are open. Due to safety and associated liability concerns, daytime grooming may limit the amount of developed terrain available for public use. As a result, additional terrain may need to be developed to achieve desired trail capacity with a corresponding increase in cost. Constraining nighttime snowmaking may limit the effectiveness of this activity early in the ski season when daytime temperatures may not be cold enough to make snow efficiently. This could result in delaying the opening of new or expanded terrain for skiing beyond when it might be available if nighttime snowmaking were not constrained. This delay may result in lost revenues and increased costs due to inefficient snowmaking operations.

Alternative C

This alternative would have similar standards and guidelines as Alternatives B and D, but would also include guideline **HU G10** (as noted for Alternative C). This guideline directs that lynx habitat improvement projects be implemented when there is a permanent conversion of lynx foraging habitat, such as the development of ski area runs. This guideline would add to the costs of ski area expansions and development, but would not preclude those projects and activities.

Alternative D

Under Alternative D, direction pertaining to designated over-the-snow routes or play areas found in Alternatives B and C as **HU S1**, is provided as a guideline **HU G10** (note: HU G10 differs for Alternatives C and D). Standard **HU S3** for Alternative D clarifies that winter access for non-recreation special uses shall be limited to routes designated for those uses.

Alternative F

Under Alternative F, direction pertaining to designated over-the-snow routes or designated play areas found in Alternatives B and C as **HU S1**, is provided as a guideline **HU G10** (note: HU G10 differs for Alternatives C and D) this would provide for the ability to offset negative impacts in one LAU by protecting more pristine areas of another LAU. Otherwise, effects caused by winter recreation use would be similar to Alternatives B, C, and D.

HU S2 Direction is presented as guideline **HU G11**, but the effects would be similar to Alternative B.

HU G1 and **G11**, see ‘Alternatives B, C and D’ section.

HU G2 would encourage that in new ski areas or in expanded portions of existing ski areas foraging opportunities for lynx are provided, consistent with ski area operational needs.

HU G9 under this alternative is more allowing in comparison to each of the other alternatives in that public motorized use is allowed unless an analysis is done that determines adverse effects to the lynx.

Additionally, this alternative includes guideline **HU G12** (this addresses **HU S3**) which states that non recreation special uses and mineral and energy exploration and development should be limited to designated routes or designated over-the-snow routes.

Lands Activities

Introduction

Lands activities and Forest Service authority to manage them depend on the types of activity and the legal status of the NFS lands on which they occur. A wide variety of authorized lands Special Use activities occur on NFS lands in the Southern Rockies region. The land ownership and adjustment program includes land exchanges, interchanges and purchases; the Small Tracts Act conveyance program; and road and trail right-of-way acquisition program. Other lands work includes encroachment resolution, title claim issues, boundary management, and appraisal services associated with many of these lands activities.

Affected Environment

Landownership Adjustment/Acquisition

Landownership adjustments include land exchanges, conveyance of NFS lands through Small Tracts Act or other programs, and acquisition of non-Federal lands through direct purchase. The program is active throughout the Southern Rockies Management Geographic Area (SRMGA). Regional figures for the preceding 10-year period include the acquisition of approximately 139,000 acres through land exchanges and 44,000 acres through purchase. The fundamental purpose of the real estate management program is to manage and conserve the public's real property within the boundaries of the NFS lands for the purposes for which they were reserved from the public domain, as well as enhance resources through the acquisition of critical inholdings. One of the purposes of the landownership adjustment program is to consolidate the NFS lands into a pattern that facilitates efficient administration of land and resource management. Lands within the proclaimed boundaries of National Forests, but outside the control of the Forest Service, constitute approximately 11 percent of the acreage within the covered in the SRMGA.

Road and trail right of way (ROW) acquisition on private, state, other federal and non-federal land is an integral part of the acquisition program. The SRMGRA acquires anywhere from 5 to 40 right-of-ways on an annual basis to gain necessary access to NFS lands.

Lands Special Use Authorizations

Special uses are defined in 36 CFR 251.50(a) as: All uses of NFS land, improvement and resources, except those provided for in the regulations governing the disposal of timber (Part 223) and minerals (Part 228) and the grazing of livestock (Part 222), are designated as "Special Uses." A Special Use Authorization (SUA) can be a permit, a term permit, a lease, or an easement. There are over 100 different use types that can be authorized on NFS lands and on National Grasslands.

These lands special uses include but are not limited to electric transmission and distribution lines, telephone lines, fiber optic cables, railroads, reservoirs, ditches, roads,

highways, communication sites, oil and gas pipelines, transmission lines, seismic sites for research and military exercises. Authorizations can also be issued for smaller facilities including apiaries and fences. Hydropower projects, which require coordination with the Federal Energy Regulatory Commission (FERC) and compliance with the Federal Power Act, are permitted with SUAs. These facilities require use and occupancy of NFS lands, clearing, and road access. The SRMGA includes approximately 4,300 lands SUAs including permits, leases and easements. Approximately 30 percent of these are road rights of way. The majority of the other uses rely upon road access to accommodate construction, operation, and maintenance. A relatively small percentage of SUAs can operate without road access.

There are a large number of requests each year for road access in the SRMGA. Many of these tracts to which access is requested are relatively small in acreage and are zoned by counties to allow development. A fair number of these requests are for “inholdings” defined as “nonfederally owned land surrounded by public lands managed by the Secretary under the Federal Land Policy and Management Act of 1976”. Under ANILCA (Alaska National Interests Lands Conservation Act of 1980), inholdings are guaranteed access. Title 36 of the Code of Federal Regulations 251 Subpart D (36 CFR 251. 110 (c)) says “as appropriate, landowners shall be authorized such access as the authorized officer deems adequate to secure them the reasonable use and enjoyment of their land.”

Other Lands Activities

Boundary management, title claim resolutions and appraisal activities typically do not involve land-disturbing activities. Encroachment resolution may involve removal of trespass improvements, depending on the case.

Environmental Consequences

Alternative A, No Action

Under the No Action alternative, there would be no change from current practices or processes that include the protection of wildlife (whether listed or not). All lands activities would continue to be evaluated and processed following the regulations and current Forest Plan direction. The No Action alternative does not address lynx and lands activities directly, but protection of wildlife species and their habitat is provided through the application of the Forest Service regulations for Special Use authorization issuance and all adjustment/ acquisition activity. Opportunities would still be sought to acquire lands important to lynx and other threatened, endangered and sensitive species. Disposal of any lands within an LAU is evaluated in light of overall net benefits, i.e. giving simultaneous consideration to those lands to be acquired in exchange.

Currently, impacts to and protection requirements or mitigation for any TES species are identified in project level analysis, associated biological assessments and evaluations, and decisions involving site-specific disturbance activities for all lands activities. This would not change under the No Action alternative.

At the project level, to ensure these mitigations are accomplished, the Forest Service may require monitoring plans, inspection during and post construction, and performance bonds. The authorized officer responsible for approving special use activities also has the discretion to limit public access without impacting the implementation or construction of the facility under permit. Under certain conditions, the authorized officer may consider imposition of a deed restriction on lands being conveyed out of Federal ownership.

Alternatives B, C, D, and F

The action alternatives are similar and represent programmatic decisions. They may have an effect on land adjustment and acquisition activities and options for special use proposals. Direct effects could occur at the project level when site-specific decisions are made. Most of the effects identified in this analysis would be indirect effects, occurring later in time.

Landownership Adjustments/Acquisitions

Lynx exemplify the need for landscape scale ecosystem management. Contiguous tracts of land in public ownership provide management opportunities to maintain lynx habitat connectivity, and options to acquire non-public tracts provide additional opportunities to enhance lynx habitat connectivity. Coordination with public land management agencies, land conservation organizations and in some cases, non-Federal landowners, is important to providing the connectivity needed for the survival of the lynx in the SRMGA.

The action alternatives provide management objectives and guidelines (**LINK O1**, and **LINK G1**) that affect the adjustment and acquisition activities.

Guideline **LINK G1** provides for the retention of linkage areas in public ownership under most circumstances. Conveyance of lands in linkage areas could occur, particularly if it can be demonstrated that the resource values of lands to be received exceed those of the lands to be conveyed, including lynx values. Conveyances could also occur with deed restrictions placed on lands to protect lynx values.

The Right of Way (ROW) acquisition program for road and trail access to NFS lands could change. If conditions warrant the need for crossings or reconsideration of upgrade options, line officers may choose not to obtain road or trail ROWs across other ownership that may be necessary for NFS access.

Lands Special Use Authorizations

The action alternatives provide management objectives and standards and guidelines that affect special use activities. Specifically the proposed action includes the following standards, objectives, and guidelines that pertain: **ALL O1**, **ALL S1**, **HU O1**, **HU O3**, **HU O5**, **HU O6**, **HU S3** (Alternatives B, C, and D only), **HU G6** (Alternatives C, D, and F differ slightly from B), **HU G7**, **HU G9** (Alternative B, C, and D only; Alternative F differs slightly), **HU G10** (Alternative C only), **HU G10** (Alternatives D and F), and **HU G12** (Alternative F only).

Granting and administering of Special Use authorizations (SUA), particularly those associated with road access, could potentially impact lynx movement, habitat connectivity and increase lynx mortality. The risk of all three appears relatively minor in the case of SUAs which provide access to inholdings, usually issued to an individual or a Homeowners Association, in comparison to highly developed, higher speed highways. Many of the non-Federal inholdings do not have year round residences on them. In Special Use right-of-way cases where project level analysis indicates that any of the above impacts would occur, mitigation measures could be considered and employed. Alternate locations of the proposed route(s) (in new construction cases) should be considered, however it is possible that no other route is physically feasible.

Road construction and use for larger projects like transmission and pipelines could also potentially affect movement, habitat connectivity and increase mortality. Again, it appears that with the new objectives, standards and guidelines, these effects would be minimal.

Development of oil and gas wells and their associated off lease Special Use and authorized facilities has the potential to impact lynx habitat. While the lynx amendment may increase cost of operation in lynx habitat, it would not prohibit access to federal minerals or prohibit the location of transmission pipelines. It may limit options for locations of facilities.

These activities would be analyzed for the effect on lynx on a case-by-case basis and the standards and guidelines applied at the project level.

Cumulative Impacts For the Action Alternatives

Land Adjustment/Acquisition

All alternatives may limit parcels available for disposal, depending on habitat presence and condition. It may also limit the options for parcels to acquire.

Lands Special Use Authorizations

The Lynx amendment may increase costs for special use facility authorizations.

Under Alternative B, this may limit options for location of access roads, and the authorized facilities. It may limit Forest Service ability to authorize upgrades to roads in areas of private development.

Under Alternatives C, D, and F Guideline **HU G6** allows for use of methods such as fencing or crossings to be used in conjunction with upgrading, rather than guidance to avoid upgrades. More roads could be upgraded using other methods to reduce potential mortality of lynx.

Under Alternative C, Guideline **HU G10** may apply to large scale projects like transmission lines or pipelines, where permanent (life of the Land and Resource Management Plan) conversion to habitat may occur. Costs may increase due to the requirement to “treat” a comparable number of acres of habitat. There may be some adjustments in use or constraints on access roads for authorized facilities. There may be

some limitations or constraints on options for location of facilities such as high voltage transmission lines or large communication sites based on the guidelines on permanent conversion of winter foraging habitat.

Other Lands Activities

The action alternatives would have no effects on the boundary management, title claim resolution, or appraisal activities. It may affect encroachment resolution depending on the degree of ground disturbing activity and access needs.

Minerals

Introduction

Exploration, development, and production of mineral and energy resources, and reclamation of ground disturbing activities are part of the Forest Service ecosystem management responsibility. As such, the Forest Service administers its minerals program to provide commodities for current and future generations commensurate with the need to sustain the long-term health and biological diversity of ecosystems. In doing this, Forest Service policy is to:

Encourage and facilitate the orderly exploration, development, and production of mineral resources from NFS lands, and,

Ensure that exploration, development, and production of mineral resources are conducted in an environmentally sound manner and that these activities are integrated with planning and the management of other National Forest resources. (FSM 2802)

The proposed action provides management direction for mineral development. Specifically the proposed action includes, subject to valid existing rights, the following objectives, standards, and guidelines: **ALL O1, ALL S1, HU O1, HU O5, HU S3, HU G4, HU G5, HU G6, HU G7, and HU G9.**

Affected Environment

Locatable Minerals and Reserved and Outstanding Minerals

The affected Forest areas have had a long history of locatable mineral activity. The “Colorado Mineral Belt” stretches across Colorado from the southwest corner to its north-central border and into the Medicine Bow and Laramie Range Mountains in southern Wyoming. During the 2000 fiscal year, the affected forests processed approximately 34 Plans of Operations and received 220 Notices of Intent to Operate from mineral operators. Access to mineral activity is typically by motorized vehicles using established routes. Any new access required for mineral operations requires a project specific analysis and approval by the authorized officer.

Exploration and mining usually occurs in areas where past mining has occurred and where geologic conditions are conducive to the formation or deposition of mineral deposits. Most locatable mineral activity in the past involved hand prospecting and maintenance of existing facilities. With the recent modification of BLM regulations regarding assessment work for mining claims, mining claimants may now post a holding fee in lieu of doing the required \$100/claim assessment work, thus reducing the level of ground disturbance typically associated with exploration and access. In addition, most on-the-ground activities are usually conducted during the months of May to September because of the elevations and climatic conditions in the area.

Leasable Minerals

Portions of each of the forests lie in areas geologically predisposed to have potential for the occurrence of natural gas and oil. In all cases, development of natural gas and oil (fossil energy) resources is dependent on forest plan management direction for oil and gas leasing and development. Individual forest plans provide details about currently leased areas, unleased areas open for lease nominations, areas with leasing restrictions, and areas unavailable to leasing.

As of August 2001, there were approximately 1.0 million acres under lease for oil and gas, while 830,000 acres were pending for lease within the planning area. Approximately 89,800 acres had been forwarded to the BLM, where most are recommended for leasing. Current leases contain 1,100 oil & gas wells that produced approximately 5.7 million barrels of oil, 13.6 billion cubic feet of gas, and 3.9 million gallons of liquid natural gas. There were approximately 310 wells proposed for drilling on existing leases. The area also contains three underground coal mines, which produced over 61.9 million tons of coal during their 2000 operating year. Total Revenues to the U.S. Treasury for fiscal year 2000 attributed to the energy mineral resources within the project area for rents, royalties, and bonuses are \$59.9 million. Areas covered by leases range in elevation between 5,000 and 11,000 feet.

Medicine Bow National Forest

The geologic environment in which natural gas and oil resources can occur on the Medicine Bow National Forest exists on the western side of the Sierra Madre and the northern and eastern sides of the Medicine Bow Mountains (Holm 1995). The area with natural gas and oil resource potential on the western side of the Sierra Madre is on the eastern edge of the Greater Green River Basin. The richness potential for this area for all hydrocarbon types (oil, natural gas, and natural gas liquids) is low (USDI EA 2003). The area with natural gas and oil resource potential on the northern and eastern sides of the Medicine Bow Mountains is on the southern edge of the Hanna basin and western edge of the Laramie Basin, respectively. The potential for natural gas and oil resource occurrence in these areas is low to moderate (Laramie Basin reference (Wyoming Oil and Gas Resource Assessment (WOGRA), USGS 1995). Some exploration for and development of natural gas and oil resources may occur in the future. Such activity would include wells, and, in the case of production, associated storage and processing facilities, roads, pipelines, and power lines.

Routt National Forest

The geologic environment in which natural gas and oil resources can occur on the Routt National Forest exists on the extreme western side of the forest in the area of the Elkhead Mountains west of Hahns Peak, west of the east boundary of Range 86 West (Holm 1995). This area is on the southeastern flank of the Greater Green River Basin. The richness potential for this area for all hydrocarbon types (oil, natural gas, and natural gas liquids) is low (USDI AE 2003). Limited areas on the east side of the Park Range (that part of the forest in Range 82 West) also have some potential for occurrence of natural gas and oil (USGS 1995). Some exploration for and development of natural gas and oil resources may occur in the future, particularly in the Elkhead Mountains area. Such

activity would include wells, and, in the case of production, associated storage and processing facilities, roads, pipelines, and power lines.

Arapaho-Roosevelt National Forest

The geologic environment in which natural gas and oil resources can occur on the Arapaho-Roosevelt National Forest exists in limited areas along the eastern boundary of the forest and on those areas of the forest in North Park Basin. The eastern area is on the western flank of the Denver-Julesburg (DJ) Basin. The potential for natural gas and oil resource occurrence in this area is low (USGS 1995). Areas of the forest in North Park Basin have low to moderate potential for natural gas and oil resource occurrence (USGS 1995). Some exploration for and development of natural gas and oil resources on the Arapaho-Roosevelt National Forest may occur in the future. Such activity would include wells, and, in the case of production, associated storage and processing facilities, roads, pipelines, and power lines.

Pike-San Isabel National Forest

The geologic environment in which natural gas and oil resources can occur on the Pike-San Isabel National Forest is limited to the following areas: A narrow strip 3-5 miles wide along the eastern edge of the Rampart Range (Townships 7-15 South); small portions of the Forest north and south of Fairplay (Townships 7-8 South, Ranges 76-77 West and Townships 10-13 South, Range 77 West); a narrow band 2-3 miles wide along the northeastern Wet Mountains from Greenwood to just south of Canon City; a small area west of Spanish Peak in Township 30-32 South, Range 69 East; and the east flank of the Sangre de Cristo Range.⁵

The area along the eastern Rampart Range is currently leased, and proposals for two exploratory wells have been submitted to the Bureau of Land Management and Forest. Other areas of the Forest with geologic potential for occurrence of hydrocarbons may have limited exploration activity in the future. Any development that may occur would include wells with associated storage and processing facilities, roads, pipelines, and power lines.

Rio Grande National Forest

The geologic environment in which natural gas and oil resources can occur on the Rio Grande National Forest occurs across most of the Forest in the following areas: Middle third of the west flank of the Sangre de Cristo Range; northern arm of the Forest west of Bonanza in the Cochetopa Hills and south into the La Garita Mountains east of the La Garita Wilderness; and all of the forest in the Del Norte and Conejos Peak Ranger Districts. Even though most of these areas have rocks of volcanic origin at or near the surface, subsurface data indicate that hydrocarbon-bearing sedimentary rocks lie below the volcanic rocks (Holm 1995).

The area of the Rio Grande National Forest with highest potential for occurrence of natural gas and/or oil lies between Ranges 2-6 East and Townships 32-44 North. This area lies in an identified USGS oil and gas play (the San Juan Sag Play). Eighteen wells have been drilled in this area (some just outside the forest boundary), most of which had some shows of oil and/or gas, and one of which produced oil for a brief time. The area is open to leasing and may experience exploration activity and possible development in the

future. Any development that might occur would include wells with associated storage and processing facilities, roads, pipelines, and power lines.

San Juan National Forest

The geologic environment in which natural gas and oil resources can occur on the San Juan National Forest exists on the southern and western sides of the forest. That part of the forest generally within Townships 33-35 North and Ranges 2 East to 6 West is in the northern part of the San Juan Basin. The richness potential for this area is low for oil and moderate to high for natural gas (USDI AE 2003). Much of the area is under lease, and the potential for development of natural gas is high, with some development already having occurred, and proposals for more development currently being analyzed. Development includes wells with associated storage and processing facilities, roads, pipelines, and power lines.

That part of the forest generally within Townships 36-42 North, Ranges 10-17 West is in the eastern part of the Paradox Basin. The richness potential for this area for all hydrocarbon types (oil, natural gas, and natural gas liquids) is low (USDI AE 2003). Some exploration for and development of natural gas and oil resources may occur in the future. Such activity would include wells, and, in the case of production, associated storage and processing facilities, roads, pipelines, and power lines.

Grand Mesa, Uncompahgre and Gunnison National Forests

The geologic environment in which natural gas and oil resources can occur on the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests is in the areas of the Grand Mesa and West Elk areas; the Uncompahgre Plateau; and the area west of Telluride and north of the San Miguel Mountains. The Grand Mesa/West Elk area is in the southern Piceance Basin. The richness potential for this area is low for oil and low to moderate for natural gas (USDI AE 2003). The extreme western side of the Uncompahgre Plateau and the area south and west of Telluride are in the Paradox Basin. The richness potential for these areas is low for all hydrocarbon types (USDI AE 2003). Some parts of the forest on the Grand Valley and Paonia Ranger Districts (Grand Valley/West Elk area) are under lease, and minor production of natural gas has been established. The potential for exploration for natural gas is high, with uncertain potential for discovery and development of economically producible resources. Any development that might occur in the future would include wells with associated storage and processing facilities, roads, pipelines, and power lines.

White River National Forest

The Forest has two areas in which long-term natural gas production occurs: Divide Creek Unit and Wolf Creek Unit, which are located south of Silt and west of Carbondale, respectively. The Divide Creek Unit has been producing natural gas since the early 1950s. The Wolf Creek Unit has been converted to a natural gas storage unit that provides the Roaring Fork Valley with natural gas.

The National Energy Policy identified the White River NF as being geographically located in one of the five "priority areas" identified by the Administration. Potential for oil and natural gas in the identified areas are considered high, with uncertain potential for discovery and development of economically producible resources. Any development that

might occur in the future would include wells and associated storage and processing facilities, roads, pipelines, and power lines.

Salable Minerals

Over 2.16 million tons of mineral materials were disposed of from the affected area during 2000 and 1.51 million tons during 2001. Most of the disposals came from existing pits and disturbed areas located adjacent to existing roads. Pit size ranged up to about five acres. The disposals had a gross value in excess of \$980,000 in 2000 and \$1.07 million in 2001. By authority of the Act of May 23, 1908, 25 percent of the total yearly receipts go back to the State where the disposal occurred for distribution to local county budgets for schools and road construction and maintenance.

Activities typically associated with the removal of salable minerals may include hand collecting from the surface, excavating, crushing/processing, and transportation of the materials to the use area. On occasion, blasting may be used to fracture durable rock deposits for excavation. Collecting or permitted sites are generally less than one acre with very little ground disturbance, but may range up to five acres. On rare occasions sites may exceed five acres in size. They are usually existing or previously used sites, located adjacent to existing roads. Most rock collecting and sales occur during the summer months when construction activity in developed areas is at its highest. The largest users of salable mineral commodities in the region are the State Departments of Transportation through the Federal Highways Administration for use in highway maintenance and reconstruction.

Environmental Consequences

Impacts of future mineral activities on lynx and lynx habitat cannot be specifically identified or evaluated at this level because future mineral activities are unknown. However, applying the identified standards and guidelines to future proposals is expected to result in little or no impact to the oil and gas resources.

Effects Common to All Alternatives

All action alternatives emphasize the protection of lynx and lynx habitat by implementing additional standards and guidelines for mineral activities. Implementing these standards and guidelines would not prohibit mineral activity to occur, but may increase the operating cost for activities in lynx habitat or linkage areas by setting timing and access restrictions and possibly additional surface disturbances. Under Alternative D, several standards related to risk factors that were found not to be a threat to lynx populations are provided as guidelines. In addition, **ALL S1** provides management flexibility for fossil fuel development.

Development of the mineral resources occurring in lynx habitat can alter small areas of lynx habitat. Of greater importance though, may be the roads constructed to access mineralized areas during the exploration phase. While road construction and surface disturbance associated with mineral activities (exploration, development, and leasing) may impact lynx habitat, these impacts would be short term. Most mineral operations are

exploratory activities which last one season or less. Producing wells often have an operation life of twenty or more years. For the producing wells disturbance would be anticipated from maintenance of facilities and traffic along roads. Reclamation of roads and other disturbances is required by regulation, and incorporated into approved reclamation plans for wells or mines at abandonment or closure (**HU G5**). Designing and constructing new roads off of ridge tops and out of saddles or important lynx habitat or linkage areas, when feasible, may affect the location or alignment of roads needed for access to mineral sites and increase the amount of disturbance by requiring additional miles of road construction to reach the target site (**HU G7**). This would also affect the economics of the mineral activity by increasing the cost of building and reclaiming the additional road.

The Forest Service would work with oil and gas operators to encourage the use of remote monitoring methods for facilities and production sites, where feasible, during the winter months, to minimize snow compaction impacts on the lynx (**HU G4**). Remote monitoring of a site could, however, increase the cost of operating the site by the operator due to the expensive equipment needed and use of satellite technology. Current leasing decisions would not need to be modified to implement this guideline.

Alternative A- No Action

Direct Effects

Under the No Action Alternative, there would be no change from current practices or processes that include the protection of wildlife (Threatened or not). Mineral activities would continue to be evaluated and processed following the regulations and current Forest Plan direction. The No Action Alternative does not address lynx and mineral activity directly but protection of wildlife species (whether listed or not) and their habitat is provided through the application of the Forest Service regulations for locatable minerals through the protection and rehabilitation of wildlife habitat (36 CFR 228, Subpart A, 228.8), or the regulations for Oil and Gas Resources (36 CFR 228, Subpart E, 228.108), requiring operators to comply with the Endangered Species Act (1973) while conducting their operations. Impacts to, and protection requirements or mitigation for a concerned species are identified in project level analysis and decisions involving site-specific disturbance for all mineral operations. Additionally, these regulations require that roads and surface disturbances authorized for mineral operations be reshaped and revegetated at closure or abandonment. The authorized officer responsible for mineral activities has the discretion to close access routes to the public without impacting the mineral operator.

While not specific to lynx, most Forest Plan decisions incorporate Regional Standards and Guidelines that also provide emphasis and direction for reclaiming disturbances resulting from mineral operations by following existing landform and vegetation characteristics as much as feasible (**HU G5**).

Locatable Minerals and Outstanding and Reserved Minerals

The effects on locatable or reserved and outstanding mineral resources are directly related to the constraints placed on the development of those resources, e.g., the mitigation

measures required to be incorporated into plans for locatable mineral development designed to protect habitat for the lynx and its prey.

Leasable Minerals

Leasing and development of minerals subject to the mineral leasing laws would continue under the guidance of the regulations and existing Forest Plans and leasing decisions approved. Existing standards and guidelines and lease stipulations would be applied to new leases issued under these decisions. Existing leases would continue in effect as issued, granting the lessee the right to explore for and develop resources within lease boundaries, subject to lease terms, conditions, stipulations, and applicable laws.

Salable Minerals

Mineral materials would continue to be disposed of under current Forest Plan direction and regulation. NEPA compliance, addressing environmental issues, impacts to threatened, endangered, and sensitive species and their habitats would be completed for each disposal. Necessary mitigation would be included with each authorization/contract for disposal as needed.

Indirect Effects

There could be indirect effects on local communities' operating budgets based on the receipts to the United States from rentals and royalties of mineral leases and the sales of mineral materials produced. These receipts would be expected to continue at the same rates and amounts currently occurring.

Alternatives B-Proposed Action, and C

Direct Effects

Locatable Minerals and Outstanding and Reserved Minerals: Implementation of standards and guidelines is not expected to have much effect on the exercise of mineral rights under the 1872 Mining Law, as amended, or reserved or outstanding rights on federal lands.

Most exploration activities would not experience any additional restrictions, as drilling and trenching are typically not done in the winter when snow compaction would be a problem. These are typically short term in duration, using existing roads for access. If new mine development is proposed for an area in lynx habitat, it is possible that modifications or realignment of road locations or additional mitigation identified in a site-specific project analysis would be required to fully protect lynx and its habitat. This could have a resulting effect of higher project costs and may delay some activities, but would not preclude prospecting, exploration and development.

Leasable Minerals: Implementing the action alternatives may affect leasable mineral resources, particularly oil and gas operations, by requiring new or additional surface occupancy restrictions (i.e., no surface occupancy, timing restriction, or controlled surface use) on lands within lynx habitat and/or linkage areas available for leasing, and increase the cost of operations on a mineral lease.

The proposed standards and guidelines were analyzed to determine if lease stipulations were necessary to meet the protections defined in the standards and guidelines. Protection such as restrictions on road use, and encouraging remote monitoring could be applied as Conditions of Approval at the time an Application for Permit to Drill is processed. When lease proposals are received from the BLM, the Forest would conduct required reviews to determine if leasing of proposed areas is consistent with the Forest Plan and leasing decision and to determine if there is any significant new information that was not considered in this amendment or Oil and Gas Leasing FEIS.

If operations such as exploratory wells were proposed on an existing lease, additional NEPA analyses would be completed as required by 36 CFR §228.107 with additional mitigation measures, if necessary, for protection of the lynx and its habitat. Limiting winter use of roads in lynx habitat to designated or approved routes for access associated with oil and gas exploration and development may reduce potential impacts on lynx, but may not impact the operator unless the use were not allowed (**HU S3**).

Geophysical exploration for oil and gas typically precedes the drilling of wells to help define geologic structures and potential reservoir traps for hydrocarbons. The activities would be analyzed for the effect on lynx on a case-by-case basis as proposals are received, and the standards and guides applied at the project level. Development and production stages may experience some restrictions because winter access is usually required during these stages. In some cases, ease of movement across frozen ground makes winter exploration attractive. This does not mean that the activity would not be approved. However, it is possible that if a proposed mineral area were in lynx habitat, modifications or realignment of location, or additional mitigation or stipulations to fully protect lynx and its habitat would be required. This could have a resulting effect of higher project costs and may delay activity, but would not preclude prospecting, exploration and development of the resource.

Salable Minerals: Effects on future disposals of salable mineral resources would be minimal because the majority of such disposals are from existing sites or pits, accessed by existing roads. Developments of new material sites less than five acres may not be impacted by the proposed action because these sites typically result in minimal disturbance. However, if a new site were proposed within lynx habitat that exceeds five acre in size, NEPA requirements would be completed together with any necessary consultation with the U.S. Fish and Wildlife Service. Activities associated with these mineral disposals are most often conducted during the summer months.

Although the decision to dispose of salable minerals is discretionary, decisions to not dispose of the materials would preclude development of the resource for public use projects such as highway reconstruction under the Federal Highways Administration. This would increase the costs to the States and local governments for maintenance and reconstruction because other material sources, usually from private sources located further from the project site, would be utilized. The costs of transportation and development may increase.

Indirect Effects

There may be indirect effects on local communities' operating budgets based on the receipts to the United States from royalties from mineral leases and the sales of mineral materials produced. It is expected that less than five percent of the payments from mineral material disposals to local communities may be affected. Indirect effects on mineral leases cannot be determined at this level of analysis

Alternative D

Direct Effects

Effects would be similar to those described under Alternative A for leaseable minerals. Effects would be similar to those described under Alternative B for locatable and salable mineral resources. Under Alternative D several standards related to risk factors that were found not to be a threat to lynx populations are provided as guidelines. In addition, ALL S2 may provide additional management flexibility for fossil fuel development.

Indirect Effects

Effects would be similar to those described under Alternative A for leaseable minerals. Effects would be similar to those described under Alternative B for locatable and salable mineral resources.

Alternative F

Direct Effects

Effects would be similar to those described under Alternative B for leasable Minerals. Under Alternative F several standards related to risk factors that were found not to be a threat to lynx populations are provided as guidelines.

Effects would be similar to those described under Alternative B for locatable, saleable, and reserved and outstanding minerals. Under Alternative F several standards related to risk factors that were found not to be a threat to lynx populations are provided as guidelines.

Indirect Effects

Effects would be similar to those described under Alternative B for leasable minerals.

Effects would be similar to those described under Alternative B for locatable, saleable, and reserved and outstanding minerals.

Cumulative Effects

Applying standards and guidelines that may discourage, if not prohibit mineral development over a number of areas would cumulatively affect and local communities by reducing the number of jobs related to the mineral exploration and development (both

directly and indirectly), increasing the prices paid for imported products, and reducing the currently available mineral reserves.

Effects on Federal lands, other than the National Forests, should be minimal since most of these lands are lower in elevation with little lynx habitat. The Bureau of Land Management is currently reviewing their land management planning authorizations to ensure they cover impacts to lynx and lynx habitat. They would continue to approve operations proposed under the US Mining Laws, as amended, but may modify decisions relevant to mineral leasing and mineral disposals under their jurisdiction.

Transportation

Introduction

The Road Management Policy (issued on January 12, 2001) defines specific requirements in Forest Service Manuals 7700 and 7710.

Affected Environment

The Forest Service maintains and administers about 23 thousand miles of classified roads on these forests. New roads may be planned to support a specific purpose or use, such as access to a recreation area or a timber sale. There have been very few miles of new NFS roads constructed in these Forests in the last several years (19 miles in the last three years). Between the years 2000-2004 in Region 2, only sixteen miles of new classified road, and eighteen miles of temporary road, were planned for construction on these Forests. However, in the past three years road density has been reduced in these Forests by the decommissioning of 646 miles of road.

Road densities in LAUs give an indication of the extent of the roads system potentially affected by these new standards and guidelines. These Forests have a relatively small number of Maintenance Level 2 - 5 roads in LAUs (only about one-half mile of road per square mile of LAU). In addition, the amount of miles of paved roads within LAUs ranges from 1 to 12 miles per forest.

Highways

Table 3- 29 lists the highway routes that may impact the Lynx in terms of accident mortality and habitat fragmentation.

Table 3- 29 - Highways, By Route Number in LAUs

State	Interstate Highways	U.S. Highways	State Highways
Colorado	I-70	6, 24, 34, 40, 50, 160, 285, 550	7, 9, 65, 82, 90, 91, 103, 114, 125, 127, 133, 134, 145, 149
Wyoming	N/A	N/A	13, 70, 130

Environmental Consequences

Alternative A — No Action

This alternative would not impose additional costs related to Lynx crossings or locating new roads away from LAUs, or impose additional constraints (beyond those required in the Roads Management Policy) for improving or constructing roads.

Alternative B

Construction or reconstruction of roads in lynx habitat or linkage areas would be subject to specific standards and guidelines that address protection of lynx and lynx habitat. These standards and guidelines would expand and reinforce the recent policies aimed at generally increasing environmental considerations of the impacts of all roads.

Applicable proposed standards and guidelines are: **ALL S1, ALL G1, HU G6, HU G7, HU G8, HU G9, and LINK S1.**

Effects on National Forest System Roads

Standard **ALL S1** would require new road and existing road plans to provide for lynx movement. This is not expected to prevent most road improvements; however, this would lead to increased costs to mitigate the negative effects on lynx habitat. This is also addressed by guideline **HU G6**.

Guideline **HU G6** direction to avoid the upgrading of unpaved roads could constrain NFS road projects from making needed safety and environmental improvements to roads in LAUs. This could adversely affect public through-traffic in the forests, recreational access, and commodity removal.

Guideline **HU G7** direction to locate any new permanent roads in lynx habitat would be subjected to considering alternatives to locating roads on ridge-tops and saddles, and through forested stringers. Any impacts would have to be evaluated to determine whether they could be avoided or mitigated. This could increase costs for alternate road locations.

Guideline **HU G8** road management considerations would include the location and extent of roadside brushing on low-speed and low-volume Forest Service roads. Once the affected locations are determined, appropriate standards for providing public safety and minimizing impacts on lynx could be developed and incorporated into the road maintenance standards for that road.

Guideline **HU G9** directs that new roads should include a plan for closure and obliteration. This should have no impacts for the roads. However, many recreational drivers may view new roads for project specific purposes as additional access routes. A plan for the construction, operation, and closure/obliteration of these roads could be required as part of the permit. This should have no impact on the intended use of these roads during the permitted period. However, this could present problems for enforcement after closure.

Highways

The Colorado Department of Transportation (DOT) and Wyoming DOT are both coordinating with the U.S. Fish and Wildlife Service on Memorandums of Understanding (MOUs) to reduce Lynx mortality, and to improve Lynx crossing opportunities.

Guideline **ALL G1** directs that highway project proposals need to propose project features and techniques to reduce Lynx mortalities. Additional time and cost would be required, amounts would be site-specific.

Objective **HU O6** directs coordination with the Colorado DOT and Wyoming DOT on highway projects to evaluate providing or improving wildlife crossings to reduce lynx mortality and impacts to linkage areas. Additional time and cost would be required, and amounts would be site-specific.

Standard **Link S1** would require the Federal Highway Administration (FHWA), Colorado DOT and Wyoming DOT to identify potential wildlife crossings to reduce the

impacts of highway projects to lynx mortality and linkage areas on projects that affect NFS lands. Additional time and cost would be required, and amounts would be site-specific.

Alternatives C, D and F

Alternatives C, D and F are similar as Alternative B, except for **HU G6**.

These alternatives change the “should be avoided” philosophy to “apply techniques to avoid or reduce effects”.

Guideline **HU G6** would reduce the potential constraints on NFS road projects, and allow more flexibility in making needed safety and environmental improvements. Additional time and cost may be required, but less than Alternative B.

Summary

Direct Effects: Minor effects to existing road system and resource programs served are anticipated.

Indirect Effects: Effects would be mainly on traveling public, especially if improvements for safety and capacity are constrained due to increased costs.

Cumulative Effects: The lynx amendment would affect new road construction, road reconstruction, changes in use of existing roads, and roadside maintenance. The impact on the road system would be relatively minor. There may be some adjustments in use or constraints on specific roads as a result of changes in management use allocations for various resources to better protect lynx and lynx habitat. These standards and guidelines, in conjunction with the Road Management Policy, could affect some specific roads, but site-specific analysis (including Roads Analysis Process), would be required to determine whether it precludes the actual construction or improvement of an individual road, and the intended management action the road supports.

There would be some additional time and cost to evaluate and implement road features and locations to avoid or reduce effects on lynx and lynx habitat. However, the miles of affected roads would be relatively small, and the overall impact to road activities related to lynx conservation would be minimal as a result of the adoption of the standards and guidelines contained in this document. Most of the actions identified are already required under current Forest Service policies and procedures.

Heritage Resources

Heritage resources include areas, sites, buildings, art, architecture, memorials, and objects that have scientific, historic, or cultural value. They link people to their cultural history, provide insight into how people lived in the past, and reveal past and ongoing relationships between people and the natural world.

The National Historic Preservation Act, 1966 and subsequent amendments (NHPA), and its implementing regulations require that federal agencies consider the effects of their undertakings on historic properties. The term “historic properties” refers to cultural properties that have been determined eligible for the National Register of Historic Places (NRHP). Federal agencies must also consider American Indian traditional use, belief system, religious practices, and lifeway values as directed by the Archeological Resource Protection Act of 1979, NHPA, and Repatriation Act, and the American Indian Religious Freedom Act (AIRFA). Traditional American Indian cultural properties and natural features are potentially eligible for listing on the NRHP. Contemporary use sites for traditional or cultural purposes are provided protection under AIRFA.

As required by NHPA, and practiced in the Rocky Mountain Region, project specific areas are subject to survey, identification of resources, determination of eligibility, evaluation of effect, consultation, and resolution of adverse effects (if any) at the time that specific project areas have been identified. Under each future site-specific management proposal, a cultural inventory of some degree and measure would be necessary to prevent further damage, mitigate unforeseen damage, and prevent future impacts to sites.

Conservation of sensitive, threatened, or endangered species habitat, and reintroduction of endemic or native species into their historical habitats in ways that do not involve surface disturbance, does not have the potential to affect historic properties. There are no known cumulative effects to heritage resources from any alternative.

Social and Economic

Affected Environment

Many communities throughout the rural West are dependent upon National Forests for their identity and livelihood. The social and economic analyses that follow estimate potential effects of the alternatives in western Colorado and southern Wyoming, as well as financial effects to the agency.

Analysis area

The proposed action provides management direction for affected lynx habitats on lands within seven National Forests in Colorado and Wyoming. Based on the large area and the magnitude of potential impacts, two impact areas were identified. The first covers the area around the Medicine Bow-Routt National Forests in southern Wyoming and northern Colorado. Two counties in Wyoming (Albany and Carbon) and three in Colorado (Jackson, Moffat, and Routt) make up the first impact area. The second area includes counties in rural, western Colorado that have connections with the Arapaho-Roosevelt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, Rio Grande, San Juan, and White River National Forests. The San Juan National Forest area was excluded from the analysis area because estimated thinning activities would not change among alternatives. Metropolitan counties containing Front Range cities and Grand Junction were excluded so that small impacts would not be dwarfed by the sizable population and economies of those areas. Thirty counties were included in the area. They are:

Alamosa	Eagle	Lake	Rio Grande
Archuleta	Fremont	Mineral	Saguache
Chaffee	Garfield	Montezuma	San Juan
Conejos	Grand	Montrose	San Miguel
Costilla	Gunnison	Ouray	Summit
Custer	Hinsdale	Park	Teller
Delta	Huerfano	Pitkin	
Dolores	La Plata	Rio Blanco	

There are many small communities and local economies within this large area of western Colorado. The size and dispersion of potential impacts suggested that smaller areas would not result in more definitive impact results.

Economic Environment

The two analysis areas are different culturally and economically. The social environment within the western Colorado analysis area ranges from small, rural communities with long-standing traditions and families that go back generations to cosmopolitan resort communities that embrace the latest trends and residents who may settle in for a few years before moving again. The Medicine Bow-Routt analysis area shares an equally

broad spectrum of communities, but is more strongly oriented toward the traditional ways of life.

The Medicine Bow-Routt area is very rural, strongly agricultural, and relies upon the National Forests for timber and forage. Although it is changing with the rest of the Rocky Mountain west, this area continues the historic relationship between rural western communities and traditional use of public lands. The thirty-county area in Colorado generally differs from the Medicine Bow-Routt area, but by no means is homogeneous in its makeup. Colorado has been affected significantly by migration from both the West and East Coasts. Portions of the analysis area had some of the highest population growth rates in the nation during the 1990s, and should experience sizable immigration by retirees over the next decade. Timber and agricultural economies have generally given way to second homes and strong tourism orientations. Coastal migrants have claimed western Colorado as their new residence while retaining business relationships in other parts of the country. Land prices have soared along with demands for local services. The cost and availability of housing for retail and service workers has become the leading social issue in many communities. A notable exception to this characterization is the San Luis Valley, which includes the Rio Grande National Forest. The Valley is dominated by agriculture and a Hispanic culture that dates from the early 1500's. In contrast to the wealth of many mountain resort towns, the San Luis Valley has some of the poorest communities in the state. Table 3- 30 includes population and age measures for the two areas. Most notable is the contrast of a younger denser population found in western Colorado. This could change markedly as retirees find their way to West Slope communities over the next decade.

Table 3- 30 - Selected Descriptors of the Impact Areas, 2003

Descriptor	Medicine Bow-Routt NF Area	Western Colorado Area
Area (sq mi)	20,889	43,591
Population	83,083	789,667
Households	18%	23%

Source: Census Bureau

Table 3- 31 summarizes the employment and income characteristics of the impact areas by industry, and shows that the two areas are quite different culturally and economically. The Medicine Bow-Routt area is relatively strong in mining, government, and professional/health/social services. These last two sectors are a likely reflection of the University of Wyoming in Laramie. The Western Colorado area is relatively strong in tourism-related sectors, such as arts/entertainment, accommodations/food service, and finance/real estate. Tourism is very diverse throughout the area, ranging from world-class destination resorts to more rural areas that focus on backcountry recreation. The general characterizations of each impact area should not be understood as applying to local conditions when viewing each area in more detail.

Table 3- 31 - Employment and Income by Industry in Impact Areas, 2003

Industry	Medicine Bow-Routt Area		Western Colorado Area	
	Employment	Labor Income	Employment	Labor Income
	(Jobs)	(\$ Million)	(Jobs)	(\$ Million)
Agriculture & forestry	2,414	20.9	16,400	261.7
Mining	1,497	112.2	4,529	402.3
Construction	5,707	228.8	33,081	1,422.9
Manufacturing	1,315	63.9	5,966	222.6
Transport, Warehousing, & Utilities	1,683	95.1	6,375	296.5
Trade	7,078	181.3	35,784	1,039.7
Finance, insurance, & real estate	4,821	108.0	25,600	921.2
Professional, admin, health & social services	8,602	272.7	39,583	1,468.9
Arts, entertainment, & recreation	2,255	58.1	17,059	446.7
Accommodation & food services	5,595	78.2	36,870	707.7
All other	3,813	91.4	27,462	667.9
Government	11,178	436.0	44,626	1,839.5
Total	55,958	1,746.7	293,337	9,697.5

Source: IMPLAN, 2003 data set

Social Environment

Concerns expressed by the public in response to scoping of the proposed action ranged from strong opposition to strong support. Some commenters felt the proposal would reduce motorized recreation opportunities and be unfair to the elderly, disabled and families with young children. Others felt the proposal might close family-oriented recreation opportunities such as mushrooming, cross country skiing and snowmobiling. Still others expressed concerns regarding loss of access to NFS lands.

Environmental Justice A specific consideration of equity and fairness in resource decision-making is encompassed in the issues of environmental justice and civil rights. As required by Executive Order 12898, all federal actions must consider potentially disproportionate effects on minority or low-income communities. Principles for considering environmental justice are outlined in Environmental Justice Guidance under the National Environmental Policy Act (Council on Environmental Quality 1997).

Table 3- 32 provides demographic statistics for counties in both impact areas. Residents of Hispanic origin are the largest minority in both areas. They make up sixteen percent in western Colorado and eight percent in the Medicine Bow Routt area. Hispanics have been the fastest growing minority in the Rocky Mountain West since 1990. Residents who are American Indian and Asian/Pacific Islander are twice as common in the Medicine Bow Routt area as they are western Colorado, but do not constitute large minority populations

in either impact area. These general representations do not hold when examining details at the county level.

The Ute Mountain and Southern Ute Reservations in southwestern Colorado (Montezuma and La Plata Counties) are home to the largest population of American Indians in the western Colorado area. Albany County is home to the largest population of American Indians in the Medicine Bow Routt area, most likely due to the University of Wyoming in Laramie.

Low-income populations are more difficult to determine in the planning areas. The high cost of living, somewhat higher wages, and many seasonal workers in resort communities render typical poverty statistics as poor metrics for identifying those with low incomes. Despite these conditions, the only common denominator for expressing low-income population is the U.S. Census Bureau measure of poverty.

Table 3- 33 shows the number and percent of persons in each analysis area that have income below the poverty level in 2004, the latest year available. The average poverty rate in the Medicine Bow Routt and Western Colorado analysis areas were nearly identical at 10.9 and 10.7 percent, respectively. This is less than the 12.7 percent rate for the US, but more than the statewide rates of 10.2 percent in Colorado and 10.3 percent in Wyoming. The rate in parts of southern Colorado is quite a bit higher than these averages. As shown below, five of six counties with the lowest poverty rates in the state are located in the San Luis Valley. In contrast, poverty rates are the lowest in resort counties along and near the I-70 corridor. Lake County, which is home for many service workers in Summit and Eagle Counties, shows a poverty rate that is higher than the area average. Median household income is a related measure to poverty, and moves inversely with the poverty rate. On average, median household income is two percent higher in the Western Colorado area than the Medicine Bow Routt area, but spans a very wide range from a low of \$22,165 in Costilla County to \$60,662 in Pitkin County.

Table 3- 32 - Population by Race and Hispanic Origin, 2000

Impact Area/ County	Total Population	Single Race Only					Two or More Races	Hispanic Origin (of any race)
		White- Other Non- Hispanic	White- Other Hispanic Origin*	Black/ African American*	American Indian & Alaska Native*	Asian/ Pacific Islander*		
Medicine Bow- Routt	81,269	71,929	4,152	510	3,557	830	1,520	6,472
Percent of Total	100.0%	88.5%	5.1%	0.6%	4.4%	1.0%	1.9%	8.0%
Albany	31,313	27,399	1,190	344	3,131	564	689	2,348
Carbon	15,505	12,776	1,194	109	202	124	326	2,140
Jackson	1,577	1,452	88	4	12	1	20	103
Moffat	13,184	11,628	1,131	28	116	47	234	1,247
Routt	19,690	18,674	549	25	96	94	252	634
Western Colorado	295,548	234,064	43,704	1,530	7,929	1,439	6,882	48,491
Percent of Total	100.0%	79.2%	14.8%	0.5%	2.7%	0.5%	2.3%	16.4%
Alamosa	14,966	8,127	5,571	145	350	150	623	6,197
Archuleta	9,898	7,946	1,487	35	139	34	257	1,659
Chaffee	16,242	14,191	1,264	257	177	79	274	1,393
Conejos	8,400	3,297	4,621	18	142	19	303	4,949
Costilla	3,663	1,038	2,272	29	91	42	191	2,476
Custer	3,503	3,302	82	13	39	10	57	88
Delta	27,834	23,969	2,903	146	211	96	509	3,171
Dolores	1,844	1,712	56	1	36	8	31	71
Eagle	41,659	30,930	9,126	142	296	372	793	9,682
Fremont	46,145	37,430	4,445	2,464	706	258	842	4,776
Garfield	43,791	35,478	6,777	196	310	226	804	7,300
Grand	12,442	11,592	496	60	54	97	143	543
Gunnison	13,956	12,899	571	68	98	80	240	700
Hinsdale	790	764	8	0	12	2	4	12

Impact Area/ County	Total Population	Single Race Only					Two or More Races	Hispanic Origin (of any race)
		White- Other Non- Hispanic	White- Other Hispanic Origin*	Black/ African American*	American Indian & Alaska Native*	Asian/ Pacific Islander*		
Huerfano	7,862	4,604	2,501	216	212	37	292	2,763
Lake	7,812	4,810	2,657	14	98	28	205	2,823
La Plata	43,941	36,270	3,806	136	2,539	201	989	4,571
Mineral	831	793	13	0	7	0	18	17
Montezuma	23,830	18,514	1,976	33	2,676	63	568	2,263
Montrose	33,432	27,571	4,423	102	340	163	833	4,967
Ouray	3,742	3,488	137	3	35	15	64	152
Park	14,523	13,452	534	72	134	64	267	628
Pitkin	14,872	13,499	882	79	40	173	199	973
Rio Blanco	5,986	5,552	256	11	46	17	104	296
Rio Grande	12,413	7,034	4,805	43	157	31	343	5,172
Saguache	5,917	3,067	2,512	7	122	27	182	2,678
San Juan	558	510	36	0	4	3	5	41
San Miguel	6,594	5,984	408	19	56	54	73	439
Teller	20,555	19,130	565	113	200	136	411	718

*Persons may be of Hispanic Origin

Table 3- 33 - Estimates of All Ages in Poverty and Median Household Income: 2003

Impact Area/County	Total Population	People of All Ages in Poverty		Median Household Income Dollars
		Number	Percent	
Medicine Bow - Routt	79,066	8,644	10.9	42,949
Albany, WY	28,789	4,232	14.7	34,627
Carbon, WY	14,525	1,714	11.8	40,750
Jackson, CO	1,442	173	12.0	33,476
Moffat, CO	13,326	1,266	9.5	46,102
Routt, CO	20,983	1,259	6.0	54,539
Western Colorado	489,704	52,426	10.7	43,731
Alamosa	14,359	2,757	19.2	31,587
Archuleta	11,868	1,258	10.6	40,592
Chaffee	15,595	1,809	11.6	37,226
Conejos	8,503	1,624	19.1	27,077
Costilla	3,424	767	22.4	22,165
Custer	3,860	413	10.7	40,332
Delta	29,288	3,661	12.5	35,280
Dolores	1,825	208	11.4	32,357
Eagle	47,283	2,837	6.0	59,037
Fremont	38,627	5,485	14.2	35,129
Garfield	49,341	4,046	8.2	50,119
Grand	13,208	951	7.2	49,907
Gunnison	13,325	1,519	11.4	38,979
Hinsdale	769	60	7.8	38,891
Huerfano	6,873	1,354	19.7	26,649
Lake	7,678	883	11.5	36,033
La Plata	45,990	4,737	10.3	44,078
Mineral	933	84	9.0	39,725
Montezuma	24,462	3,547	14.5	34,416
Montrose	37,254	4,396	11.8	40,234
Ouray	4,264	307	7.2	47,424
Park	16,920	1,269	7.5	52,684
Pitkin	14,783	680	4.6	60,662
Rio Blanco	5,835	531	9.1	43,501
Rio Grande	12,104	1,973	16.3	34,680
Saguache	7,022	1,594	22.7	23,638
San Juan	570	77	13.5	32,057
San Miguel	7,190	568	7.9	46,891
Summit	24,661	1,455	5.9	52,220
Teller	21,889	1,576	7.2	53,787

US Census Bureau, SAIPE

Environmental Consequences

Employment and Income

Employment and income are common measures for gauging the economic impact of public land management decisions. Effects can be categorized as direct and secondary. Direct effects are those changes associated with the initial expenditures – either by the agency or through sales by local businesses. Secondary effects result from the subsequent rounds of spending within the economy by contractors, businesses that provide goods and services to thinning contractors, and employees of all such businesses.

Comments on the Draft and Supplemental Draft Environmental Impact Statements included concerns about adverse impacts to local economies. These comments cited restrictions on land management activities that would in turn cause recreation use would drop. As stated in the Recreation section of this chapter, changes in recreation use could not be estimated. More specifically, summer recreation use, winter non-motorized recreation use, and downhill skiing use would be unaffected. Winter motorized recreation use (snowmobiles) might see future growth somewhat moderated. These very general and non-quantified portrayals of minor recreation effects do not permit a meaningful economic impact analysis for recreation use for either the two large analysis areas or more local areas.

In other parts of this FEIS, numerous references were made to increased costs for some businesses holding special use permits, such as ranches and ski areas. The purpose of those narratives is to alert the reader to potential business effects. The likelihood and magnitude of the potential cost increases, as well as their larger economic effects, are impossible to assess at the scale of this FEIS. Only if and when project-level specifics are known could impacts to permit holders be quantitatively estimated. NEPA does not require the disclosure of impacts to individual firms, but does require disclosure when communities may be affected.

Forest thinning activities are presented in the Forest Vegetation and Timber Management section of this FEIS. About 45 percent of all thinning activities are done for timber management purposes; these are discussed below. The balance of thinning actions is done to reduce wildfire fuels, especially in the wildland-urban interface where a large fire can be devastating to communities. As discussed in the Fuels, Fire, and Fire Ecology section of this FEIS, these activities may be limited under some alternatives. Because wildfires can have very significant social and economic consequences, the potential limitation of fuel reduction activities is of vital interest to many communities and land owners. Estimating the probable social and economic impacts of fuels treatments requires very site-specific information. Only more general programmatic data are available for this analysis. Therefore, the social and economic implications in this FEIS must be limited to general recognition that greater restrictions on fuels reduction activities, such as those found in Alternatives B and C could ultimately have effects on potential wildfire losses in communities within the wildland-urban interface. The magnitude and location of potential losses cannot be determined in this FEIS.

Private and other public lands that are adjacent to national forests in the two analysis areas could experience similar effects to those disclosed above. These effects should be limited to 1) the convenience of neighboring areas which may not be able to increase the amount of motorized recreation opportunities and 2) the amount of fuels reduction activities in lynx habitat. The juxtaposition of private and other public lands to national forest lands with lynx habitat may be the most important factor in locating potential effects by alternative for individual landowners. The very site-specific nature of these effects is beyond the scope of this FEIS.

Just under half of all thinning activities are done for timber management purposes. The timber program causes economic effects through either precommercial thinning paid for by the Forest Service or by the sale of national forest timber. Precommercial thinning carried out by independent contractors is the basis for estimating job and labor income effects shown below. The effect of thinning on commercial timber sale volumes would not happen for many decades – well beyond the 2007-2011 analysis timeframe used in this analysis. The implication of potential commercial timber sale volume upon the timber industry many decades from now is speculative at best, and therefore not addressed. The benefits and costs of future commercial timber sale volume are addressed, however, in the Financial/Economic Efficiency subsection later.

Estimates of thinning are found in the Forest Vegetation and Timber Management section of this FEIS. The typical cost of thinning one acre in the Rocky Mountain Region currently ranges from \$150 to \$180. Historically, half of all thinning contractors doing work for the USDA-Forest Service in this region are based outside Colorado and Wyoming. Some are based outside the Western US. Based on this information, the following employment and income effects were estimated. (See Table 3- 34)

Table 3- 34 - Annual Employment and Income Effects by Impact Area, 2007-2012

Measure/Analysis Area	A	B	C	D	F	Change from A			
						B	C	D	F
Employment (Jobs)									
Medicine Bow-Routt	2	1	1	1	-1	-1	-1	2	1
Western Colorado	5	3	3	3	-2	-2	-2	5	3
Rest of U.S.	7	4	4	4	-3	-3	-3	7	4
Labor income (\$1,000)									
Medicine Bow-Routt	\$45	\$31	\$31	\$36	\$36	-\$14	-\$14	-\$9	-\$9
Western Colorado	\$67	\$42	\$42	\$54	\$54	-\$25	-\$25	-\$13	-\$13
Rest of U.S.	\$115	\$73	\$73	\$90	\$90	-\$38	-\$38	-\$25	-\$25

The annual employment and income effects of precommercial thinning activities by the Forest Service are negligible for all alternatives, regardless of analysis area. Because half of the contract work is expected to come from outside the two analysis areas, an equal number of jobs would be sustained elsewhere in the US. Again, these effects are negligible. There is no expectation that the effects would be concentrated in a single community.

Social Effects

Because economic effects of the alternatives are extremely small, it is estimated that social effects—often driven by economic consequences—would be negligible. Social effects include such things as quality of life (including use of the national forests), housing, commuting, social services, and local governments. There is no expectation that these effects would be concentrated in a small number of communities.

Based on average labor income per job derived from Table 3- 34, many affected individuals probably have incomes that are below the area average. While the magnitude of effects is extremely small, it appears that low income individuals could experience disproportionate effects compared with the general population. On the other hand, the seasonality of forestry service jobs rather than low salaries may account for the low averages found in Table 3- 34. The dispersion of these effects across analysis area communities suggests that no single community would bear the effects disproportionately.

Cumulative Effects

Cumulative effects analysis is designed to reveal the context of alternative impacts within the planning area. This is done by comparing total changes in the planning area with each alternative to total changes without any of them. While past actions have set the stage for current social and economic conditions, it is current and reasonably foreseeable actions that strongly influence conditions in the future. Because the direct and indirect social and economic effects are extremely small, it is not likely that they would prompt cumulative effects of any significance in the planning area.

Financial/Economic Efficiency

Both financial and economic efficiency are analyzed in this section. Financial efficiency examines revenue and cost implications from the perspective of the Forest Service. This may be considered the taxpayer perspective. Only those revenues and costs recorded in agency financial records are included in this analysis.

Economic efficiency examines a broader definition of benefits by including values for national forest uses that are not captured in Forest Service revenues. Generally, the primary additions over a financial analysis include willingness-to-pay values for recreation use and estimated market value for meat gained by grazing livestock. As noted above, changes in recreation use could not be estimated by recreation specialists. Consequently, there is no accounting of recreation use benefits in the efficiency analysis.

Many non-market, non-use values that might be expected in this analysis are excluded and treated qualitatively in other sections of this chapter. Some outcomes or effects, such as biological diversity, visual amenities, quality of recreation experiences, forest access, and social impacts can be effectively considered by decision makers apart from an economic efficiency analysis.

Efficiency calculations can only be made when there are quantitative estimates of outputs or outcomes and agency work activities. When analyzing the alternatives, resource specialists were unable to provide quantitative estimates of consequences, except for timber-related activities. Therefore, the efficiency analyses are limited to timber consequences. Because timber revenues to the agency represent current market value, the financial analysis is identical with the economic analysis.

The main criterion used in assessing financial and economic efficiency is present net value (PNV). Table 3- 35 displays the economic and financial PNV for each alternative. All monetary values are expressed in constant dollars with no allowance for inflation. A four-percent discount rate was used over a 65-year period (2007 to 2072). This time period was used to capture the timber product consequences of precommercial thinning conducted over the next five years. Timber stumpage prices used for this analysis range from a high of \$65.92/CCF for spruce sawtimber to a low of \$9.78/CCF for timber products other than sawlogs. Revenues are not reduced for payments made to states and counties.

Table 3- 35 - Economic and Financial Efficiency (Present net value in thousands of 2005 dollars)

Indicator	A	B	C	D	F
Forest Service revenues	\$1,328	\$610	\$610	\$773	\$773
Costs	\$6,760	\$4,114	\$4,114	\$5,129	\$5,129
Financial net revenues	-\$5,433	-\$3,504	-\$3,504	-\$4,356	-\$4,356
Economic net benefits	-\$5,433	-\$3,504	-\$3,504	-\$4,356	-\$4,356

As shown in Table 3- 35, present net value ranges from a low of -\$5.4 million for the no action alternative (A) to a high of -\$3.5 million for Alternatives B and C. What appears to make Alternatives B and C the highest PNV rather than the No Action alternative is the fewest acres of pre-commercial thinning. A discounted return from increased sawtimber volume that is associated with precommercial thinning does not cover the discounted cost of the thinning activity. Alternative A has the highest number of acres that would be thinned.

Economic return is not the sole criterion for any public investment, but it is one measure among many. The reduction of PNV in any alternative as compared to the highest value available is an expression of the trade-off, or opportunity cost, of achieving the objectives embodied by that alternative. For instance, should the decision-maker select Alternative F or D, the implied value of non-priced benefits would be worth at least \$850,000. Non-priced benefits would include such things as lynx habitat, the quality of recreation, and reduced risk of community losses due to wildfire.

Resource Commitments

Relationship between Short-term Uses of the Environment and Long-term Productivity

Short-term uses are those expected to occur on the forests over the next ten years. These uses include but are not limited to recreation use, grazing, mineral development, timber harvest and prescribed burning. Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the next ten years. The minimum management requirements established by the 1982 regulations (36 CFR 219.27) provided for the maintenance of long-term productivity of the land.

Management requirements prescribed by forest-wide standards and guidelines would be met under all alternatives. Minimum requirements ensure that long-term productivity of the land would not be impaired by short-term uses.

All action alternatives propose protective measures for habitat for the Canada lynx through adoption of standards and guidelines. Because of this, no impairment of long-term productivity would be expected.

Monitoring is included under all alternatives. If monitoring and subsequent evaluation indicate that standards and guidelines are insufficient to protect long-term productivity, the plans would be amended. Although all alternatives were designed to maintain long-term productivity, there are differences between alternatives in the long-term availability or condition of resources. There may also be differences between alternatives in the long-term expenditures necessary to maintain desired conditions. These types of differences between the alternatives are described in Chapters 2 and 3.

Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitment of resources is defined in Forest Service Handbook 1909.15 Environmental Policy and Procedures.

The irreversible commitment of resources means that nonrenewable resources are consumed or destroyed. Examples include mineral extraction, which removes nonrenewable minerals, and potential destruction of such things as heritage resources by other management activities.

The irretrievable commitment of resources is opportunities foregone: trade-offs in the use and expenditure of funds, loss of production, or restrictions on resource use. Decisions made in a plan determine what kinds and levels of activities are appropriate on the forest; it does not make site-specific or project decisions. The decision to irreversibly or irretrievably commit resources occurs:

- When the Forest Service makes a project or site-specific decision
- When Congress acts on a recommendation to establish a new wilderness or to include a river in the Wild and Scenic River System.

All action alternatives propose protective measures for habitat for the Canada lynx through adoption of standards and guidelines. No changes are made in suitability decisions, management area allocations, or recommendations for wilderness or other special areas. Because of this, no irreversible or irretrievable commitment of resources are anticipated in any of the alternatives.

Other Required Disclosures

The alternatives are programmatic in nature, consisting of direction that would be applied to future management activities. The alternatives do not prescribe site-specific activities on the ground. Standards in the alternatives do not allow more actions that could affect the environment than the existing plans do.

American Indian Religious Freedom Act and Tribal Treaty Rights

No effects on American Indian social, economic, or subsistence rights are anticipated. Comments from Tribal Government offices pertained to notification of future management activities. The comments did not identify concerns about compliance with the American Indian Religious Freedom Act or impacts to tribal treaty rights from any of the alternatives.

Prime farmland, rangeland, or forestland

None of the alternatives would adversely affect prime farmland or rangeland. NFS lands are not considered prime forestland.

Effects on floodplains or wetlands

None of the alternatives would adversely affect floodplains or wetlands. Existing management direction for these resources would be maintained.

Effects on water quality

Section 303(d) of the Clean Water Act requires states to evaluate water quality in light of state water quality standards, report those stream segments that are impaired, and require determination of the total maximum daily load of pollutants allowed. The Colorado and Wyoming have identified impaired stream segments on NFS lands, and they are working with the agencies to determine how to reduce pollutants impacts and meet total maximum daily load requirements.

The alternatives encourage the use of fire to restore ecosystems; however, they do not change management allocations to allow fires to burn in new areas. The alternatives could result in fewer ground disturbing activities such as less precommercial thinning, and could result in additional protection of riparian areas from grazing. Therefore, the alternatives would not directly or indirectly result in further degradation of 303(d) listed waters.

Effects on special areas

Special areas include Wilderness areas, proposed wilderness, and Wild and Scenic River Corridors. These areas are generally to be managed to maintain their existing character. The alternatives do not change the overall management direction of these areas.

Effect on other resources

Several other resources are not affected by the programmatic management direction. These include but are not limited to caves, soils, and scenery.

NFMA “Significance” Finding

The purpose of this proposal is to incorporate management direction into plans for the conservation and recovery of Canada lynx.

This proposal was initiated March 28, 2000, with the publication in the Federal Register of a Notice of Intent to prepare an Environmental Impact Statement. A revised Notice of Intent was published on June 30, 2000. This project was initiated under the 1982 regulations, before the transition period of the 2000 planning regulations. The current planning regulations, published April 21, 2008, continue to allow use of the provisions of the 1982 regulations (36 CFR 219.14(b)(2)[2008]).

The National Forest Management Act (NFMA) provides that forest plans may be amended in any manner, but if the management direction results in a significant change in the plan, the same procedure as that required for development and approval of a plan shall be followed. The 1982 regulations at 36 CFR 219.10(f) required the agency to determine whether or not a proposed amendment will result in a significant change in the plan. If the change resulting from the amendment is determined not to be significant for the purposes of the planning process, then the agency may implement the amendment following appropriate public notification and satisfactory completion of NEPA procedures.

Forest Service Manual (FSM) 1920, section 1926.5 (Jan. 31, 2006) identifies factors to consider in determining whether an amendment is significant or non-significant for those plans using planning regulations in effect before November 9, 2000.

Changes to the land management plan that are not significant can result from:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.
2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis.
3. Minor changes in standards and guidelines.
4. Opportunities for additional projects or activities.

Examples of significant changes include:

1. Changes that would significantly alter the long-term relationship between levels of multiple-use goods and services originally projected.
2. Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

Significance determination: The selected alternative would change plans in a way that is similar to examples of non-significant changes #1 and #3. The effects of this decision are not similar to either example of significant plan changes. These findings are discussed in further detail below.

Under the selected alternative the management direction will apply to lynx habitat within Lynx Analysis Units (LAUs) on the Arapaho-Roosevelt, Medicine Bow-Routt, Pike-San Isabel, Grand Mesa-Uncompahgre-Gunnison, San Juan, Rio Grande, and White River National Forests. The area covered by the amendment is comprised of 14.6 million acres of National Forest System lands, with approximately 7.5 million acres (51 percent of the total acres) mapped as lynx habitat in LAUs.

Changes in standards and guidelines are minor

The selected alternative adds one goal to forest plans; conserve Canada lynx. This goal is consistent with other goals in existing plans and other legal requirements to provide for habitat needs for threatened and endangered species. The selected alternative adds several objectives to the plans. These objectives require consideration of natural ecosystem process and functions, and consideration of lynx habitat needs. The additional objectives provide more species-specific guidance but do not alter the overall objectives to provide for habitat needs for threatened and endangered species. The proposal does not change any Management Area (MA) designation.

The selected alternative adds seven standards and 24 guidelines. The addition of these new standards and guidelines are minor as discussed below.

Changes would not significantly alter the long-term relationship between levels of multiple-use goods and services originally projected.

The management direction would not substantially alter outputs for grazing, minerals, energy, transportation systems, and developed recreation areas, such as ski areas or winter recreation sites. These activities will not be prohibited by the management direction; however, habitat needs for lynx will need to be considered when managing these resources. The new direction will also not substantially alter timber outputs, even though it may affect growth and yield.

The selected alternative limits precommercial thinning in winter snowshoe hare habitat in young regenerating forests, with some exceptions – see Standard VEG S5.

Precommercial thinning is allowed to restore aspen. Precommercial thinning will also be allowed if new research indicates it will benefit or only have short-term adverse effects to lynx. Precommercial thinning is not allowed in young regenerating lodgepole pine forests, unless new research indicates it is beneficial or benign. Limiting precommercial thinning in lodgepole pine forests could affect growth and yield, and the potential to produce some products in the future, because these forests tend to stop growing if not thinned; however, overall cubic foot volume would not be affected.

The selected alternative limits precommercial thinning in winter snowshoe hare habitat in young regenerating forests, with some exceptions – see Standard VEG S5.

Precommercial thinning is allowed to restore aspen. Precommercial thinning will also be allowed if new research indicates it will benefit or only have short-term adverse effects to lynx. Precommercial thinning is not allowed in young regenerating lodgepole pine forests, unless new research indicates it is beneficial or benign. Limiting precommercial thinning in lodgepole pine forests could affect growth and yield, and the potential to produce some products in the future, because these forests tend to stop growing if not thinned; however overall cubic foot volume would not be affected.

Limiting precommercial thinning would reduce Long-Term Sustained Yield (LTSY) on the Forests. The effect on LTSY would vary with age at the time of thinning, species, site quality, rotation length, final product, etc. Based on average conditions in the analysis area, the LTSY reduction is assumed to be 1,800 cubic feet per acre. The precommercial thinning programs in lynx habitat have historically been concentrated in young lodgepole pine stands. Approximately half of this lodgepole pine is seral to spruce-fir and considered lynx habitat. Future volume reductions and forest health concerns resulting from precommercial thinning restrictions would be greatest in the seral lodgepole pine stands. However, the effect of the sawtimber volume reduction on actual harvest volumes would be relatively small. In addition, some precommercial thinning may be allowed in the future if new information becomes available.

In addition, the ASQ should not be affected on any units because the management direction does not preclude timber harvest. Standards VEG S1 and VEG S2 may defer regeneration harvest in some areas, but Guideline VEG G1 encourages projects creating winter snowshoe hare habitat where it is lacking. Timber outputs have never been at the level of LTSY over the life of these plans. Therefore, changes in LTSY are unlikely to lead to changes in outputs, especially as measured in cubic feet. There could be changes in what material is harvested and where.

Changes would not have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

There are approximately 14.6 million acres within the seven National Forests in the planning area. Of this, approximately 7.5 million acres or 51 percent of the areas has been mapped as lynx habitat. Of the 7.5 million acres of mapped lynx habitat, approximately 5.1 million acres are in land allocations that allow for management actions. Therefore the management direction only potentially affects about 35 percent of the planning area. The most noticeable effects are likely to be the location and amount of precommercial thinning. The potential acreage that could be affected is between 950 to 1,660 acres per year (Table 3- 13). This is less than one percent of the planning area.

Summary: Considering the three factors, I determined this management direction is not a significant change under the National Forest Management Act to the eight forest plans because it imposes minor changes over a limited area of these national forests.

While this amendment would not be significant, the plan revision process is underway on several of the forests affected by this decision. The GUMG, Pike-San Isabel and San Juan National Forest Plans are currently being revised.

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Appendix A – Interdisciplinary Team

Ronald L. Baer

Team Position – Minerals Specialist

Associate of Arts - Math and Physical Science from American River Junior College

Bachelor of Science - Geology from California State University, San Jose

Experience - 33 Years

Current Position – Retired (Regional Geologist/ Certified Minerals Examiner, USDA Forest Service, Rocky Mountain Region)

Jan Burke

Team Position - Silviculturist (vice)

Bachelor of Science – Forest Management from Colorado State University

Experience – 18 years

Current Position - Forest Silviculturist and Timber Management Officer, White River National Forest

Anthony Edwards

Team Position - Recreation Specialist (vice - Acting Dispersed Area Manager, Recreation Planner and Landscape Architect, USDA Forest Service, Rocky Mountain Region)

Bachelors of Science - Civil Engineering from the University of Arizona

Experience – 17 years

Current Position - Physical Resources Staff Officer, Pike & San Isabel National Forests/Cimarron & Comanche National Grasslands

Steve Gregonis

Team Position - Geographic Information Systems Support

Bachelor of Arts - Environmental Conservation and Geography from the University of Colorado

Experience - 23 Years

Current Position - Regional Geographic Information System Coordinator/Spatial Technical Specialist/Biological Scientist, USDA Forest Service, Rocky Mountain Region

Julie Sarazin Grode

Team Position - Wildlife Biologist

Bachelor of Science - Wildlife Biology from Colorado State University

Experience - 24 Years

Current Position –Grand Valley Ranger District Wildlife Biologist, Grand Mesa, Uncompahgre, Gunnison National Forest, USDA Forest Service, Rocky Mountain Region

Polly Hays

Team Position - Hydrologist

Bachelor of Arts – Anthropology from Wesleyan University

Master of Science – Geosciences from the University of Arizona

Experience - 14 Years

Current Position – Regional Water Program Manager, USDA Forest Service, Rocky Mountain Region

Melody Holm

Team Position - Leasable Minerals Specialist

Current Position – Leasable Minerals and Energy Resources Program Manager, USDA Forest Service, Rocky Mountain Region

Larry Hoovestol

Team Position - Transportation (vice)

Bachelor of Science, Master of Science - Civil Engineering from North Dakota State University

Masters of Public Administration from the University of Colorado - Denver

Current Position - Retired (Transportation Planner, USDA Forest Service, Rocky Mountain Region)

Paul Langowski

Team Position - Fire, Fuels and Fire Ecology Specialist

Bachelor of Science - Resources Management from State University of New York College of Environmental Science and Forestry

Technical Fire Management Certificate - Colorado State University; Certified Silviculturist

Experience - 28 Years

Current Position - Branch Chief for Fuels and Fire Ecology, USDA Forest Service, Rocky Mountain Region

Terri Liestman

Team Position – Heritage Resources Specialist

Bachelor of Arts from University of Minnesota

Master of Arts from University of Minnesota

Experience – 18 Years

Current Position - Heritage Program Leader, USDA Forest Service, Rocky Mountain Region

Diana Menapace

Team Position - NEPA Specialist

Bachelor of Science – Colorado State University

Master of Science – Colorado State University

Experience – 21 years

Current Position – Retired (Regional Environmental Coordinator, USDA Forest Service, Rocky Mountain Region)

Veronica Mitchell

Team Position - Transportation Specialist

Bachelor of Science – Civil Engineering from New Mexico State University

Experience – 19 years

Current Position - Transportation Planner, USDA Forest Service, Rocky Mountain Region

Michele M. O'Connell

Team Position - Lands and Special Uses Specialist

Bachelor of Science - Resource Management and Forestry from the University of Wisconsin

Experience - 26 Years

Current Position - Group Leader for Rocky Mountain Region Lands Special Uses, USDA Forest Service, Rocky Mountain Region

Lois J. Pfeffer

Team Position – Interdisciplinary Team Leader

Bachelor of Science – Forest Resources from the University of Minnesota

Experience – 20 years

Current Position - Environmental Coordinator, TEAMS Enterprise Unit, USDA Forest Service, Enterprise Program

Charles M. Quimby

Team Position - Rangeland Management Specialist

Bachelor of Science - Rangeland Management (with wildlife management option) from the University of Arizona.

Master of Science - Watershed Management (emphasis on water quality and natural resource recreation) from the University of Arizona

Experience - 36 Years

Current Position - Regional Rangeland Management Program Manager, USDA Forest Service, Rocky Mountain Region

Michael Retzlaff

Team Position - Social and Economic Analysis Specialist

Bachelor of Science - Watershed Science from Colorado State University

Master of Science – Economics from Colorado State University

Experience - 33 Years

Current Position – Retired (Economist and Social Science Coordinator, USDA Forest Service, Rocky Mountain Region)

John Rupe

Team Position - NFMA Specialist

Bachelor of Science, Civil Engineering from University of Idaho

Master of Science, Civil Engineering from University of California, Berkeley

Experience – 28 years

Current Position – Planning, USDA Forest Service, Rocky Mountain Region

Debra Ryon

Team Position - Lands Specialist

Bachelor of Science, Forest Management, Colorado State University

Experience – 22 years

Current Position – Realty Specialist, Lands Special Uses, USDA Forest Service, Region 2

Janice Schultz

Team Position – Editorial Assistant

Experience – 26 Years

Current Position – Writer/Editor, TEAMS Enterprise Unit, USDA Forest Service, Enterprise Program

Bruce Short

Team Position - Silviculturist and Timber Management (vice)

Bachelor of Science – Forestry and Conservation, North Carolina State University

Experience - 32 years

Current Position – Retired (Staff Officer, Rio Grande National Forest)

Victor J. Starostka

Team Position - Fisheries/Aquatic Biology Specialist

Bachelor of Science – Biology from University of Wisconsin

Master of Science - Wildlife Biology from South Dakota State University

Experience - 33 Years

Position – Retired (Regional Fisheries Program Leader, USDA Forest Service, Rocky Mountain Region)

Jim Thinnes

Team Position - Silviculturist and Timber Management Specialist

Bachelor of Science - Natural Resource Management, Ohio State University

Experience - 28 years

Position - Regional Silviculturist, Rocky Mountain Region, USDA Forest Service

Francisco Valenzuela

Team Position - Recreation Planner (vice)

Bachelor of Science - Recreation Planning and Administration from Colorado State University

Experience - 27 Years

Current Position - Developed Recreation Program Manager, USDA Forest Service, Washington Office

Thomas L. Williams

Team Position - Leasable Minerals Specialist

Associate of Science - Biology Red Rocks Community College

Bachelor of Arts - Environmental, Population, and Organismic Biology from the University of Colorado at Boulder

Experience - 12 years

Current Position - Regional Leasable Minerals/Energy Resources Specialist, USDA Forest Service, Rocky Mountain Region

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Appendix C – Glossary

- *CFR = Code of Federal Regulations*
- *FSM = Forest Service Manual*
- *LCAS = Canada Lynx Conservation Assessment Strategy, January 2000*
- *NIFC = National Interagency Fire Center. 1998. Wildland and Prescribed Fire Management Policy- Implementation Procedures Reference Guide, National Wildfire Coordinating Group, Boise ID*
- *NWCG = National Wildfire Coordinating Group. 1996. Glossary of Wildland Fire Terminology, National Wildfire Coordinating Group, Boise ID*

Active Crown Fire: A **crown fire** in which the entire **fuel complex** becomes involved, but the crowning phase remains dependent on heat released from the **surface fuels** for continued spread. Also called **running** and **continuous crown fire**.

ANILCA: Alaska National Interest Lands Conservation Act, Act of December 2, 1980, which provides statutory entitlement to non-federally, owned land within the boundaries of the National Forest System.

Appropriate Management Response: Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Areas of Consistent Snow Compaction: An area of land or water generally with consistent winter snow cover which receives enough use to compact the snow to the extent that individual tracks are indistinguishable; where the compacted snow is visually evident most of the time, except immediately after a snowfall (within 48 hours). The cause of the snow compaction can be by snowmobiling, cross-country skiing, snowshoeing, sledding, ice fishing, dog sledding, the staging area for events, or by any other activity which compacts the snow over a large area. These “areas” are generally found in association with both designated winter routes and trails and undesignated winter routes, typically in adjacent openings, parks and nearby meadows; snowmobile “play areas”, “Telemark” hills near ski huts, or near plowed roads or winter parking sites. Sledding/snow play areas in close proximity to plowed roads are examples of such areas. A regularly used helicopter landing site for heli-skiing, the area at the end of a “snow road” used by a snowcat tour, and small lakes with significant ice fishing use and little wind scour, may also meet the definition as an area of concentrated use resulting in snow compaction. The determination of areas of consistent snow compaction will be based on the maximum area or miles used in 1998, 1999, or 2000.

Available fuel: The total mass of ground, surface and canopy fuel per unit area consumed by a fire, including fuels consumed in postfrontal combustion of duff, organic soils, and large woody fuels.

Baseline Areas: Areas of consistent snow compaction that were identified/mapped on each Forest in the Southern Rockies based on routes and areas that were authorized, promoted or encouraged in 1998, 1999 and 2000 (See "Areas of Consistent Snow Compaction").

Broad-scale Assessment: A synthesis of current scientific knowledge, including a description of uncertainties and assumptions, to provide an understanding of past and present conditions and future trends, and a characterization of ecological, social and economic components within an area (Lynx Conservation Assessment and Strategy (LCAS)). A broadscale assessment should be based on a 4th code hydrologic unit code (HUC) (500,000 to 1,500,000 acres) or an ecological unit of similar size. The assessment should include information on age classes, communities and general vegetative conditions, define a time period of analysis in relation to range of disturbance regimes, clearly define all categories of structural stages as they relate to suitable and unsuitable lynx habitat; frame specific questions to be answered; use charts as an approach to describing the current situation; use more than one data source to validate results; and list assumptions. There should be a peer review of the assessment. (Lynx Biology Team Meeting Notes, June 19, 2002)

Canopy base height: The lowest height above the ground at which there is a sufficient amount of **canopy fuel** to propagate fire vertically into the canopy. Canopy base height is an effective value that incorporates ladder fuels such as shrubs and understory trees. See also **fuel strata gap** and **crown base height**.

Canopy bulk density: The mass of **available canopy fuel** per unit canopy volume. It is a bulk property of a stand, not an individual tree.

Canopy fuels: The live and dead foliage, live and dead branches, and lichen of trees and tall shrubs that lie above the **surface fuels**. See also **available canopy fuel**.

Carr: Deciduous woodland or shrub land occurring on permanently wet, organic soil. (Dictionary of Forestry and LCAS)

Catastrophic: A violent or sudden change in a feature of the earth.

Classified Road: See **National Forest System Road**.

Coarse Woody Debris: Any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses on the ground or in streams. (Dictionary of Forestry and LCAS)

Community: A unified body of individuals; people with common interests living in a particular area; a group linked by common policy.

Community at risk: Urban wildland interface communities within the vicinity of federal lands that are at high risk from wildfire, as published in the Federal Register August 17, 2001.

Continuous Crown Fire: See **Active Crown Fire**.

Crown Base Height: The vertical distance from the ground to the bottom of the live crown of an individual tree. See also **canopy base height**.

Crown Bulk Density: The mass of available fuel per unit crown volume. It is a property of an individual tree, not a whole stand. See also **canopy bulk density**.

Crown Fire: Any fire that burns in **canopy fuels**.

Crown Fire Hazard: A physical situation (fuels, weather, and topography) with potential for causing harm or damage as a result of crown fire.

Crowning Index: The open (6.1:m/ 20 ft) wind speed at which **active crown fire** is possible for the specified **fire environment**.

Daylight Thinning: A vegetation treatment that removes trees within a certain radius around shade-intolerant species, i.e. western larch, quaking aspen, and ponderosa pine.

Decommissioned: See **Road Decommissioning**.

Defensible Fuels Profile(s): Strategically located strips or blocks of land where forest canopy and fuels, both living and dead, have been modified to affect fire behavior. The objectives may include reducing the potential for large and damaging fires, increase firefighter safety, reduce the wildland fire threat to local communities by reducing fuels adjacent to the communities, and to facilitate fire use (prescribed and wildland fire use). The strategically placed treatments (strips or blocks) have less surface fuels and the bases of the live tree crowns are higher off the ground. The reduced surface fuels, open understory, and higher overstory tree crowns interrupt the pathway between a surface and the forest canopy. Fires burn at lower intensities and at slower rates of spread than in comparable untreated areas. The amount, intensity and type of treatments are influenced by the fuels conditions and values at risk.

Defensible Space: Area around a structure or other improvement where fuels and vegetation are treated, cleared, or reduced to slow the spread of wildfire towards the structure. Defensible Space also reduces the chance of a structure fire moving from the building to the surrounding forest. Creating an effective defensible space involves developing a series of management zones in which different treatment techniques are used. The actual design and development of defensible space depends on several factors: size and shape of buildings, materials used in their construction, the slope of the ground on which the structures are built, surrounding topography, and sizes and types of vegetation on the property. (Colorado State Forest Service)

Denning Habitat (lynx): Habitat used during parturition and rearing of young until they are mobile. The common component appears to be large amounts of coarse woody debris, either downed logs or root wads. Coarse woody debris provides escape and thermal cover for kittens. Denning habitat may be found either in older mature forest of conifer or mixed conifer/deciduous types, or in regenerating stands (greater than 20 years since disturbance). Denning habitat must be located within daily travel distance of foraging habitat (typical maximum daily distance for females is 3-6 miles). (LCAS)

Designated Over-the-Snow Routes: A route or trail (linear travel way) that is managed by the USDA Forest Service, by any agency or organization under agreement with the Forest Service, or by a special use permittee, and is usually identifiable to the visitor as a result of on-the-ground markings such as blue or orange diamonds, bamboo wands, blazes, or difficulty markers, or is

shown on a public map (other than travel maps), brochures, recreation opportunity guides, or electronic media produced by or approved by the Forest Service. If a trail otherwise meets this criteria, but is not entered into the Forest Service trail inventory as a System trail, it is still a designated trail for the purpose of the LCAS. All trails that are groomed under an agreement, special use permit, or by force account, are also “designated” trails. “Snow roads,” maintained by permitted snowcat tour operators are groomed winter routes. The determination of baseline snow compaction routes will be based on the maximum miles of groomed and designated over-the-snow routes that were authorized, promoted or encouraged in 1998, 1999, or 2000.

Designated Route: A road or trail that has been identified by a Forest Service decision as open for specified travel use.

Developed Recreation: Recreational uses that are dependent upon facilities and therefore occur in concentrated use areas. Examples include campgrounds and ski areas. Facilities in these areas might include roads, parking lots, picnic tables, drinking water, toilets, ski lifts, and buildings. (LCAS)

Dispersed Recreation: Those outdoor recreation activities in forest, range, or desert environments that normally take place outside of developed sites or areas that support concentrated recreational use. Dispersed recreation activities may require facilities for safeguarding visitors, protecting resources, and enhancing the quality of the visitor experience. (LCAS)

Disturbance: Events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include drought, floods, wind, wildfires, wildlife grazing, and insects and pathogens. Human caused disturbances include actions that alter vegetation such as timber harvest, wildland fire use, livestock grazing, road construction, and the introduction of exotic species. (LCAS)

Diurnal Security Habitat (Lynx): Places in lynx habitat that provide secure winter bedding sites in highly disturbed landscapes such as ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Site characteristics and stand conditions make human access difficult and discourage human activity. Security habitats are sufficiently large to provide effective visual and acoustic insulation and to let lynx easily move away from any intrusion. Lynx security habitat must be in proximity to winter snowshoe hare habitat.

Dwelling: A place in which to live.

Ecological Integrity: The degree to which the elements of biodiversity and the functions that link them together are complete and capable of performing desired functions. Absolute measures of ecological integrity do not exist (LCAS).

Ecological Processes: The flow and cycling of energy, material, and organisms through an ecosystem. (LCAS)

Environmental Conditions: That part of the **fire environment** that undergoes short-term changes: weather, which is most commonly manifested as wind speed and dead fuel moisture content.

Fire-Adapted Ecosystem: An ecosystem with the ability to survive and regenerate in a fire-prone environment.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather and topography. (NWCG)

Firebreak: A natural or constructed barrier to stop or check fires that may occur, or to provide a control line from which to work. (NWCG)

Fire Environment: The characteristics of a site that influence fire behavior. In fire modeling the fire environment is described by surface and canopy fuel characteristics, wind speed and direction, relative humidity, and slope steepness.

Fire Frequency (Fire Return Interval): How often fire burns a given area; often expressed in terms of fire return intervals (e.g., fire returns to a site every 5-15 years).

Fire Hazard: A fuel complex, defined by volume, type, condition, arrangement and location, which determines the ease of ignition and the resistance to control. A physical situation (fuels, weather, and topography) with potential for causing harm or damage as a result of wildland fire.

Fire Intensity: See **frontal fire intensity**. Contrast with **fireline intensity**.

Fireline Intensity: The rate of heat release in the **flaming front** per unit length of fire front (Byram 1959). Can be converted to flame length. ($FL = 0.45 * (I^{0.46})$)

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. This plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, prevention plans and operational wildland fire use plans. (NIFC)

Fire Regime: A generalized description of the role fire plays in an ecosystem. It is characterized by fire frequency, seasonality, intensity, duration and scale (patch size), as well as regularity or variability. (Agee, as modified by Sexton.)

Fire Risk: Applies to the probability of an ignition occurring as determined from historical fire record data.

Fire Safe Conditions: As defined by Agee (1996) fire safe conditions include those conditions where:

1. Surface fuel conditions that limit surface fireline intensity;
2. Forest stands that are comprised of fire-tolerant trees, described in terms of species, sizes and structures;

3. A low probability that crown fires will either initiate or spread through the forest.

Fire Use: The combination of wildland fire use and prescribed fire applications to meet resource objectives. (NIFC)

Flaming Front: The zone at a fire's edge where solid flame is maintained.

Foraging Habitat (lynx): Foraging habitat is habitat that supports lynx primary prey - snowshoe hare - and alternate prey, especially red squirrels. The highest quality snowshoe hare habitat contains a high density of young trees or shrubs that are tall enough to protrude above the snow in winter. Red squirrel densities tend to be highest in mature con-bearing forests with substantial quantities of coarse woody debris. (LCAS)

Forested Stringer: A narrow band of trees that is an outcropping of a forested stand, sometimes connecting patches of habitat.

Frontal Fire Intensity: Similar to **fireline intensity**, it is the rate of heat release per unit length of fire front, including the additional heat released from postfrontal flaming and smoldering combustion (Forestry Canada Fire Danger Group 1992).

Fuel Break: A natural or manmade change in fuel characteristics that affects fire behavior so that fires burning into them can be more readily controlled. (NWCG)

Fuel Characteristics: Factors that make up fuels such as compactness, loading, horizontal continuity, vertical arrangement, chemical content, size and shape, and moisture content. (NWCG)

Fuel Continuity: The degree or extent of continuous or uninterrupted distribution of fuel particles in a fuel bed thus affecting a fire's ability to sustain combustion and spread. This applies to aerial fuels as well as surface fuels.

Fuel Complex: The combination of ground, surface, and canopy fuel strata.

Fuel Model: A set of surface fuel bed characteristics (load and surface-area-to-volume-ratio by size class, heat content, and depth) organized for input to a fire model. Standard fuel models (Anderson 1982) have been stylized to represent specific fuel conditions.

Fuel Strata Gap: The vertical distance between the top of the **surface fuel** stratum and the bottom of the **canopy fuel** stratum.

Fuel Stratum: A horizontal layer of fuels of similar general characteristics. We generally recognize three fuel strata: ground, surface, and canopy.

Full-range Fire Behavior Simulation: The simulated behavior of a wildland fire whether it is a surface fire, passive crown fire, or active crown fire. Ground fire behavior is usually not included.

Goals: Description of what an agency strives to achieve. (LCAS)

Groomed Over-the-Snow Route: A route or trail, usually intended for snowmobile, dogsled, snowcat, or cross-country skiing, on which the snow surface is packed, leveled or scarified, with or without “set tracks”, usually by means of equipment towed behind a snowmobile or snowcat. Most such routes or trails are maintained through agreements with snowmobile clubs, permittees, event holders and others for varying periods of time during the winter months. Snow roads maintained by permitted snowcat tours are “groomed” under this definition. The determination on the maximum miles of groomed over-the-snow routes that were authorized, promoted or encouraged in 1998, 1999, or 2000.

Ground fire: A slow-burning, smoldering fire in **ground fuels**. Contrast with **surface fire**.

Ground fuels: Fuels that lie beneath surface fuels, such as organic soils, duff, de-composing litter, buried logs, roots, and the below-surface portion of stumps. Compare with **surface fuels**.

Guidelines: Techniques or prescriptions that should be used to meet objectives; rationale for deviations must be documented. A plan amendment is not required. (LCAS modified).

Habitat Connectivity (lynx): Cover (vegetation) in sufficient quantity and arrangement to allow for the movement of lynx. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat. Wooded riparian communities may provide cover across open valley floors between mountain ranges. (LCAS)

Highway: A road that is at least 2 lanes wide, paved with asphalt or concrete. Average daily traffic may exceed 5,000 vehicles and speeds are 45 mph or greater. (LCAS) This includes Interstate Highways, US Highways, and State Highways, which are not managed by the Forest Service, but may go through Forest System Lands.

Home Ignition Zone: The home and its immediate surroundings. The characteristics of a home and its immediate surroundings determine a home’s ignition potential during wildland fires. The home ignition zone generally extends to a few tens of meters from the structure. The ignition potential within the home ignition zone is home ignitability.

Horizontal Cover – The visual obscurity provided by vegetation that extends to the ground or snow surface, primarily provided by tree stems and tree boughs, but may also be provided by shrubs, herbaceous vegetation, and landscape topography.

Human Uses Management Activities and Practices - Includes activities, practices, and projects associated with recreation, minerals, transportation systems, and other similar types of developments.

Independent Crown Fire: A **crown fire** that spreads without the aid of a supporting **surface fire**.

Intermittent Crown Fire: A **crown fire** that alternates in space and time between active crowning and surface fire or passive crowning. See also **passive crown fire**.

Jurisdiction: The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority, but not necessarily ownership. (FSM 7705)

Landscape connectivity: See **Lynx Habitat Connectivity**.

Leasable Minerals: The federally owned fossil fuels (oil, gas, coal, oil shale, etc), geothermal resources, sulfur, phosphates, and uranium. These minerals are subject to exploration and development under leases, permits, or licenses issued by the Secretary of the Interior, with Forest Service consent. The 1920 Mineral Leasing Act, as amended by the 1989 Federal Onshore Oil and Gas Leasing Reform Act, provide the authority and management direction for federal leasable minerals on National Forest System lands. In addition, mineral leasing on the Grasslands is authorized under the 1947 Mineral Leasing Act for Acquired Lands.

Linkage Areas (lynx): Linkage areas provide landscape connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas where blocks of lynx habitat are separated by intervening areas of non-lynx habitat such as basins, valleys, agricultural lands, or where lynx habitat naturally narrows between blocks.

Livestock grazing management activities and practices – Includes activities, practices, and projects associated with the management of livestock grazing.

Locatable Minerals: Those deposits subject to location and development under the General Mining Law of 1872 (as amended). Forest Service regulations at 36 C.F.R. 228, Subpart “A” provide that operations shall be conducted so as to minimize adverse environmental impacts to the surface resources, which includes “taking all practicable measures to maintain and protect wildlife habitat affected by an operation” and, “where practicable, reclaim surface disturbances”, including, among other things, “the rehabilitation of wildlife habitat”.

Low Speed, Low Volume Road: Low volume is less than 100 vehicles per day (seasonal average daily traffic) and low speed is less than 20 MPH.

Lynx Analysis Unit (LAU): The LAU is a project analysis unit upon which direct, indirect, and cumulative effects analyses are performed. LAU boundaries should remain constant to facilitate planning and allow effective monitoring of habitat changes over time. (LCAS)

Lynx Habitat: Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the southern Rocky Mountains, lynx habitat generally occurs between 8,000 and 12,000 feet in elevation. Primary vegetation consists of Engelmann spruce, subalpine fir, aspen-conifer mix and lodgepole pine on spruce-fir habitat types. On cool moist sites, Douglas-fir and aspen, when interspersed with subalpine forests, may also contribute to lynx habitat. Dry forest types (e.g., ponderosa pine, climax lodgepole pine) do not provide lynx habitat.

Lynx Habitat Matrix: The most extensive and most connected landscape element type present, which plays the dominant role in landscape function; the landscape surrounding a patch. For lynx, this is an area which is predominantly lynx habitat, but due to natural fragmentation, includes stringers or isolated patches of vegetation such as sagebrush, grasslands, or alpine. These stringers or patches may have value to lynx for alternate prey species or as cover.

Lynx Habitat Currently in Unsuitable Condition: Areas within identified/mapped lynx habitat in the stand initiation structural stage where the trees are generally less than ten to 30 years old and have not grown tall enough to protrude above the snow during winter. Stand replacing fire, insect epidemics or certain vegetation management projects can create unsuitable conditions. Vegetation management projects that can result in unsuitable habitat include clearcuts and seed tree harvest, and sometimes shelterwood cuts and commercial thinning depending on the resulting stand composition and structure. (LCAS)

Maintain: To provide for; to keep in existence; sustain (American Heritage Dictionary). In the context of this amendment maintain means to provide the necessary level of lynx habitat to conserve lynx. It does not mean keep the status quo.

Maintenance Level: Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria. (FSH 7709.58, Sec 12.3 – Transportation System Maintenance Handbook)

Maintenance Level 1: Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are “prohibit” and “eliminate”. Roads receiving Level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at Level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.

Maintenance Level 2: Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles.

Maintenance Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either “encourage” or “accept.” “Discourage” or “prohibit” strategies may be employed for certain classes of vehicles or users.

Maintenance Level 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is “encourage.” However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times.

Maintenance Level 5: Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is “encourage.”

Map and Field Validate: Map means to identify and locate certain conditions on a map. Field validate means to sample a representative number of areas, using an acceptable sampling method, to ensure those areas provide the specific conditions that were mapped. Every area does not have to be field validated.

Mechanical Fuels Treatments: Mechanical treatments include all methods of modifying the fuels profile except for fire use applications, chemical treatments and livestock grazing. Mechanical treatments include: biomass removal, biomass thinning, rearrangement, chipping, piling, felling and piling, crushing, and mastication.

Mesic: Environmental conditions that have medium moisture supplies as opposed to xeric (dry) conditions, or hydric (wet) conditions.

Multi-story mature or late successional forest – This stage is similar to the *old multistory structural* stage (see below). However, trees are generally not as old, and decaying trees may be somewhat less abundant.

Old multistory structural stage – Many age classes and vegetation layers mark the old forest, multistoried stage. It usually contains large old trees. Decaying fallen trees may be present that leave a discontinuous overstory canopy. On cold or moist sites without frequent fires or other disturbance, multi-layer stands with large trees in the uppermost layer develop.

National Forest System (NFS) Road: A Forest road (under FS jurisdiction) wholly or partly within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. (FSM 7705) Part of the designated NFS road system. Previously called Forest Development Roads. (FDRs)

Need: Circumstances in which a thing or course of action is required (reason for action).

Non-Lynx Habitat: Areas such as lakes and openings that do not support snowshoe hare populations and are not considered capable of providing lynx habitat. See also **Lynx Habitat** and **Lynx Habitat Currently in Unsuitable Condition**. (LCAS)

Objective: A statement describing desired resource conditions, or range of conditions, intended to promote achievement of programmatic goals. (LCAS)

Operational Wildland Fire Use Plans: A supplement to the **FMP** that identifies the prescription under which a wildland fire may be managed to accomplish pre-stated resource management areas. It supports the development of a **Wildland Fire Implementation Plan** when an event occurs.

Outbuilding: A building separate from but associated with a main building (in this case a dwelling). (American Heritage Dictionary).

Passive Crown Fire: A crown fire in which individual or small groups of trees torch out, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire encompasses a wide range of crown fire behavior from the occasional torching of an isolated tree to a nearly active crown fire. Also called torching and candling. See also **intermittent crown fire**.

Peer review: Peer review is the independent consideration and evaluation of a scientific article by more than one other expert in the same field of study. If the reviewers find the article to be reasonable in its descriptions of research methods, findings and conclusions, it's been **peer reviewed**. The reviewing experts must be independent of the author and should be anonymous. In a reputable scientific journal, an article will not be published until it has been peer reviewed.

Permanent Development: Any development that results in loss of lynx habitat for at least the duration of a Forest Plan, approximately 15 years. Ski trails which are maintained in an early seral stage, parking lots, new permanent roads, structures, campgrounds and many special use developments would be considered permanent developments.

Plume-dominated Fire: A fire for which the power of the fire exceeds the power of the wind, leading to a tall convection column and atypical spread patterns. Contrast with **wind-driven fire**.

Precommercial Thinning: A thinning that does not yield trees of commercial value, usually designed to reduce stocking in order to concentrate growth on the more desirable trees. (LCAS).

Preponderance: A number greater than half of a total.

Prescribed Fire: Any fire ignited by management actions to meet specific objectives. A written approved prescribed fire plan must exist and NEPA requirements must be met, prior to ignition. This term replaces management ignited prescribed fire. (NWCG)

Private Mineral Rights: On some lands within the National Forest System another party may own the mineral estate. These are known as private mineral rights. Most of the National Forest System lands in the Southern Rockies were reserved from the public domain by executive order under authority of the Forest Revision Act of 1891.

Probability: A number representing the chance that a given event will occur. The range is from 0% for an impossible event, to 100% for an inevitable event.

Project proposals: A plan for specific action(s) that is put forward for consideration, not a natural event.

Recreation Quality: The degree of satisfaction that an individual achieves while participating in their preferred recreational activity. Quality is best assured through the provision of a diverse set of recreation opportunities. Providing a wide range of specific settings varying in level of development, access, social interactions and other factors as described in the Recreation Opportunity Spectrum insures that the broadest segment of the public will find quality recreation opportunities.

Red Squirrel Habitat: Coniferous forests of seed and cone producing age that may contain snags and downed woody debris. This is generally associated with mature or older forests.

Regeneration Harvest: The cutting of trees and creating an entire new age class; an even-age harvest. The major methods are clearcutting, seed tree, shelterwood, and group selective cuts. (Helms, 1998)

Research Studies: Studies conducted to increase scientific knowledge or technology that are financed from the Forest Research budget (FSM 4040). Research studies have no tenure limitation. (FSM 1991.05(1))

Restore: To bring back to an original state (Webster's Dictionary).

Riparian Area: An area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. (LCAS)

Risk: The possibility of meeting danger or suffering harm. When used in reference to wildland fires it refers to the probability of escape resulting in financial and ecological loss. Alternative management scenarios generate different degrees of risk and ultimately a different set of economic outcomes (Hesslin and Rideout, 1999)

Road: A motor vehicle travel way over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified or temporary. (36 CFR 212.1)

Road Construction: Activity that results in the addition of forest classified or temporary road miles to the NFS road system. (36 CFR 212.1, FSM 7705)

Road Decommissioning: Activities that result in the stabilization and restoration of unneeded roads to a more natural state. (36 CFR 212.1)

Road Density: Miles of NFS roads located in a one square mile area of NFS lands.

Road Improvement: Activity that results in an increase of an existing road's traffic service level, expands its capacity, or changes its original design function. (FSM 7705)

Road Maintenance: The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective. (FSM 7705)

Roads Analysis Process (RAP): A science-based procedure for evaluating ecological, social, and economic impacts from both individual roads and road systems. The process does not produce a decision document, but informs management decisions.

Running Crown Fire: See **Active Crown Fire**.

Salable Minerals: Include mineral materials, otherwise known as “common varieties” or “mineral materials” which generally include deposits of sand, gravel, clay, rock or stone used for a number of purposes including road surfacing, construction materials, and landscaping. The disposal of these materials is by a materials contract issued at the discretion of the Forest Service.

Salvage Harvest: The removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost. (Dictionary of Forestry) Personal use firewood collection is not considered salvage harvest.

Security Habitat (lynx): Places in lynx habitat that provide secure winter bedding sites in highly disturbed landscapes such as ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Site characteristics and stand conditions make human access difficult and discourage human activity. Security habitats are sufficiently large to provide effective visual and acoustic insulation and to let lynx easily move away from any intrusion. Lynx security habitat must be in proximity to winter snowshoe hare habitat. (LCAS)

Seral Stages

Early Seral: A stage in the succession of a plant community that is the starting point or early stage following a disturbance, typically a grass/forb stage.

Mid Seral or Later: A stage in the succession of a plant community that is midpoint as it moves from bare ground to climax. For riparian areas, that generally means that willows or other shrubs have become established. For the shrub-steppe, it means that shrub species associated with climax are present and increasing in density.

Site characteristics: The characteristics of a location that do not change with time: slope, aspect, and elevation.

Ski Area: A site and attendant facilities expressly developed to accommodate alpine or Nordic skiing. Operation of Nordic and alpine ski areas for up to 40 years and encompassing such acreage as the Forest Officer determines sufficient and appropriate is authorized by the National Ski Area Permit Act of 1986. (LCAS)

Snowshoe Hare Habitat: See **Lynx Habitat** and **Winter Snowshoe Hare Habitat**.

Special Use Authorization: A permit, term permit, temporary permit, lease, or easement, or other written instrument that grants rights or privileges of occupancy and use subject to specified terms and conditions on National Forest System land. (FSM 2705)

Standards: Required management actions specifying how to achieve objectives. Standards can include requirements to refrain from taking action in certain situations. A plan amendment is required to deviate from a standard. (LCAS)

Stand: A group of trees or other vegetation occupying a specific area and sufficiently uniform in composition, age spatial arrangement, and conditions as to be distinguishable from the vegetation on adjoining lands. (Dictionary of Forestry)

Stand Composition: The proportion of each tree species in a stand expressed as a percentage of the total number, basal area, or volume of all tree species in the stand. (Dictionary of Forestry)

Stand Structure: The horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags, and down woody debris. (Dictionary of Forestry)

Structure Ignition Zone: The structure and its immediate surroundings. The characteristics of an administrative site, dwelling, outbuilding or home and its immediate surroundings determine a structure ignition potential during wildland fires. Fire behavior and intensity is also an important factor. The structure ignition zone generally extends to a few tens of meters from the structure, but is described as a set distance (200 feet) for select standards in this amendment.

Succession: The ecological sequence of species within a habitat or community. (Dictionary of Ecology, Evolution and Systematics).

Surface fire: A fire spreading through **surface fuels**.

Surface fuels: Needles, leaves, grass, forbs, dead and down branches and boles, stumps, shrubs, and short trees.

Temporary Road: Road authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be a part of the forest transportation system and not necessary for long-term resource management. (36 CFR 212.1, FSM 7705)

Threat: An indication of something impending. An expression of intention to inflict injury or damage.

Timber Management Practices: See **Timber Production**.

Timber Production: The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees for growing into logs, bolts, or other round sections for industrial or consumer use. For purposes of forest planning, timber production does not include fuel wood or harvest from unsuitable lands. (FSH 2409.13)

Total fuel load: The mass of fuel per unit area that could possibly be consumed in a hypothetical fire of the highest intensity in the driest fuels.

Uncharacteristic Wildfire Effects: An increase in wildfire size, severity and resistance to control, and the associated impact to people and property, compared to that which occurred in the native system.

Unclassified Roads: Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travel ways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization. (36 CFR 212.1, FSM 7705)

Unsuitable Habitat: See **Lynx Habitat Currently in Unsuitable Condition**.

Valid Existing Rights: Definable legal interest established or existing through statute, real estate transactions, federal grants and leases.

Value: See also **Values at Risk:** The monetary worth of something.

Values at Risk: Include property, structures, physical improvements, natural and cultural resources, community infrastructure, and economic, environmental, and social values. They may be on or off-site values.

Vegetation Management Activities or Practices: The use of fire, timber harvest, tree thinning, rangeland, and wildlife habitat activities, practices, and projects that alter the vegetation to meet vegetation resource management objectives. This does not apply to activities and practices that alter vegetation for other purposes (i.e. Human Uses Management Activities and Practices).

Vegetation Management Prescription: A detailed written document that describes and schedules vegetation management activities needed to achieve resource management objectives. (Adapted from FSH 2409.17)

Wildfire: An unwanted wildland fire. This is not a separate type of fire. (NIFC)

Wildland Urban Interface: The line, area, or zone where there is a wildland fire threat to communities. Wildland fire threat to communities is where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Wildland Fire: Any non-structure fire, other than prescribed fire, that occurs in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires. (NIFC)

Wildland Fire Implementation Plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and

describes the appropriate management response for a wildland fire being managed for resource benefits. (NIFC)

Wildland Fire Use: The management of naturally ignited wildland fires to accomplish pre-stated resource management objectives in predefined areas in **Fire Management Plans**. Operational Management is described in a **Wildland Fire Implementation Plan**. This term replaces prescribed natural fire. (NIFC)

Wind-driven fire: A wildland fire in which the power of the wind exceeds the power of the fire, characterized by a bent-over smoke plume and a high length-to-width ratio.

Winter snowshoe hare habitat – Winter snowshoe hare habitat consists of places where young trees or shrubs grow densely – thousands of woody stems per acre – and tall enough to protrude above the snow during winter, so snowshoe hare can browse on the bark and small twigs (LCAS). Winter snowshoe hare habitat develops primarily in the stand initiation, understory reinitiation and old forest multistoried structural stages.

Appendix D - Southern Rockies Lynx Linkage Areas

The goal of linkage areas is to ensure population viability through population connectivity.

Linkage areas are **areas of movement opportunities**. They exist on the landscape and can be maintained or lost by management activities or developments. They are not “corridors” which imply only travel routes; they are broad areas of habitat where animals can find **food, shelter and security**.

The LCAS defines Linkage areas as: “Habitat that provides landscape connectivity between blocks of habitat. Linkage areas occur both within and between geographic areas, where blocks of lynx habitat are separated by intervening areas of non-habitat such as basins, valleys, agricultural lands, or where lynx habitat naturally narrows between blocks. Connectivity provided by linkage areas can be degraded or severed by human infrastructure such as high-use highways, subdivisions or other developments.” (LCAS Revised definition, Oct. 2001).

Alpine tundra, open valleys, shrubland communities and dry southern and western exposures naturally fragment lynx habitat within the subalpine and montane forests of the Southern Rocky Mountains. Because of the southerly latitude, spruce-fir, lodgepole pine, and mixed aspen-conifer forests constituting lynx habitat are typically found in elevational bands along the flanks of mountain ranges, or on the summits of broad, high plateaus. In those circumstances where large landforms are more isolated, they still typically occur within 40 km (24 miles) of other suitable habitat (Ruggerio et al. 2000). This distribution maintains the potential for lynx movement from one patch to another through non-forest environments.

Because of the fragmented nature of the landscape, there are inherently important natural topographic features and vegetation communities that link these fragmented forested landscapes of primary habitat together, providing for dispersal movements and interchange among individuals and subpopulations of lynx occupying these forested landscapes. Landscape connectivity may take the form of narrow forested mountain ridges or plateaus connecting more extensive mountain forest habitats. Wooded riparian communities may provide travel cover across open valley floors between mountain ranges, or lower elevation ponderosa pine, pinyon-juniper woodlands or shrublands that separate high elevation spruce-fir forests. It is anticipated that where sagebrush communities are proximal to forest habitats, they may also prove valuable to lynx in the Southern Rockies.

The identification and mapping of potential lynx linkage areas and connective shrub-steppe habitats for lynx in Colorado and Wyoming was agreed to in the Conservation Agreement (#00-MU-11015600-013, 2/07/2000), between the Forest Service and US Fish and Wildlife Service, and by the BLM under a different Conservation Agreement. This mapping effort was initiated in January, 2002, by an interagency team, and further refined at the local level, by including consideration of local information and conditions. The interagency team consisted of representatives from: U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Park Service, Colorado Division of Wildlife, Federal Highways Administration, Colorado Department of Transportation, and the Colorado State Forest Service. The National Lynx and Wolverine Interagency Steering Committee reviewed them in October, 2002.

The following is a brief narrative description of the 38 lynx linkages mapped within the Southern Rocky Mountain Geographic Area: (See Figure 1 in Chapter One) of the SDEIS for a spatial display).

1. **Sierra Madre:** This area provides for movement north-south through the Sierra Madre to the Routt National Forest LAU's.
2. **Snowy Range:** This area provides a Colorado to Wyoming connection through Snowy Range. Other wildlife species that use this habitat for travel include a wolverine sighting and big game use.
3. **Northgate:** This area provides east to west movement opportunities from the Medicine Bow Range to Sierra Madre, near the Colorado-Wyoming border.
4. **Bull Mountain:** This linkage area connects Redfeather LAU to Bull Mountain, which has FS and BLM lynx habitat. This linkage is located entirely within the Arapaho-Roosevelt National Forest.
5. **Gould:** This linkage area connects the west side of the Rawahs from Owl Mountain LAU on the Routt to the Laramie LAU on the Roosevelt, through the Colorado State Forest. The majority of the area is through State Forest land, and it connects the LAUs on the two National Forests.
6. **Muddy Pass:** This linkage area provides for movement across shrub-steppe habitats from Rabbit Ears Pass to the Park Range. It has mixed land ownership.
7. **Egeria:** This linkage area provides for movement opportunities from the Flattops (White River Plateau) east to the Routt, and includes mixed land ownership.
8. **State Bridge:** This linkage area provides for movement across shrub-steppe habitats from the Gore Range to the Sheephorn area, and has mixed land ownership.
9. **Castle Peak:** This linkage area provides for movement across shrub-steppe habitats between the Flattops (White River Plateau) east to Castle Peak, and has mixed land ownership.
10. **Glenwood:** This linkage area provides for movement between the Flattops, south through Glenwood Canyon, and then across shrub-steppe habitats to the Red Tables. Underpasses of I-70 are in place (e.g. Bair Ranch). There is mixed land ownership within this linkage area. There are several existing barriers to movement: Glenwood Canyon, the Colorado River, the railroad and Interstate 70, so remaining crossing areas are in need of maintenance/protection.
11. **Dowd Junction:** This linkage area is west of Vail, and is a north-south connection with an existing underpass and fencing. At Dowd Junction, there is an intersection of highway and interstate, with two drainages intersecting as well. The Colorado Division of Wildlife has identified it as a major problem area for elk. Some data has been collected on animal use with cameras. It is also an important crossing area for deer, elk and lion. There is residential and commercial development on both the north and south sides of this linkage area.
12. **Vail Pass:** This linkage area provides movement areas from approximately Timber Creek to Guller Creek. The area crosses I-70 and has high winter recreation use. The area

- mapped for this linkage area is the best remaining place for animals to cross I-70 in the Vail area, based on terrain features, habitat and lack of development. There is a potential to develop underpasses – as there is only one currently in place under west-bound lanes.
13. **Officer's Gulch:** This linkage area is a north-south connection of the Tenmile Range and Leadville with the Eagles Nest wilderness. It is the best remaining crossing area between Copper Mountain and Frisco, based on terrain, habitat and lack of development.
 14. **Loveland Pass:** This linkage area provides for north-south movements near I-70 at the Continental Divide, Peru Creek, Loveland Pass, Laskey Gulch and Jones Gulch. It includes portions of the White River National Forest and the Arapaho-Roosevelt National Forest. Some portions of the linkage are highly developed, with I-70, ski areas and towns.
 15. **Berthoud Pass:** This linkage is in an area with existing high volume highway and ski developments, where there is potential for additional development. This linkage covers both sides of the Continental Divide where lynx habitat is fairly well-connected, but human influence is high.
 16. **Herman Gulch:** This linkage area straddles I-70 for approximately 4 miles between the Herman Gulch area and Bakerville. It connects lynx habitat on both sides of a very high traffic volume interstate highway. The linkage area is needed to maintain existing connectivity, and improve the permeability of I-70 and the frontage roads.
 17. **Fraser Valley:** This linkage area is a north-south connection to northern Colorado, from the Fraser Valley, connecting subalpine forests along the west slope of the Continental Divide in a narrow area between alpine and private land.
 18. **Guanella Pass:** This linkage area is a North-south connection across a divide between the Pike-San Isabel and the Arapaho-Roosevelt National Forests, through a narrow alpine willow corridor on a high elevation mountain pass (Guanella Pass). There are several potential impediments and threats to connectivity, including a two lane highway and recreational developments.
 19. **Kenosha Pass:** This linkage area provides for north-south movements and east/west movements near Kenosha Pass. Connectivity is threatened with potential for highway upgrades and urbanization within South Park.
 20. **Georgia Pass:** The area within this linkage is the best forested, and least developed habitat connection that provides for north-south movements from South Park across the Continental Divide to Summit County. It connects to the Loveland Pass-Peru Creek connections.
 21. **Tennessee Pass:** This linkage area provides for major connections between blocks of habitat, tying the Sawatch Range to Summit County and into a habitat block near Vail Pass. It includes a portion of Fremont Pass and connects the Snake and Arkansas River drainages.
 22. **Clear Creek:** This linkage area includes a narrow forested corridor across Highway 24. It connects suitable blocks of habitat to each other through an open, lower elevation block of non-habitat. The existing threats to connectivity include highway crossing concerns.

23. **Cottonwood Pass:** This linkage area provides an east-west connection from the Collegiate Range to Taylor Park in the Sawatch Range, with a narrow forested corridor. There is heavy snowmobile use and a recent highway upgrade.
24. **Poncha:** This linkage area provides for movement between the San Juans to the Sawatch and Sangre de Cristo Ranges. It connects central Colorado to southern Colorado and is very important connection. The topography pattern and vegetation results in a funneling north-south connection near Poncha Pass. It also includes Monarch and Marshall Pass as they provide a series of habitat and terrain features that provide a “stepping stones” type series of connections.
25. **Black Mountain:** This linkage area provides a connection of the Sangre de Cristo range to the Wet Mountains. It includes a very narrow corridor of pinyon-juniper habitat for cover, which is the only forested canopy habitat available. It has mixed land ownership.
26. **LaVeta:** This linkage area provides north-south movement opportunities between the Sangre de Cristo range to the Culebra Range and the Spanish Peaks. Threats to habitat connectivity include crossing Hwy. 160. This linkage connects major blocks of habitat through shrub-steppe habitat and pinyon-juniper habitat.
27. **Trinchera:** This linkage area provides an East-West connection from the Culebras range to the Spanish Peaks, and includes Cucharas Pass. There is some mixed ownership. Threats are Hwy 12, Cuchara Ski Area, large ranches and subdivisions on west side that are and have been logging and building roads. Linkage refined to protect the critical area of undeveloped habitat on the NF.
28. **Cochetopa Hills/North Pass:** This linkage area provides for North-south movements from the San Juans to the Sawatch Ranges. It is a well-used movement corridor by lynx. North Pass (Highway 114) is a potential barrier or impediment to movements.
29. **Slumgullion Pass:** This linkage area includes the Spring Creek and Indian Creek areas. It provides a north-south connection between Lake City to the Creede area, with threats that include highway crossing problems (Hwy 149).
30. **Wolf Creek Pass:** This linkage area includes areas on both sides of Hwy 160, and provides for north-south movement. Lynx mortality at Pass Creek on east side of pass documents it is being used by lynx. Threats include a high volume, two lane highway, which is currently being upgraded.
31. **North la Plata:** this linkage area includes the ridgeline above Hermosa Creek, which connects the Lizardhead and Molas area to the La Plata Peaks block of habitat. IT incorporates the Divide Road, and the narrowest segment of spruce-fir habitat from north to south, which is fragmented both naturally and by past harvest activities.
32. **Lizard Head Pass:** this linkage area includes Lizard Head pass (Hwy. 145) to Rico to East Hermosa Triangle. Threats to lynx movements include highway crossing problems for the east-west connection and subdivision development. Lynx habitat is disjunct near the Pass, but highway crossing is important all along the linkage area. The area provides movement opportunities between blocks of habitat as well as maintaining permeability across highway.

33. **Molas-Coalbank Pass:** this linkage area includes areas on both sides of Molas Pass, Coalbank Pass and Silverton, due to the high volume highway and associated crossing concerns. It provides an east-west connection to habitat blocks on both sides of the highway. Highway 550 is high volume traffic and a potential barrier and mortality factor for lynx. There is documented lynx use in area. It extends to the South Mineral portion of Red Mountain Pass linkage, and has a shared linkage boundary at Deadwood Gulch.
34. **Red Mountain Pass:** This linkage area covers lynx habitat surrounding highway 550 from Silverton to Ouray. It is an east-west movement corridor with potential highway crossing problems on Hwy. 550. It includes the South Mineral drainage to provide a connection west towards Lizardhead. This linkage is needed to maintain/improve the permeability of the highway and to maintain connectivity within S. Mineral drainage.
35. **Silverton-Lake City:** This linkage area provides for lynx movements between Engineer Pass and Cinnamon Pass, through alpine habitats with scattered patches of willow. It is a well-documented lynx movement area.
36. **Dallas Divide:** This linkage area connects the Uncompahgre Plateau to the San Juans (Sneffels Range). It is entirely private land, therefore no standards and guidelines from the LCAS would apply. Conservation groups or the county could work towards conservation easements, etc. to maintain connectivity within this linkage.
37. **McClure Pass:** This linkage area connects a large area of central Colorado mountains with the Grand Mesa. There are possible highway crossing problems (Hwy. 133) and a great deal of winter recreational use.
38. **Battlement Mesa:** This linkage area connects the Grand Mesa to Battlement Mesa through non- lynx habitat.

Appendix E – Crosswalk between the Original Proposed Action and Proposed Action Clarified (Alternative B)

The following table is a crosswalk between the original proposed action that was scoped and changes made to the original proposed action to clarify intent and meaning. The Clarified Proposed Action is Alternative B in the Draft EIS. The intent of the clarification was to respond to comments that suggested the proposal was not clear, it was redundant, or that existing procedures already were covered. The sentences in italics provide rationale for the change. The changes are primarily based on the following considerations

- Some guidelines were written to clearly reflect the intent of a “guideline” which is the action “should” be done in such a manner, versus “must” be done.
- Several objective, standards and/or guidelines were dropped and/or combined if they were redundant.
- Some were edited for better clarity.
- Some were dropped if already required under existing procedures.
- Some were added if missed in the original proposed action to better show intent of the LCAS.

G/O=Goal, S=Standard, and G=Guideline

Table E-1 - Crosswalk between the Proposed Action and Clarification

Proposed Action Federal Register Notice	Proposed Action Clarified (Alternative B)
Range G/O 1. Manage grazing to maintain or move toward the composition and structure of native plant communities within lynx habitat and adjacent shrub-steppe habitats.	GRAZ O1. Manage livestock grazing to be compatible with the improvement or maintenance of lynx habitat.
Range S1. Within lynx habitat, manage livestock grazing in riparian areas and willow carrs to maintain or achieve mid-seral or later condition to provide cover and forage for lynx prey species	GRAZ S3. Manage livestock grazing in riparian areas, and willow carrs, so as to contribute to maintaining or achieving a preponderance of mid- or later-seral stages, similar to the conditions that would have occurred under historical disturbance regimes.
Range S2. Delay livestock use in post-fire and post-harvest created openings until successful regeneration of the shrub and tree components occurs.	GRAZ S1. In fire- and harvest-created openings, manage livestock grazing to ensure impacts do not prevent successful regeneration of shrubs and trees.
Range G1. Ensure that ungulate grazing does not impede the development of snowshoe hare habitat in natural or created openings within lynx habitat.	GRAZ S1. In fire- and harvest-created openings, manage livestock grazing to ensure impacts do not prevent successful regeneration of shrubs and trees.
Range G2. Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.	GRAZ S2. In aspen stands, manage livestock grazing to ensure impacts do not prevent or inhibit sprout survival sufficient to perpetuate the long-term viability of the clones.
Range G3. Maintain or achieve mid-seral or higher condition in shrub-steppe habitat that is within the elevational range of forested lynx habitat or that	GRAZ S4. Manage livestock grazing in shrub steppe habitats, in the elevational ranges that encompass forested lynx habitat (within LAUs) to

Proposed Action Federal Register Notice	Proposed Action Clarified (Alternative B)
provides landscape connectivity between blocks of primary lynx habitat.	contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar the conditions that would have occurred under historic disturbance regimes.
Silviculture G/O 1. Design regeneration harvest, planting, and thinning to develop characteristics suitable for lynx and snowshoe hare habitat.	VEG O4. Design regeneration harvest, reforestation, and thinning to develop characteristics suitable for lynx and snowshoe hare habitat.
Silviculture G/O 2. Maintain suitable acres or lynx habitat and juxtaposition of habitat through time when planning timber sales and related activities.	VEG O2. Maintain or improve lynx habitat, with an emphasis on continued availability of high-quality foraging habitat in juxtaposition to denning habitat.
Silviculture S1. Pre-commercial thinning will 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 snowpack).	VEG S5. Precommercial 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). The following precommercial thinning activities may occur prior to the stands no longer providing snowshoe hare habitat: 1. Precommercial thinning conducted within the structure ignition zone (200 feet of administrative sites, dwellings and/or associated outbuildings). 2. Wildfire suppression. 3. Wildland Fire Use practices and activities that restore ecological processes.
Silviculture S2. In aspen stands within lynx habitat, favor regeneration of aspen.	VEG G1. Where little or no habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Preference should be given to mesic sites and mid-seral stage stands. Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.
Silviculture S3. Following a disturbance such as blowdown, fires, insects, and disease, where lynx denning habitat is less than 10% of a Lynx Analysis Unit, do not salvage harvest when the affected area is smaller than 5 acres if it could contribute to lynx denning habitat. (Exceptions are developed recreation sites or other sites of high human concentration.) Where larger areas are affected, retain a minimum of 10% of the affected area per Lynx Analysis Unit in patches of at least 5 acres to provide future denning habitat. In such areas, defer or modify management activities that would prevent development or maintenance of lynx foraging habitat.	VEG S4. 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: 1. Developed recreation sites, administrative sites, or authorized special use structures or improvements; 2. Designated road and trail corridors where public safety or access has been or may be compromised; and 3. LAUs where denning habitat has been mapped and field validated, provided that at least 10 percent denning habitat is retained and is well distributed. 4. Wildfire suppression.

Proposed Action Federal Register Notice	Proposed Action Clarified (Alternative B)
Silviculture G1. Management activities retain adequate amounts of coarse woody debris for lynx and snowshoe hare cover, if it exists on site.	VEG G2. Where recruitment of additional denning habitat is desired, vegetation management practices should retain sufficient standing dead trees and coarse woody debris, consistent with the likely availability of such material under natural disturbance regimes. The juxtaposition of denning and foraging habitat should be maintained or improved.
Silviculture G2. Commercial thinning projects shall maintain or enhance lynx habitat.	VEG S2. Timber management practices, such as timber harvest and salvage sales, shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.
Silviculture G3. Design vegetation management activities that consider retaining or encouraging tree species composition and structure that will provide habitat for red squirrels or other lynx alternate prey species.	VEG G5. Habitat for alternate prey species (primarily red squirrel) should be provided in each LAU.
Threatened, Endangered, and Sensitive Species - (TES) G/O 1. Maintain effectiveness of lynx habitat. (Effectiveness is primarily affected by high level of human use.)	VEG O1. Manage vegetation to be consistent with historical succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.
TES S1. If more than 30% of the lynx habitat in a Lynx Analysis Unit (LAU) is currently in unsuitable condition, no further reduction of suitable habitat shall occur as a result of vegetation management activities.	VEG S1. 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 percent of lynx habitat within a 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. Exceptions to this include: 1. Wildland Fire Use practices and activities that restore ecological processes. 2. Wildfire suppression.
TES S2. Vegetation management shall not change more than 15 percent of lynx habitat within a LAU to unsuitable condition within a 10-year period.	VEG S2. Timber management practices, such as timber harvest and salvage sales, shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.
Denning G/O 1. Provide a landscape with interconnected blocks of high quality foraging and denning habitat that allows lynx movement between these habitats.	ALL O1. Maintain or restore lynx habitat connectivity.
S1. Within a Lynx Analysis Unit, maintain denning habitat on at least 10% of the area that is capable of producing	VEG S3. Maintain denning habitat within a LAU in patches generally larger than 5 acres comprising at least 10 percent of the lynx habitat. Where less

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stands with characteristics suitable for denning habitat. Denning habitat should be well distributed, in patches generally larger than 5 acres. This applies to vegetation treatment, timber harvest, prescribed fire, fire suppression actions, and other similar activities.	than 10 percent denning habitat is present in a LAU, defer vegetation management activities and practices in stands that have the highest potential to develop denning-habitat. Exceptions to this include: 1. Wildland Fire Use practices and activities that restore ecological processes. 2. Wildfire suppression.
Denning G1. In areas where future 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, consider improvement of habitat through activities such as commercial thinning and selection harvesting. Use harvesting and thinning to retain and recruit understories of small diameter conifers and shrubs preferred by hares and to retain and recruit coarse woody debris.	VEG G1. Where little or no foraging habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Provide for continuing availability of foraging habitat in proximity to denning habitat. VEG G2. Where recruitment of additional denning habitat is desired, vegetation management practices should retain sufficient standing dead trees and coarse woody debris, consistent with the likely availability of such material under natural disturbance regimes. The juxtaposition of denning and foraging habitat should be maintained or improved.
Denning G2. Maintain or improve the juxtaposition of denning to foraging habitat. This can be important in large wildfire events in late seral.	VEG G3. Vegetation management should provide for the retention or restoration of denning habitat on landscapes settings with a low probability of loss from stand replacing fire events.
Denning G3. Design vegetation and fire management activities to retain or restore lynx denning habitat on landscapes with the highest probability of escaping stand-replacing fire events.	VEG G3. Vegetation management should provide for the retention or restoration of denning habitat on landscapes settings with a low probability of loss from stand replacing fire events.
Connectivity G/O 1. Maintain and, where necessary and feasible, restore lynx habitat connectivity across forested landscapes and within and between Lynx Analysis Units. Facilitate wildlife movement within key linkage areas considering highway crossing structures when feasible.	ALL O1. Maintain or restore lynx habitat connectivity. LINK O1. In areas of intermixed land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.
Connectivity G/O 2. Within Lynx Analysis Units that have been fragmented by past management activities that reduced the quality of lynx habitat, management practices will be implemented to move toward forest composition, structure and patterns more similar to those that would have occurred	VEG O1. Manage vegetation to be consistent with historical succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.

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under historical conditions and natural disturbance processes.	
Competition G/O 1. Avoid management practices that would increase competition with and predation on lynx Prey Species:	HU O1. Maintain the lynx's natural competitive advantage over other predators in deep-snow conditions by discouraging the expansion of snow compaction activities in lynx habitat.
Competition G/O 1a. Reduce incidental harm or capture of lynx during predator control activities and ensure retention of adequate prey base.	HU O1. Maintain the lynx's natural competitive advantage over other predators in deep-snow conditions by discouraging the expansion of snow compaction activities in lynx habitat.
Competition G/O 2. Retain and enhance existing habitat conditions for important lynx prey species and alternate prey species, such as the red squirrel.	VEG O2. Maintain or improve lynx habitat, with an emphasis on continued availability of high-quality foraging habitat in juxtaposition to denning habitat.
Fire G/O 1. Restore fire as an ecological process through time and use fire as a tool to maintain, enhance, or restore lynx habitat.	VEG O3. Conduct fire use activities to restore ecological processes and maintain or improve lynx habitat.
Fire G1. Consider prescriptions that can result in regeneration and the creation of snowshoe hare habitat when developing burn prescriptions, especially for lodgepole pine and aspen.	VEG G1. Where little or no foraging habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Provide for continuing availability of foraging habitat in proximity to denning habitat.
Fire G2. Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.	VEG G1. Where little or no habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Preference should be given to mesic sites and mid-seral stage stands. Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.
Fire G3. Consider the need for pre-treatment of fuels before conducting management ignitions.	Standard operating procedures.
Fire G4. In lynx habitat, avoid constructing permanent firebreaks on ridges or saddles.	HU G7. 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.
Fire G5. Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities in lynx habitat.	Standard operating procedures.
Fire G6. In the event of a large wildfire in stands that were formally late seral, during the post-disturbance assessment	VEG G1. Where little or no habitat for snowshoe hares is currently available, vegetation management practices should be planned to recruit a high

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<p>prior to restoration or salvage harvesting, evaluate the potential for providing for lynx denning and foraging habitat.</p>	<p>density of conifers, hardwoods, and shrubs preferred by snowshoe hares. Preference should be given to mesic sites and mid-seral stage stands. Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.</p> <p>VEG G2. Where recruitment of additional denning habitat is desired, vegetation management practices should retain sufficient standing dead trees and coarse woody debris, consistent with the likely availability of such material under natural disturbance regimes. The juxtaposition of denning and foraging habitat should be maintained or improved.</p>
<p>Recreation Dev S1. Locate new or relocated trails, roads, and ski lift termini to direct winter use away from diurnal security habitat.</p>	<p>HU S2. When developing or expanding ski areas, locate trails, access roads and lift termini to maintain and provide lynx diurnal security habitat if it is identified as a need.</p>
<p>Recreation Dev S2. Protect key linkage areas when planning new or expanding recreational developments.</p>	<p>HU G3. Recreational development and recreational operational uses should be planned to provide for lynx movement and to maintain effectiveness of lynx habitat.</p>
<p>Recreation Dev G1. Provide adequately sized coniferous inter-trail islands, including the retention of coarse woody material, to maintain snowshoe hare habitat when designing ski area expansions.</p>	<p>HU G1. In the development or expansion of ski areas, adequately sized inter-trail islands should be provided, including the retention of coarse woody debris, to maintain snowshoe hare habitat.</p>
<p>Recreation Dev G2. Identify and protect potential lynx security habitats in and around proposed developments or expansions.</p>	<p>HU S2. When developing or expanding ski areas, locate trails, access roads and lift termini to maintain and provide lynx diurnal security habitat if it is identified as a need.</p>
<p>Recreation Dev G3. Evaluate, and adjust as necessary, ski operations in expanded or newly developed areas to provide nocturnal foraging opportunities for lynx in a manner consistent with operational needs, especially in landscapes where lynx habitat occurs as narrow bands of coniferous forest across the mountain slopes.</p>	<p>HU G2. When developing or expanding ski areas, nocturnal foraging opportunities should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.</p>
<p>Standards: Recreation Disp S1. Allow no net increase in groomed or designated over-the-snow routes and designated snowmobile play areas by Lynx Analysis Units unless the designation serves to consolidate unregulated use and improves lynx habitat. Winter logging activity would be an exception.</p>	<p>HU S1. 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 in-holdings and to other access regulated by HU S3.</p>

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<p>Guidelines: Recreation Disp G1. Limit or discourage activities that result in snow compaction in areas where it is shown to compromise lynx habitat. Such actions should be undertaken on a priority basis considering habitat function and importance.</p>	<p>HU S1. 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 in-holdings and to other access regulated by HU S3.</p> <p>HU S3. Winter access for non-recreation special uses, and mineral and energy exploration and development, shall be limited to designated routes or designated over-the-snow routes.</p>
<p>Infrastructure S1. Close temporary roads constructed for timber sale activities in lynx habitat to public use during the winter.</p>	<p>HU G9. On new roads built for project-specific activities, public motorized use should be restricted. 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.</p>
<p>Infrastructure G1. Design new roads that could impact lynx habitat, especially the entrance, for effective closure and subsequent decommissioning, if it meets overall management objectives.</p>	<p>HU G9. On new roads built for project-specific activities, public motorized use should be restricted. 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.</p>
<p>Infrastructure G2. Minimize roadside brushing on low speed, low volume roads in order to provide snowshoe hare habitat.</p>	<p>HU G8. Cutting brush along low-speed, low-volume roads should be done to the minimum level necessary to provide for public safety.</p>
<p>Infrastructure G3. Locate trails and roads away from forested stringers to avoid fragmentation.</p>	<p>HU G7. 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.</p>
<p>Infrastructure G4. Minimize creation of permanent travelways on ridgetops and saddles that could facilitate increased access by lynx competitors in lynx habitat.</p>	<p>HU G7. 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.</p>
<p>Real Estate G/O 1. Retain key wildlife linkage areas on National Forest System lands in public ownership. Cooperate with other ownerships to establish unified management direction via habitat conservation plans, conservation easements or agreements, and land acquisition.</p>	<p>LINK G1. National Forest System lands should be retained in public ownership.</p>

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Special Uses G/O 1. Design activities and facilities to minimize impacts on lynx habitat.	HU 05. Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.
Special Uses S1. Restrict authorized use under permits to designated routes when in lynx habitat on projects where over-snow access is required. Close newly constructed roads to public access during project activities. Upon project completion, evaluate the need to reclaim these roads.	HU S3. Winter access for non-recreation special uses, and mineral and energy exploration and development, shall be limited to designated routes or designated over-the-snow routes.
Special Uses G1. Encourage remote monitoring of sites that are located in lynx habitat, so that they do not have to be visited daily.	HU G4. Remote monitoring of mineral and energy development sites and facilities should be encouraged to reduce snow compaction.
Transportation G1. Reduce the potential for lynx mortality related to highways.	LINK S1. When forest highway or highway construction/reconstruction is proposed in linkage areas, <u>identify potential highway crossings.</u>
Transportation G/O 2. Work cooperatively with the Federal Highway Administration and State Departments of Transportation to address the movement needs of lynx.	HU 06. Reduce adverse highway effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity, and to reduce the potential for lynx mortality.
Transportation S. Maintain connectivity of lynx habitat during the planning for highway rights-of-ways, construction, reconstruction, and other possible transportation corridors.	ALL S1. New or expanded permanent developments and vegetation management activities and practices must maintain habitat connectivity.

Appendix F - Procedures for Lynx Habitat and Lynx Analysis Unit Mapping

Lynx Habitat Mapping:

Information contained in the Science Team Report (Ruggiero et al. 2000a) provides the starting point for lynx habitat mapping. The outer boundary that should be used for each geographic area is shown in Chapter 8 (McKelvey et al. 2000): Figs 8.20 for western U.S., Fig. 8.22 for the Great Lakes, and Fig. 8.23 for the Northeast (these are combined into the insert map entitled “Vegetation Types and Elevation Zones Associated with Lynx Occurrences”), with the following exceptions:

- ♦ In southern Colorado, the Rocky Mountain Conifer Forest type as depicted in Fig. 8.19 should be added to the outer boundary. These areas were lost in the transition to Fig. 8.20 due to vagaries of the Kuchler delineations of vegetation subtypes, rather than lack of historical occurrences (K. McKelvey, pers. comm. 2000).
- ♦ Models for denning and foraging were developed using habitat definitions and descriptions contained in the Lynx Conservation Assessment and Strategy. Note that elevation ranges used for the Southern Rockies is 8,000 to 11,500 feet.
- ♦ Within the boundaries defined by the first two steps, map vegetation that could contribute to lynx habitat, as described for each geographic area in the Lynx Conservation Assessment and Strategy, using the finest-scale vegetation information that is available. The following clarifies primary and secondary vegetation for the western U.S.
- ♦ Mesic subalpine fir forests in the western U.S. are extensions of boreal forests. Subalpine fir habitat types dominated by cover types of spruce/fir, Douglas-fir, and seral lodgepole pine should be mapped as primary vegetation. These types must be present to support foraging, denning and rearing of young.
- ♦ Other cool, moist habitat types (e.g., some Douglas-fir, grand fir) may contribute to lynx habitat where intermingled with and immediately adjacent to primary vegetation. These types are described as secondary vegetation.
- ♦ Lynx do not appear to be associated with dry forest habitat types (e.g., ponderosa pine, dry Douglas-fir, and dry or climax lodgepole pine) except to move among mesic stands (Ruggiero et al. 2000b). These dry types should not be included as vegetation contributing to lynx habitat.

The next steps are to identify lynx habitat within a Lynx Analysis Unit (LAU), which involves consideration of several additional factors:

- ♦ Determine whether the amount and spatial arrangement of vegetation is sufficient to warrant delineating a LAU (amount, patch size, inter-patch distance).
- ♦ Evaluate land ownership pattern (to assess feasibility of achieving lynx conservation objectives on federally administered lands, to determine appropriate size and configuration of the LAU, etc.).
- ♦ Review occurrence records of all types to assess validity of identifying the area as lynx habitat – location, pattern, consistency, and year in relation to Canadian population cycles. Evaluate the records as described in Chapter 8 (McKelvey et al. 2000). Lack of records in an area does not necessarily indicate lack of habitat; conversely, detections do not necessarily

indicate lynx habitat. Independently, occurrence records indicate only occurrence.

Collectively, as a data set, occurrences can reveal habitats that likely are important to lynx.

- ♦ Snow depth information may be useful to exclude ungulate winter ranges and areas that do not retain adequate snow cover during the winter.

National Forest Units in the SRMGA started mapping lynx habitat in January and February of 2000, based on habitat descriptions from the LCAS, and initially used the internal Ryke and Buell protocol developed in 1999 as a starting point (Ryke and Buell 1999). Further refinements were made based on the August 22, 2000 memo from the Lynx and Wolverine Steering Committee. Each forest unit documented their specific criteria and rationale for LAU boundaries and lynx habitat. Coordination of mapping was done with adjacent administrative units and state wildlife agencies where appropriate. Lynx habitat, Lynx Analysis Units and linkage areas were coordinated with the US Fish and Wildlife Service, to achieve as much consistency as possible, given the different habitats within the SRMGA. Coordination meetings were scheduled in February, 2000, on each forest, with the lead lynx biologists for the US Fish and Wildlife Service and the US Forest Service in attendance, to review and provide recommendations or comments on each forest's lynx habitat mapping. Further instructions for the Southern Rockies habitat mapping were given including the following LAU boundary instructions:

LAU boundaries:

- ♦ Eliminate large areas of non-lynx habitats (primarily at lower elevations)
- ♦ Eliminate areas of potentially suitable lynx habitat (based on vegetation type alone), which have conditions due to isolation or climate that result in the habitat not being capable of producing lynx winter foraging habitat or denning habitat in the long term. Examples of this include the "dry" lodgepole habitat classifications and the extensive stands of pure, stable aspen.

Forest's lynx habitat maps were once again reviewed in December, 2001 by the lead lynx biologists for the U.S. Fish and Wildlife Service (both Colorado and Wyoming) and the U.S. Forest Service, Region 2 and were accepted.

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Appendix G - Management Indicator Species

San Juan Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In San Juan Plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
Abert's squirrel	No
American marten	Yes
Beaver	Yes
Black bear	Yes
Deer mouse	Yes
Elk	Yes
Mule deer	Yes
River otter	Yes
Canada lynx	Yes
Birds:	
Columbian sharp-tailed grouse	No
Green-tailed towhee	No
Hairy woodpecker	Yes
Mallard	Yes
Merriam's turkey	Yes
Mountain bluebird	Yes
Northern goshawk	Yes
Bald eagle	Yes
Southwestern willow flycatcher	Yes
Mexican spotted owl	No
Fish:	
Brook trout	Yes
Brown trout	Yes
Colorado River cutthroat trout	Yes
Rainbow trout	Yes
Insects:	
Uncompahgre fritillary butterfly	No

Arapaho-Roosevelt Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In Arapaho/Roosevelt plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
Elk	yes
Mule deer	yes
Bighorn sheep	yes
Black-tailed prairie dog	no
Birds:	
Ferruginous hawk	no
Mountain plover	no
Burrowing owl	no
Hairy woodpecker	yes

Mountain bluebird	yes
Warbling vireo	yes
Pygmy nuthatch	yes
Golden-crowned kinglet	yes
Wilson's warbler	yes
Lark bunting	no
Fish:	
Brook trout	yes
Brown trout	yes
Colorado River cutthroat trout	yes
Greenback cutthroat trout	yes
Plains topminnow	no
Plains killifish	no
Amphibians:	
Boreal toad	yes

Grand Mesa, Uncompahgre, Gunnison Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In Grand Mesa, Uncompahgre, Gunnison plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
Elk	yes
American marten	Yes
Abert's squirrel	Yes
Birds:	
Northern goshawk	yes
Brewer's sparrow	no
Merriam's wild turkey	yes
Fish:	
Colorado River cutthroat trout	yes
Rainbow trout	yes
Brown trout	yes
Brook trout	yes

Medicine Bow Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In Medicine Bow/Routt Plans	Does the Species Occur Within Lynx Habitat?
Mammals:	
American marten	yes
Snowshoe hare	yes
Birds:	
Northern goshawk	yes
Three-toed woodpecker	yes
Golden-crowned kinglet	yes
Wilson's warbler	yes
Lincoln sparrow	yes
Fish:	
Colorado River cutthroat trout	yes
Common trout species	yes

Routt Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In Routt Forest Plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
Birds:	
Northern goshawk	yes
Three-toed woodpecker	yes
Golden-crowned kinglet	yes
Wilson's warbler	yes
Vesper sparrow	yes
Fish:	
Colorado River cutthroat trout	yes
Common trout species	yes

Pike-San Isabel Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed Pike-San Isabel Plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
Elk	yes
Abert's squirrel	no
Fish:	
Greenback cutthroat trout	yes
Brook trout	yes

Rio Grande Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In Rio Grande plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
Elk	yes
Mule deer	yes
Birds:	
Brown creeper	yes
Pygmy nuthatch	yes
Hermit thrush	yes
Wilson's warbler	yes
Lincoln's sparrow	yes
Vesper sparrow	yes
Fish:	
Rio Grande cutthroat trout	yes
Rainbow trout	yes
Brook trout	yes
Brown trout	yes

White River Forest Plan Management Indicator Species and Occupancy in Lynx Habitat

MIS Addressed In White River National Forest Plan	Does the Species Occur Within Lynx Habitat?
Mammals:	
American Elk	yes
Cave bats	no
Birds:	
American Pipit	no
Brewer's Sparrow	no
Virginia's Warbler	no
Fish and Aquatic Insects:	
Aquatic Macroinvertebrates	yes
All trout (brook, brown, rainbow and Colorado River cutthroat trout)	yes

Appendix H - Management Direction for the Final EIS Preferred Alternative, Alternative F

GOAL¹⁴

Conserve the Canada lynx.

ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL). The following objectives, standards, and guidelines apply to all management practices and activities in lynx habitat in lynx analysis units (LAUs) and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use.

Objective³⁰ ALL O1

Maintain²⁶ or restore³⁹ lynx habitat²³ connectivity¹⁶ in and between LAUs²¹, and in linkage areas²².

Standard⁴³ ALL S1

New or expanded permanent developments³³ and vegetation management projects⁴⁸ must maintain²⁶ habitat connectivity¹⁶ in an LAU²¹ and/or linkage area²².

Guideline¹⁵ ALL G1

Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways¹⁸ or forest highways¹² across federal land. Methods could include fencing, underpasses, or overpasses.

Standard⁴³ LAU S1

Changes in LAU²¹ boundaries shall be based on site specific habitat information and after review by the Forest Service Regional Office.

VEGETATION MANAGEMENT ACTIVITIES AND PRACTICES (VEG). The following objectives, standards, and guidelines apply to vegetation management projects in lynx habitat within lynx analysis units (LAUs). With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards, and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, roads, and the like. None of the objectives, standards, or guidelines apply to linkage areas.

Objective³⁰ VEG O1

Manage vegetation⁴⁸ to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.

Objective VEG O2

Provide a mosaic of habitat conditions through time that support dense horizontal cover¹⁹, and high densities of snowshoe hare. Provide winter snowshoe hare habitat⁵⁰ in both the stand initiation structural stage and in mature, multi-story conifer vegetation.

Objective VEG O3

Conduct fire use activities to restore³⁹ ecological processes and maintain or improve lynx habitat.

Objective VEG O4

Focus vegetation management⁴⁸ in areas that have potential to improve winter snowshoe hare habitat⁵⁰ but presently have poorly developed understories that lack dense horizontal cover.

Standard⁴³ VEG S1

Where and to what this applies:

Standard VEG S1 applies to all vegetation management⁴⁸ practices and activities that regenerate³⁷ forested stands, except for fuel treatment¹³ projects within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation:

Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects within the WUI see guideline VEG G10.

The Standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages⁴⁴ limit disturbance in each LAU as follows:

If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.

Standard VEG S2

Where and to what this applies:

Standard VEG S2 applies to all timber management⁴⁸ practices and activities that regenerate³⁷ forested stands, except for fuel treatment¹³ projects within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation:

Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects within the WUI see guideline VEG G10.

The Standard: Timber management projects shall not regenerate³⁷ more than 15 percent of lynx habitat on NFS lands within an LAU in a ten-year period.

Standard VEG S5

Where and to what this applies:

Standard VEG S5 applies to all precommercial thinning³⁵ practices and activities, except for fuel treatment¹³ projects that use precommercial thinning as a tool within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation:

Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects within the WUI see guideline VEG G10.

The Standard: Precommercial thinning practices and activities that reduce snowshoe hare habitat, may occur from the stand initiation structural stage⁴⁴ until the stands no longer provide winter snowshoe hare habitat only:

1. Within 200 feet of administrative sites, dwellings, or outbuildings; or
2. For research studies³⁸ or genetic tree tests evaluating genetically improved reforestation stock; or
3. Based on new information that is peer reviewed and accepted by the regional/state levels of the Forest Service and FWS, where a written determination states:
 - a. that a project is not likely to adversely affect lynx; or
 - b. that a project is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat; or
4. For conifer removal in aspen, or daylight thinning⁵ around individual aspen trees, where aspen is in decline.

Standard VEG S6

Where and to what this applies:

Standard VEG S6 applies to all vegetation management⁴⁸ practices and activities that regenerate³⁷ forested stands, except for fuel treatment¹³ projects within the wildland urban interface (WUI) as defined by HFRA, subject to the following limitation:

Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects within the WUI see guideline VEG G10.

The Standard: Vegetation management practices and activities that reduce snowshoe hare habitat in multi-story mature or late successional forests²⁹ may occur only:

1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or
2. For research studies³⁸ or genetic tree tests evaluating genetically improved reforestation stock; or
3. For incidental removal during salvage harvest⁴¹ (e.g. removal due to location of skid trails).

(NOTE: Timber harvest is allowed in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover [e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow]).

Guideline VEG G1

Vegetation management⁴⁸ practices and activities should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority for treatment should be given to stem-exclusion, closed-canopy structural stage⁴⁵ stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands).

Winter snowshoe hare habitat⁵⁰ should be near denning habitat⁶.

Guideline VEG G4

Prescribed fire³⁴ activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.

Guideline VEG G5

Habitat for alternate prey species, (primarily red squirrel³⁶) should be provided in each LAU.

Guideline VEG G10

Fuel treatment projects within the WUI⁴⁹ as defined by HFRA¹⁷ should be designed considering standards VEG S1, S2, S5, and S6 to promote lynx conservation.

Guideline VEG G11

Denning habitat⁶ should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be

lacking in the LAU, then projects should be designed to retain some coarse woody debris⁴, piles, or residual trees to provide denning habitat⁶ in the future.

LIVESTOCK MANAGEMENT (GRAZ): Applies to grazing practices and activities in lynx habitat in lynx analysis units (LAUs). They do not apply to linkage areas.

Objective³⁰ GRAZ O1

Manage livestock grazing to be compatible with the improvement or maintenance²⁶ of lynx habitat²³.

Guideline¹⁵ GRAZ G1

In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.

Guideline GRAZ G2

In aspen stands, livestock grazing should be managed to contribute to the long-term viability of the aspen.

Guideline GRAZ G3

In riparian areas⁴⁰ and willow carrs³, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages²⁸, similar to conditions that would have occurred under historic disturbance regimes.

Guideline GRAZ G4

In shrub-steppe habitats⁴², livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs²¹, to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.

HUMAN USE PROJETS (HU): The following objectives and guidelines apply to human use projects, such as special uses (other than grazing), recreation management, roads, highways, and mineral and energy development, in lynx habitat in lynx analysis units (LAUs), subject to valid existing rights. They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.

Objective³⁰ HU O1

Maintain²⁶ the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat²³.

Objective HU O2

Manage recreational activities to maintain lynx habitat and connectivity¹⁶.

Objective HU O3

Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.

Objective HU O4

Provide for lynx habitat needs and connectivity when developing new or expanding existing developed recreation⁹ sites or ski areas.

Objective HU O5

Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.

Objective HU O6

Reduce adverse highway¹⁸ effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity¹⁶, and to reduce the potential of lynx mortality.

Guideline¹⁵ HU G1

When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris⁴, so winter snowshoe hare habitat⁵⁰ is maintained.

Guideline HU G2

When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.

Guideline HU G3

Recreation development and recreational operational uses should be planned to provide for lynx movement and to maintain the effectiveness of lynx habitat²³.

Guideline HU G4

Remote monitoring of mineral and energy development sites and facilities should be encouraged to reduce snow compaction.

Guideline HU G5

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.

Guideline HU G6

Methods to avoid or reduce effects to lynx habitat connectivity should be used when upgrading unpaved roads to maintenance levels 4 or 5, where the result would be increased traffic speeds and volumes, or contribute to development or increases in human activity.

Guideline HU G7

New permanent roads should not be built on ridge-tops and saddles, or in areas identified as important for lynx habitat connectivity¹⁶. New permanent roads and trails should be situated away from forested stringers.

Guideline HU G8

Cutting brush along low-speed²⁵, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.

Guideline HU G9

If project level analysis determines that new roads adversely affect lynx, then public motorized use should be restricted. Upon project completion, these roads should be reclaimed or decommissioned, if not needed for other management objectives.

Guideline HU G10

Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction¹, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs.

This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12.

Use the same analysis boundaries for all actions subject to this guideline.

Guideline HU G11

When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat¹⁰.

Guideline HU G12

Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes⁸ or designated over-the-snow routes⁷.

LINKAGE AREAS (LINK): The following objective, standard, and guidelines apply to all projects within linkage areas, subject to valid existing rights.

Objective³⁰ LINK O1

In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.

Standard⁴³ LINK S1

When highway¹⁸ or forest highway¹² construction or reconstruction is proposed in linkage areas²², identify potential highway crossings.

Guideline¹⁵ LINK G1

NFS lands should be retained in public ownership.

Guideline LINK G2

Livestock grazing in shrub-steppe habitats⁴² should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages²⁸, similar to conditions that would have occurred under historic disturbance regimes.

REQUIRED MONITORING

1. Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998 to 2000. The mapping is to be completed within one year of this decision, and changes in activities and routes are to be monitored every five years after the decision.
2. Annually report the number of acres where any of the exemptions 1 through 4 listed in Standard VEG S5 were applied. Report the type of activity, the number of acres, and the location (by unit, and LAU²¹).
3. Report the acres of fuel treatment in lynx habitat within the wildland urban interface⁴⁹ as defined by HFRA¹⁷ when the project decision is approved. Report whether or not the fuel treatment met the vegetation standard. If standard(s) are not met, report which standard(s) are not met, why they were not met, and how many acres were affected.

GLOSSARY

¹ *Area of consistent snow compaction* – An area of consistent snow compaction is an area of land or water that during winter is generally covered with snow and gets enough human use that individual tracks are indistinguishable. In such places, compacted snow is evident most of the time, except immediately after (within 48 hours) snowfall. These can be areas or linear routes, and are generally found in or near snowmobile or cross-country ski routes, in adjacent openings, parks and meadows, near ski huts or plowed roads, or in winter parking areas. Areas of consistent snow compaction will be determined based on the acreage or miles used during the period 1998 to 2000.

² *Broad scale assessment* – A broad scale assessment is a synthesis of current scientific knowledge, including a description of uncertainties and assumptions, to provide an understanding of past and present conditions and future trends, and a characterization of the ecological, social, and economic components of an area. (LCAS)

³ *Carr* – Deciduous woodland or shrub land occurring on permanently wet, organic soil. (LCAS)

⁴ *Course woody debris* – Any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses on the ground or in streams. (LCAS)

⁵ *Daylight thinning* – Daylight thinning is a form of precommercial thinning that removes the trees and brush inside a given radius around a tree.

⁶ *Denning habitat (lynx)* – Denning habitat is the environment lynx use when giving birth and rearing kittens until they are mobile. The most common component is large amounts of coarse woody debris to provide escape and thermal cover for kittens. Denning habitat must be within daily travel distance of winter snowshoe hare habitat – the typical maximum daily distance for

females is about three to six miles. Denning habitat includes mature and old growth²⁴ forests with plenty of coarse woody debris. It can also include young regenerating forests with piles of coarse woody debris, or areas where down trees are jack-strawed.

⁷ *Designated over-the-snow routes* – Designated over-the-snow routes are routes managed under permit or agreement or by the agency, where use is encouraged, either by on-the-ground marking or by publication in brochures, recreation opportunity guides or maps (other than travel maps), or in electronic media produced or approved by the agency. The routes identified in outfitter and guide permits are designated by definition; groomed routes also are designated by definition. The determination of baseline snow compaction will be based on the miles of designated over-the-snow routes authorized, promoted or encouraged during the period 1998 to 2000.

⁸ *Designated route* – A designated route is a road or trail that has been identified as open for specified travel use.

⁹ *Developed recreation* – Developed recreation requires facilities that result in concentrated use. For example, skiing requires lifts, parking lots, buildings, and roads; campgrounds require roads, picnic tables, and toilet facilities.

¹⁰ *Security habitat (lynx)* – Security habitat amounts to places in lynx habitat that provide secure winter bedding sites for lynx in highly disturbed landscapes like ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Forest structures that make human access difficult generally discourage human activity in security habitats. Security habitats are most effective if big enough to provide visual and acoustic insulation and to let lynx easily move away from any intrusion. They must be close to winter snowshoe hare habitat. (LCAS)

¹¹ *Fire use* – Fire use is the combination of wildland fire use and using prescribed fire to meet resource objectives. (NIFC) Wildland fire use is the management of naturally ignited wildland fires to accomplish resource management objectives in areas that have a fire management plan. The use of the term wildland fire use replaces the term prescribed natural fire. (Wildland and Prescribed Fire Management Policy, August 1998)

¹² *Forest highway* – A forest highway is a forest road under the jurisdiction of, and maintained by, a public authority and open to public travel (USC: Title 23, Section 101(a)), designated by an agreement with the FS, state transportation agency, and Federal Highway Administration.

¹³ *Fuel treatment* – A fuel treatment is a type of vegetation management action that reduces the threat of ignition, fire intensity, or rate of spread, or is used to restore fire-adapted ecosystems.

¹⁴ *Goal* – A goal is a broad description of what an agency is trying to achieve, found in a land management plan. (LCAS)

¹⁵ *Guideline* – A guideline is a particular management action that should be used to meet an objective found in a land management plan. The rationale for deviations may be documented, but amending the plan is not required. (LCAS modified)

¹⁶ *Habitat connectivity (lynx)* – Habitat connectivity consists of an adequate amount of vegetation cover arranged in a way that allows lynx to move around. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat; wooded riparian areas may provide travel cover across open valley floors. (LCAS)

¹⁷ *HFRA (Healthy Forests Restoration Act)* - Public Law 108-148, passed in December 2003. The HFRA provides statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. (Modified from Forest Service HFRA web site.)

¹⁸ *Highway* – The word highway includes all roads that are part of the National Highway System. (23 CFR 470.107(b))

¹⁹ *Horizontal cover* – Horizontal cover is the visual obscurity or cover provided by habitat structures that extend to the ground or snow surface primarily provided by tree stems and tree boughs, but also includes herbaceous vegetation, snow, and landscape topography.

²⁰ *Isolated mountain range* – Isolated mountain ranges are small mountains cut off from other mountains and surrounded by flatlands. On the east side of the Rockies, they are used for analysis instead of sub-basins. Examples are the Little Belts in Montana and the Bighorns in Wyoming.

²¹ *LAU (Lynx Analysis Unit)* – An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (LCAS). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant.

²² *Linkage area* – A linkage area provides connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys, or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks. (LCAS updated definition approved by the Steering Committee 10/23/01)

²³ *Lynx habitat* – Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Douglas-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat. (LCAS)

²⁴ *Lynx habitat in an unsuitable condition* – Lynx habitat in an unsuitable condition consists of lynx habitat in the stand initiation structural stage where the trees are generally less than ten to 30 years old and have not grown tall enough to protrude above the snow during winter. Stand replacing fire or certain vegetation management projects can create unsuitable conditions. Vegetation management projects that can result in unsuitable habitat include clearcuts and seed tree harvest, and sometimes shelterwood cuts and commercial thinning depending on the resulting stand composition and structure. (LCAS)

²⁵ *Low-speed, low-traffic-volume road* – Low speed is less than 20 miles per hour; low volume is a seasonal average daily traffic load of less than 100 vehicles per day.

²⁶ *Maintain* – In the context of this amendment, maintain means to provide enough lynx habitat to conserve lynx. It does not mean to keep the status quo.

²⁷ *Maintenance level* – Maintenance levels define the level of service provided by and maintenance required for a road. (FSH 7709.58, Sec 12.3) Maintenance level 4 is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most level 4 roads have double lanes and an aggregate surface. Some may be single lane; some may be paved or have dust abated. Maintenance level 5 is assigned to roads that provide a high degree of user comfort and convenience. Normally, level 5 roads are have double lanes and are paved, but some may be aggregate surfaced with the dust abated.

²⁸ *Mid-seral or later* – Mid-seral is the successional stage in a plant community that is the midpoint as it moves from bare ground to climax. For riparian areas, it means willows or other shrubs have become established. For shrub-steppe areas, it means shrubs associated with climax are present and increasing in density.

²⁹ *Multi-story mature or late successional forest* – This stage is similar to the *old multistory structural* stage (see below). However, trees are generally not as old, and decaying trees may be somewhat less abundant.

³⁰ *Objective* – An objective is a statement in a land management plan describing desired resource conditions and intended to promote achieving programmatic goals. (LCAS)

³¹ *Old multistory structural stage* – Many age classes and vegetation layers mark the old forest, multistoried stage. It usually contains large old trees. Decaying fallen trees may be present that leave a discontinuous overstory canopy. On cold or moist sites without frequent fires or other disturbance, multi-layer stands with large trees in the uppermost layer develop. (Oliver and Larson, 1996)

³² *Old growth* – Old growth forests generally contain trees that are large for their species and the site, and are sometimes decadent with broken tops. Old growth often contains a variety of tree sizes, large snags, and logs, and a developed and often patchy understory.

³³ *Permanent development* – A permanent development is any development that results in a loss of lynx habitat for at least 15 years. Ski trails, parking lots, new permanent roads, structures, campgrounds, and many special use developments would be considered permanent developments.

³⁴ *Prescribed fire* – A prescribed fire is any fire ignited as a management action to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements met, before ignition. The term prescribed fire replaces the term management ignited prescribed fire. (NWCG)

³⁵ *Precommercial thinning* – Precommercial thinning is mechanically removing trees to reduce stocking and concentrate growth on the remaining trees, and not resulting in immediate financial return. (Dictionary of Forestry)

³⁶ *Red squirrel habitat* – Red squirrel habitat consists of coniferous forests of seed and cone-producing age that usually contain snags and downed woody debris, generally associated with mature or older forests.

³⁷ *Regeneration harvest* – The cutting of trees and creating an entire new age class; an even-age harvest. The major methods are clearcutting, seed tree, shelterwood, and group selective cuts. (Helms, 1998)

³⁸ *Research* – Research consists of studies conducted to increase scientific knowledge or technology. For the purposes of Standards VEG S5 and VEG S6, research applies to studies financed from the forest research budget (FSM 4040) and administrative studies financed from the NF budget.

³⁹ *Restore, restoration* – To restore is to return or re-establish ecosystems or habitats to their original structure and species composition. (Dictionary of Forestry)

⁴⁰ *Riparian area* – An area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. (LCAS)

⁴¹ *Salvage harvest* – Salvage harvest is a commercial timber sale of dead, damaged, or dying trees. It recovers economic value that would otherwise be lost. Collecting firewood for personal use is not considered salvage harvest.

⁴² *Shrub steppe habitat* – Shrub steppe habitat consists of dry sites with shrubs and grasslands intermingled.

⁴³ *Standard* – A standard is a required action in a land management plan specifying how to achieve an objective or under what circumstances to refrain from taking action. A plan must be amended to deviate from a standard.

⁴⁴ *Stand initiation structural stage* – The stand initiation stage generally develops after a stand-replacing disturbance by fire or regeneration timber harvest. A new single-story layer of shrubs, tree seedlings, and saplings establish and develop, reoccupying the site. Trees that need full sun are likely to dominate these even-aged stands. (Oliver and Larson, 1996)

⁴⁵ *Stem exclusion structural stage (Closed canopy structural stage)* – In the stem exclusion stage, trees initially grow fast and quickly occupy all of the growing space, creating a closed canopy. Because the trees are tall, little light reaches the forest floor so understory plants (including smaller trees) are shaded and grow more slowly. Species that need full sunlight usually die; shrubs and herbs may become dormant. New trees are precluded by a lack of sunlight or moisture. (Oliver and Larson, 1996)

⁴⁶ *Timber management* – Timber management consists of growing, tending, commercially harvesting, and regenerating crops of trees.

⁴⁷ *Understory re-initiation structural stage* – In the understory re-initiation stage, a new age class of trees gets established after overstory trees begin to die, are removed, or no longer fully occupy their growing space after tall trees abrade each other in the wind. Understory seedlings then re-grow and the trees begin to stratify into vertical layers. A low to moderately dense uneven-aged overstory develops, with some small shade-tolerant trees in the understory. (Oliver and Larson, 1996)

⁴⁸ *Vegetation management projects* – Vegetation management projects change the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire or timber harvest. For the purposes of this amendment, the term does not include removing vegetation for permanent developments like mineral operations, ski runs, roads and the like, and does not apply to fire suppression or to wildland fire use.

⁴⁹ *Wildland urban interface (WUI)* - The area adjacent to an at-risk community that is identified in the community wildfire protection plan. If there is no community wildfire protection plan in place, the WUI is the area 0.5 mile from the boundary of an at-risk community; or within 1.5 miles of the boundary of an at-risk community if the terrain is steep, or there is a nearby road or ridgetop that could be incorporated into a fuel break, or the land is in condition class 3, or the area contains an emergency exit route needed for safe evacuations. (Condensed from HFRA. For full text see HFRA § 101.)

⁵⁰ *Winter snowshoe hare habitat* – Winter snowshoe hare habitat consists of places where young trees or shrubs grow densely – thousands of woody stems per acre – and tall enough to protrude above the snow during winter, so snowshoe hare can browse on the bark and small twigs (Ruediger et al. 2000). Winter snowshoe hare habitat develops primarily in the stand initiation, understory reinitiation and old forest multistoried structural stages.