United States Department of Agriculture
Forest Service

Cumbres Vegetation Management Project
Final Environmental Impact Statement

Conejos Peak Ranger District, Rio Grande National Forest, Conejos County, Colorado

May 2014

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Cumbres Vegetation Management Project
Final Environmental Impact Statement
Conejos County, Colorado

Lead Agency: **USDA Forest Service**

Responsible Official: Andrea Jones, District Ranger
Conejos Peak Ranger District
Rio Grande National Forest
15571 County Rd T.5
La Jara, CO 81140

For Information Contact: Diana McGinn
San Luis Valley Public Lands Center
Rio Grande National Forest
1083 W. Hwy 160
Monte Vista, CO 81144

This document is available on the internet at:
http://www.fs.usda.gov/projects/riogrande/landmanagement/projects

Project PALS ID = 34685

ABSTRACT: This Final Environmental Impact Statement (FEIS) evaluates the potential effects of the short-term benefits of salvaging timber stands being killed by spruce beetle and the need for long-term regeneration of the future forest, implementing fuel reduction treatments adjacent to private land, and managing hazard trees that may impact infrastructure in the Cumbres project area. It discloses the direct, indirect, and cumulative effects of a proposed action and alternative actions for vegetation management in this analysis area. This document follows the format established in the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations {CFR} Parts 1500-1508). It includes a discussion of the need for the proposal, alternatives to the proposal, the impacts of the proposed action and alternatives, and a listing of agencies consulted. It is tiered to the 1996 Revised Land and Resource Management Plan, as amended (Forest Plan), for the Rio Grande National Forest and the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) issued for the Forest Plan.

Summary

Currently much of the high elevation portions of the Rio Grande National Forest are experiencing extensive mortality of Engelmann spruce (*Picea engelmannii*) trees resulting from epidemic spruce beetle (*Dendroctonus rufipennis)* populations. Aerial surveys completed by the Forest Service's Forest Health Protection Service Center out of Gunnison, CO have shown spruce beetles have infested and killed over 32,500 "footprint" acres of Engelmann spruce in Conejos County since 2001.

Spruce beetle activity has steadily increased across the Forest. Heavy spruce beetle infestations were first noted in the winter of 2003 in the southern portions of the nearby County Line Analysis Area. Since that time, spruce beetles have progressed northward into the Rio de Los Pinos Analysis Area (2010) and most recently moved eastward towards into the Cumbres analysis area.

The Rio Grande National Forest proposes to salvage dead and dying spruce to capture economic value in the short-term, but also to reduce the number of potential hazard trees in key areas to protect infrastructure, evaluate regeneration needs to meet long term desired conditions considering stocking requirements, wildlife habitat, and the desired rate of ecological recovery.

The area affected by the proposal includes Engelmann spruce dominated stands located on National Forest System lands approximately 23 miles west of Antonito, Colorado in Conejos County. The project analysis area includes approximately 3,541 acres. Private land is located on the northeast and southwest edges. This action is needed to move toward desired conditions as described in the Forest Plan for this Management Area Prescription(s).

Areas of Controversy

No major areas of controversy were identified during scoping.

Issues raised by Agencies and Public

Concerns identified during scoping included the potential effects of proposed activities on wildlife habitat, watershed health, soils, scenery, recreation, and local communities. These preliminary issues were evaluated to determine whether they were already resolved through land use designations, implementation of Forest Plan standards and guidelines and Best Management Practices (BMP's), project-specific design criteria, through processes or analyses routinely conducted by the Interdisciplinary Team (IDT or ID Team), or were beyond the scope of the project. All concerns that fell within these categories were considered resolved. Concerns that would have to be addressed through spatial location of activities or that would drive (or partially drive) an alternative were considered unresolved. These unresolved concerns were developed into issues.

Issues to be Resolved

Concerns that would need to be addressed through the spatial location of activities or that would drive or partially drive an alternative were considered unresolved. These unresolved concerns were developed into issues. Three issues were identified for this analysis. These issues led the agency to develop alternatives to the proposed action including: Alternative 1 – No Action and Alternative 3 – Limited Action. Each action alternative was designed to be viable and consistent with Forest Plan direction. The action alternatives propose varying degrees of treatments which include salvage harvesting, forest stand regeneration activities, fuels reduction adjacent to private land, and hazard tree removal to protect infrastructure. Project Design Criteria (PDC) are incorporated in each action alternative to protect other resources. Alternative 2 is the proposed action and is considered the preferred alternative.

Major conclusions include:

When evaluating effects between the alternatives, it was found that the No Action alternative would likely have the fewest short-term effects for most resources, though there could be long-term effects as dead trees fall and impede movement or damage infrastructure. The relatively slow rate of forest stand recovery could be detrimental to some resources. Fuel loadings would continue to increase as snags fall, adding to high severity fire potential. No Action would not benefit the local forest products industry.

The Action alternatives would have some short-term disturbance effects during harvest activities to wildlife and some Forest users. There could be some positive benefit to local industry. Mid to long-term, there is low risk for any adverse effects to resources. Accelerated stand regeneration would be positive in the long-term for all resources. Reducing potential long-term fuel loadings would reduce the risk for widespread high severity fires in the analysis area and reduce firefighter safety concerns. The action alternatives would also do more to protect existing infrastructure.

The Forest Service has prepared this EIS in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. Based upon the effects of the alternatives, the Responsible Official will decide whether or not to authorize some level of action on all, part, or none of the analysis area. The decision will be documented in a Record of Decision (ROD).

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CHAPTER 1. Purpose and Need for Action

1.1 Introduction

The Forest Service has prepared this environmental impact statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This environmental impact statement (EIS) discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at the Conejos Peak Ranger District, Rio Grande National Forest.

1.2 Background

Currently much of the high elevation portions of the Rio Grande National Forest are experiencing extensive mortality of Engelmann spruce (*Picea engelmannii*) trees resulting from epidemic spruce beetle (*Dendroctonus rufipennis)* populations. The latest aerial surveys completed by the Forest Service's Forest Health Protection Service Center out of Gunnison, CO have shown spruce beetles have infested over 32,800 "footprint" acres of spruce in Conejos County since 2001[1]. This is an increase of over 12,000 acres from 2011 to 2012. Figure 1-3 shows the aerial extent of cumulative spruce beetle mortality in the Cumbres project area and vicinity as of the summer of 2012.

Spruce beetle activity has steadily increased across the Forest. Heavy spruce beetle infestations were first noted in the winter of 2003 in the southern portions of the nearby County Line Analysis Area. Since that time, spruce beetles have progressed northward into the Rio de Los Pinos Analysis Area (2010) and most recently moved towards the east into the Cumbres Analysis Area.

As shown in figure 1-1, the proposed Cumbres Vegetation Management Project (Cumbres Project) area is located on National Forest System lands about 23 miles west of Antonito, Colorado and south of the Trujillo Meadows Reservoir in Conejos County. The project analysis area includes approximately 3,541 total acres. Legal description for the analysis area is: T 32 N, R 5 E, Sections 4 through 9, 17; T 33 N, R 5 E, Section 31; T 32 N, R 4 E, Section 1, 12; T 33 N, R 4 E, Sections 25, 36, New Mexico P.M.

1.3 Purpose and Need for Action

The purpose of this project is to:

- Salvage dead or dying trees while the value remains high in stands designated for multiple use management and are part of the suitable timber base.
- Regenerate treated portions of the forested acres killed by bark beetles in order to accelerate the rate of forest and ecological recovery over the long term.
- Treat potential hazard trees in areas of concentrated public use, along private property, roads, and other infrastructure.
- Reduce fuels adjacent to private land in order to modify fire behavior.
- Reduce the accumulation of large diameter fuels in areas severely impacted by the spruce beetle, especially those adjacent to private land.

1 Spruce beetle detection by aerial surveys underestimates actual acres infested, since spruce fade over 2 to 3 years compared to distinctly changing colors like pines. Ground surveys have found many more acres infested across the District

- Utilize the existing transportation network as much as possible to minimize both resource impacts and road construction costs.
- Provide forest and wood products, such as fuelwood, sawtimber or house logs, to the people of the San Luis Valley and/or other areas.

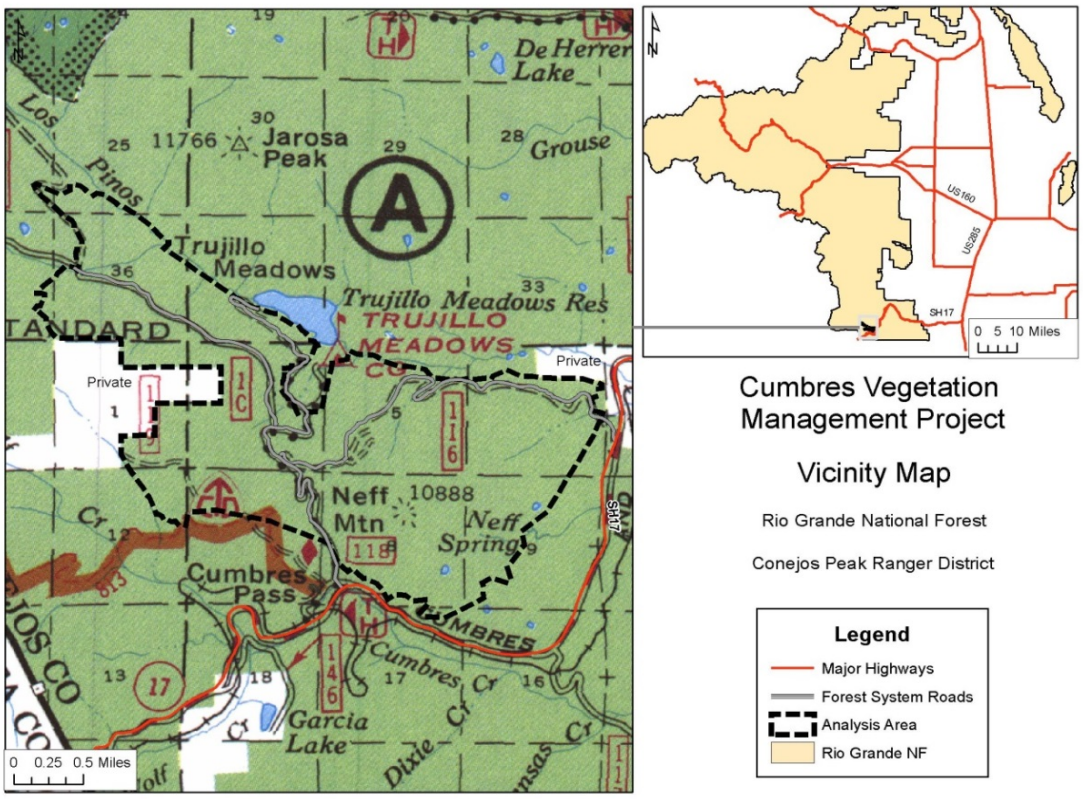

Figure 1-1. Vicinity map, Cumbres Vegetation Management Project.

1.4 Forest Plan and Related Direction

All land management decisions are governed by an array of laws and policy which direct or provide bounds for decisions. While some laws and policy provide constraints, others provide intent and direction for certain actions to occur.

This action is needed to respond to the widespread tree mortality caused by the ongoing spruce beetle epidemic. This proposal responds to the desired conditions and objectives as described in the Forest Plan, Rio Grande National Forest Land and Resource Management Plan (USDA Forest Service 1996, as amended) and moves the project area toward desired conditions described in that plan. This DEIS is tiered to the Forest Plan Final EIS. Forest Plan desired conditions and objectives for this analysis are listed in table 1-1 below. Objectives are "concise projections of measurable, time-specific intended outcomes. The objectives for a plan are the means of measuring progress toward achieving or maintaining desired conditions (36 CFR 219.7(a)(2)(ii))."

The Forest Plan FEIS addresses concerns about forest health and the potential for spruce beetle epidemics (FEIS pp. 3-219 to 3-221). Forest-wide objectives include reducing insect and disease infestations and using a range of silvicultural prescriptions to achieve ecosystem management objectives (Forest Plan p. II-3). The Forest Plan FEIS also addresses the demonstrated and ongoing

demand for wood and miscellaneous forest products such as firewood and poles (FEIS p. 3-159). Any regulated timber harvest activities would occur on lands classified as suitable for timber production, as per the Timber Suitability amendment to the Forest Plan (3/2/2000).

Table 1-1. Forest Plan Desired Conditions (goals) and objectives for this project

Forest-wide Desired Conditions	Forest-wide Objectives
Vegetative structure on the Forest is capable of sustaining timber harvesting that supplies wood products for humankind while providing for biological diversity of those forested areas. **Harvest operations are designed to emulate smaller-scale disturbance events or processes.** **The amount, arrangement, and continuity of live and/or dead material, which would contribute to fire spread (fuel profiles), are consistent with land uses and estimates of historic fire regimes.**	**2.2**. Manage the Forest to maintain or improve the health and vigor of all native plant associations. **2.8.** Treat aspen stands to maintain or improve wildlife and scenic values **2.10** Use appropriate vegetative-management methods to modify unacceptable fuel profiles and reduce potentially unacceptable future high-intensity wildfires.
Special forest products, such as firewood…continue to be available from the Forest… **The Forest recognizes the needs of people from the San Luis Valley and surrounding areas, and strives to meet their needs for forest and wood products, while protecting those resources for future generations.**	**3.2.** Emphasize long-term sustainable production of resources for economies, communities, and people. **3.3.** Use a range of silvicultural prescriptions to achieve ecosystem management objectives. These objectives may include supplying forage for wildlife, reducing insect and disease infestations, maintaining or improving aspen stands, or enhancing scenery. **3.4.** Use existing roads, instead of constructing new ones.
Provide for scenic quality and a range of recreational opportunities that respond to the needs of Forest customers and local communities.	**4.1** Provide natural appearing landscapes with diverse scenery, and increase access to recreation opportunities in attractive settings. Meet scenic integrity objectives as described in the Forest Plan.
Improve the financial efficiency of all programs and projects.	**6.2.** Manage, as much as practicable, the Forest's market oriented programs (timber, range, minerals, and special uses), so that they are financially profitable.
Emphasize cooperation with individuals, organizations, and other agencies while coordinating planning and project implementation.	**7.1.** Cooperate with all people, including those whose livelihood is dependent on National Forest resources, in the development of plans and projects. **7.2.** Cooperate with federal, state, local, and tribal governments, as well as private organizations and individuals, to: promote rural-development efforts…reduce loss of wildlands and structures to wildfires.
Promote rural development.	**8.1** Be a leader in working with rural people and communities including American Indian tribes, to develop opportunities and enterprise that contribute to their economic and social vitality. **8.2** Recognize the nature and extent of local economic dependencies on National Forest activities. Give special attention to resources that help diversify rural economies.
General Infrastructure.	-Facilities are safe, accessible […].as needed to achieve resource management objectives. -Forest work programs are conducted within the guidelines of the National Health and Safety Codes and the Occupational Safety and Health Administration.
Conserve and promote Canada lynx recovery (SRLA 2008)	- Manage vegetation to mimic or approximate natural succession and disturbance processes while maintain habitat components for lynx conservation (VEG O1). -Provide a mosaic of habitat conditions through time that support dense horizontal cover and high densities of

Forest-wide Desired Conditions	Forest-wide Objectives
	snowshoe hare. Provide snowshoe hare habitat in both the stand initiation structural stage (SISS) and mature, multi-story conifer vegetation (VEG O2). -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 (VEG O4).

The Forest Plan assigned land areas designated to be managed for a particular emphasis or theme known as Management Area Prescriptions (MAPs). Each MAP in the Forest Plan includes a description of the theme and physical setting, along with a description of the desired future conditions for that area. Each MAP also has a list of Standards and Guidelines that apply and that are used during project implementation to help achieve Forest Plan desired conditions and objectives. Table 1-2 describes the Forest Plan MAP theme and acres are within the project area and figure 1-2 shows their spatial distribution.

Table 1-2. Forest Plan Management Area Prescriptions, Cumbres Project Area

Forest Plan MAP	MAP Theme description	Acres
5.11 – General Forest and Intermingled Rangelands[1]	Allow a variety of management options, such as livestock grazing, wildlife habitat, dispersed recreation, mineral development, and timber harvest. Management emphasis is on a balance of resources uses.	3,209
5.13 – Forest Products[1]	Allow a full range of activities, with emphasis on the production of commercial wood products. Numerous open roads offer commercial access and roaded recreation opportunities, while restricted roads offer non-motorized recreation opportunities.	337
Total Acres		***3,541***
[1]MAP included in the suitable timber base.		

The Forest Plan goals can be reviewed online at:
http://www.fs.usda.gov/main/riogrande/landmanagement/planning

Where consistent with other Forest Plan goals and objectives, there is Congressional intent to allow timber harvesting on suitable lands (*Organic Administration Act of 1897, Multiple-Use Sustained-Yield Act of 1960; Forest and Rangeland Renewable Resources Planning Act of 1974; Federal Land Policy and Management Act of 1976; National Forest Management Act of 1976).* Intent is also expressed to allow the salvage of dead timber (*Forest and Rangeland Renewable Resources Planning Act of 1974)*. Such actions are also directed and authorized by Federal Regulation (*36 CFR 221.3; 36 CFR 223).* In keeping with these intents, it is Forest Service policy to provide timber resources to the local and regional economy (*Forest Service Manual [FSM] 2402; Forest Plan, pp. II-3 through II-4)*, salvage dead trees (*FSM 2435)*, and treat stands experiencing insect or disease infestations or to prevent infestations (*Forest Plan IV-25 through IV-28)*.

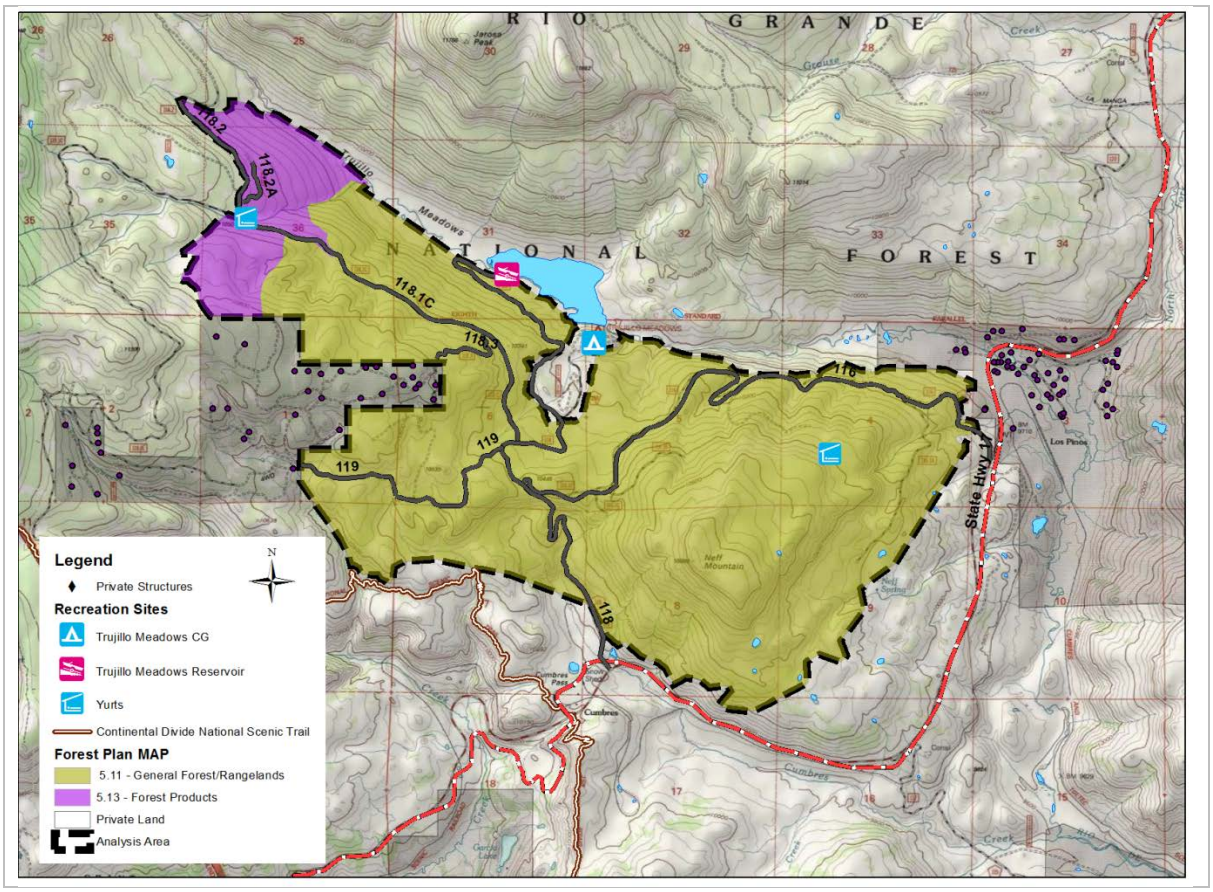

Figure 1-2. Forest Plan MAPs, recreation developments, and private structures in project vicinity.

Silviculturally, salvage harvest is typically considered an Intermediate harvest. However, when tree mortality is so extensive that the stand is being returned to a regenerated stage, the prescribed harvest is then described as a regeneration harvest (FSM 2470 – Silvicultural Practices, Section 2471.3). Since mortality of the mature Engelmann spruce stands in the Cumbres project is generally 90 percent or greater (refer to chapter 3, Timber Management), a salvage harvest would be considered the final removal for most stands. Therefore, any salvage harvest would likely be coded as a type of regeneration harvest based on what best describes the residual stand characteristics.

1.5 Proposed Action

In response to the purpose and need for action, the Forest proposes to use ground-based equipment to salvage and regenerate up to 2,498 acres of beetle infested Engelmann spruce stands. Only dead and dying spruce 8 inches diameter breast height (dbh) and larger would be considered for harvest. Hazard tree removal would be implemented within a distance of up to 2.0 tree heights from open roads, fences, private land, or recreation facilities. Hazard distance would depend on localized factors such as slope, topography, and/or the number and arrangement of potentially hazardous trees. To improve defensible space, fuel reduction treatments would be implemented in Wildland-Urban Interface (WUI) areas up to 400 feet from adjacent private land on approximately 171 acres.

The proposed action is expected to begin in 2014 and be implemented over the next 10 years. Tree planting would not occur until other operations have been substantially completed in an area.

1.6 Decision Framework

Given the purpose and need, the responsible official will review the proposed action, the other alternatives, the environmental consequences disclosed in this document, along with comments received on the draft EIS in order to make the following decisions:

- Will project activities be implemented as proposed, as modified, or not at all?
- If project activities proceed, which project design features or monitoring items will be incorporated?

A separate Record of Decision (ROD) that will be signed by the responsible official will explain the rationale for the decision and disclose how the decision responded to the issues and moves toward desired conditions as described in the Forest Plan.

The *Cumbres Vegetation Management Project* is a non-HFRA project and is subject to the objection process pursuant to 36 CFR 218, subparts A and B.

1.7 Public Involvement

Public involvement was key in the project planning process. The Forest invited public comment and participation through a variety of methods throughout the planning process:

- A news release regarding the DEIS availability for comment was published in the *Valley Courier*.
- A Legal Notice regarding the opportunity to comment on the DEIS was published in the *Valley Courier*, newspaper of record, on December 13, 2013.
- The Notice of Availability of the DEIS was published in the Federal Register on Friday December 20, 2013.
- A letter requesting comments on the DEIS was mailed to 138 individuals, agencies, Tribal contacts, and elected officials on December 9, 2013. This letter also notified potential commenters of the change from the 215 Appeal process to the 218 Objection Process. Ten letters were received following the release of the DEIS document; two documented they had no concerns and one was to express support for the project (see appendix D.3).
- The Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) was published in the Federal Register on July 29, 2013. The NOI asked for public comment on the proposal prior to August 28 2013.
- In addition, as part of the public involvement process, a scoping notice was published in the Valley Courier, the newspaper of record, on July 25, 2013. Two comment letters were received.
- When the Responsible Official decided that an EIS should be prepared, all those that commented in 2011 and 2012 were notified by mail of the change and assured that the comments provided previously would be used as the analysis process continued.
- The *EA for Comment (draft)* was released on June 25, 2012. Notification of the availability of this document was mailed to 128 individuals, agencies, Tribal contacts, and elected officials. Five comments letters were received on this document.
- A scoping letter describing proposed activities was mailed on March 22, 2011 to136 individuals, organizations, government agencies, and Tribal contacts; eleven letters were

received in response to scoping in 2011. Of those, three were supportive or had no concerns, unless cultural resources were identified, and eight had issue(s) or concerns that needed to be addressed. Comments from this process were used to identify issues and develop alternatives to the Proposed Action.

- A public scoping notice was published in the *Valley Courier*, newspaper of record, on March 26, 2011.
- The project has been listed in the Forest Schedule of Proposed Actions since March 2011

Following the initial scoping, each concern identified was considered as a potential issue. Following the comment analysis process, similar individual comments were consolidated into issue statements from which the IDT developed a list of issues to address in this analysis.

1.8 Issues

As described in Forest Service Handbook (FSH) 1909.10, issues are: a) cause and effect statements that serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives; b) used to identify opportunities during the analysis to reduce adverse effects; and c) used to compare trade-offs in an understandable and, if possible, quantitative manner. The process is intended to ensure that all key issues are identified and that all relevant issues are appropriately addressed in the analysis.

The Forest Service separated the issues into two groups: key and non-key issues. Key issues were defined as those directly or indirectly caused by implementing the proposed action. Non-key issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific or factual evidence; or 5) concerns that the IDT felt would be addressed as part of the analysis, by Forest Plan Standards and Guidelines (S&G), Best Management Practices (BMPs), Project Design Criteria (PDC), mitigation measures, and/or monitoring. The issue analysis process is documented and is part of the project record.

The Forest Service identified three key issues (hereafter referred to as Issues) for the Cumbres Project. The issue statements and selected Measurement Indicators (Indicators) were identified or developed by the IDT in response to scoping comments and used to: develop an additional action alternative, to focus the analysis, use as discussion points, and to compare potential effects of each alternative for this project.

Issue 1 - Spruce beetle populations have exceeded endemic levels and may have moved forest stands away from Forest Plan Desired Conditions of protecting and promoting forest products, while perpetuating landscape diversity.

Indicators:

- Acres, distribution, and species composition of stands regenerated to desired stocking levels;
- Tons per acre of large diameter fuel removed and effect on potential fire severity;
- Acres salvaged;
- Volume of commercial forest products recovered.

Issue 2 – Project activities may impact watershed condition, water quality, and site productivity by increasing soil compaction, erosion, sedimentation, and altering water flows.

Indicators:

- Total acres treated;
- Percent area surface disturbance by watershed;
- Miles of old non-system roads re-opened
- Miles of road maintenance;
- Miles of new temporary road construction;
- Percent increase in connected disturbed area.

Issue 3 – Project activities may impact suitable lynx habitat as defined by the Southern Rockies Lynx Amendment to the Forest Plan.

Indicators:

- Total acres of suitable lynx habitat affected in the Rito Archuleta Lynx Analysis Unit (LAU);
- Acres of incidental impacts to dense horizontal cover (DHC) in the short term;
- Acres of suitable habitat converted to the stand initiation structural stage (SISS).

1.9 Changes made from Draft EIS to Final EIS

The Notice of Availability of the DEIS was published in the Federal Register on Friday December 20, 2013.The public notice and request for comment letter for the DEIS (or the actual document) was mailed to a total of 138 individuals, organizations, government agencies, Tribal contacts, and elected officials on December 9, 2013.

Ten letters were received from the individuals, organizations, or agencies listed in table 1-3 in response to the Notice of Intent or the DEIS; two documented they had no concerns and one was to express support for the project (see appendix D.3 for letters).

Table 1-3. List of those that commented on the DEIS.

Commenter	Date	Representing
Alden Naranjo	02/13/2014	Southern Ute Indian Tribe
Philip Strobel	02/03/2014	U.S. Environmental Protection Agency, R8
Robert Stewart	01/30/2014	U.S. Department of Interior
Rocky Smith	01/27/2014	San Luis Valley Ecosystem Council, Rocky Mountain Wild, Ecoflight, Randall McKown, Colorado Mountain Club, Joanie Berde, Rocky Mountain Chapter Sierra Club
Tony Joe	01/06/2014	The Navajo Nation
Dick Artley	01/05/2014	Dick Artley
Joanie Berde	12/23/2013	Carson Forest Watch
Raymond Johnson	12/12/2013	Rincones Ranch LLC
Rocky Smith	08/14/2013	San Luis Valley Ecosystem Council, Rocky Mountain Recreation Initiative, Quiet Use Coalition
Jean Pubilc	07/30/2013	Jean Pubilc

As a result of these comments and additional review of the DEIS, the Forest Service has incorporated the following changes to the Final EIS (FEIS):

- Minor corrections of typographical errors, other clarifications, and updates were made throughout the FEIS.

- Figures 2-2 and 2-3 were updated in an effort to improve clarity by making road and harvest unit numbers and boundaries more visible.
- Some elements were removed from the Wildlife monitoring section, since they are monitoring during sale layout (riparian buffers) or the data is collected during post-harvest stand exam (snags and coarse woody debris).
- Chapter 4 was updated to include the list the individuals, organizations, and agencies that received notification of the notice and comment period for the DEIS and a list of those that received notification of the availability of FEIS.
- Additional discussion on project compliance with the National Forest Management Act was moved from the project file to the FEIS to facilitate review.
- Additional discussion in section 3.4 – Wildlife on the other activities occurring in the Rito Archuleta LAU and how those have been accounted for.
- Appendix D was added to include the public comment letters received on both the DEIS (appendix D.3) and EA for Comment (appendix D.4); responses to comments on the DEIS (appendix D.1) and EA for Comment (appendix D.2); and Forest Service responses to opposing views submitted by commenter on the EA for Comment and/or the DEIS (appendix D.5).

2.0 Other Related Efforts

There are no other known projects or efforts that would affect the proposed actions or the decision to be made.

CHAPTER 2. Alternatives, Including the Proposed Action

2.1 Introduction

This chapter describes and compares the alternatives developed to meet the purpose and need for the Cumbres Vegetation Management Project (Cumbres Project). It includes a description and map of each alternative considered in detail. This chapter also describes the environmental consequences of the proposed action and alternatives in comparative form, as measured in chapter 3, to define the differences between the alternatives and provide a basis for choice among the options by the responsible official and the public.

2.2 Alternatives Considered in Detail

The Forest Service developed three alternatives, including No Action and Proposed Action, in response to issues raised by the public during scoping. Alternative(s) considered, but dropped from detailed study are also listed below. Collectively, these alternatives represent a reasonable range of alternatives given the site-specific situation, purpose and need, and issues for this project. Table 2-3 provides a comparison of the alternatives considered and analyzed in detail, organized by resource.

Alternative 1 – No Action

Figure 2-1, shows the cumulative “footprint” acres mapped by aerial detection surveys as being infested by spruce beetle from 2001 through 2012 in the vicinity of the Cumbres analysis area. To date, over 1,987 acres of spruce stands have been affected to various degrees in the project area, which is an increase of over 780 acres since 2011; the Forest FSVeg database has about 2,447 acres mapped as spruce/fir stands. Based on current trends and field surveys, it is expected that dead Engelmann spruce will dominate the landscape on most of these acres within less than 5 years.

Under No Action, natural processes would continue. No salvage of dead or dying trees would occur beyond those areas open to permitted firewood cutting. Seedlings would not be planted to reforest under-stocked stands or to improve stand species composition. Over time, tons per acre of large diameter down fuel would continue to increase as trees die and fall. Hazard tree removal would be done as part of maintenance activities by road crews, recreation facility managers, homeowners, or livestock permittees on an ongoing basis. Wildland-Urban Interface (WUI) fuels reduction treatments adjacent to private land would not occur. System roads would be maintained as funding permits. Other activities, such as livestock grazing and dispersed recreation would continue.

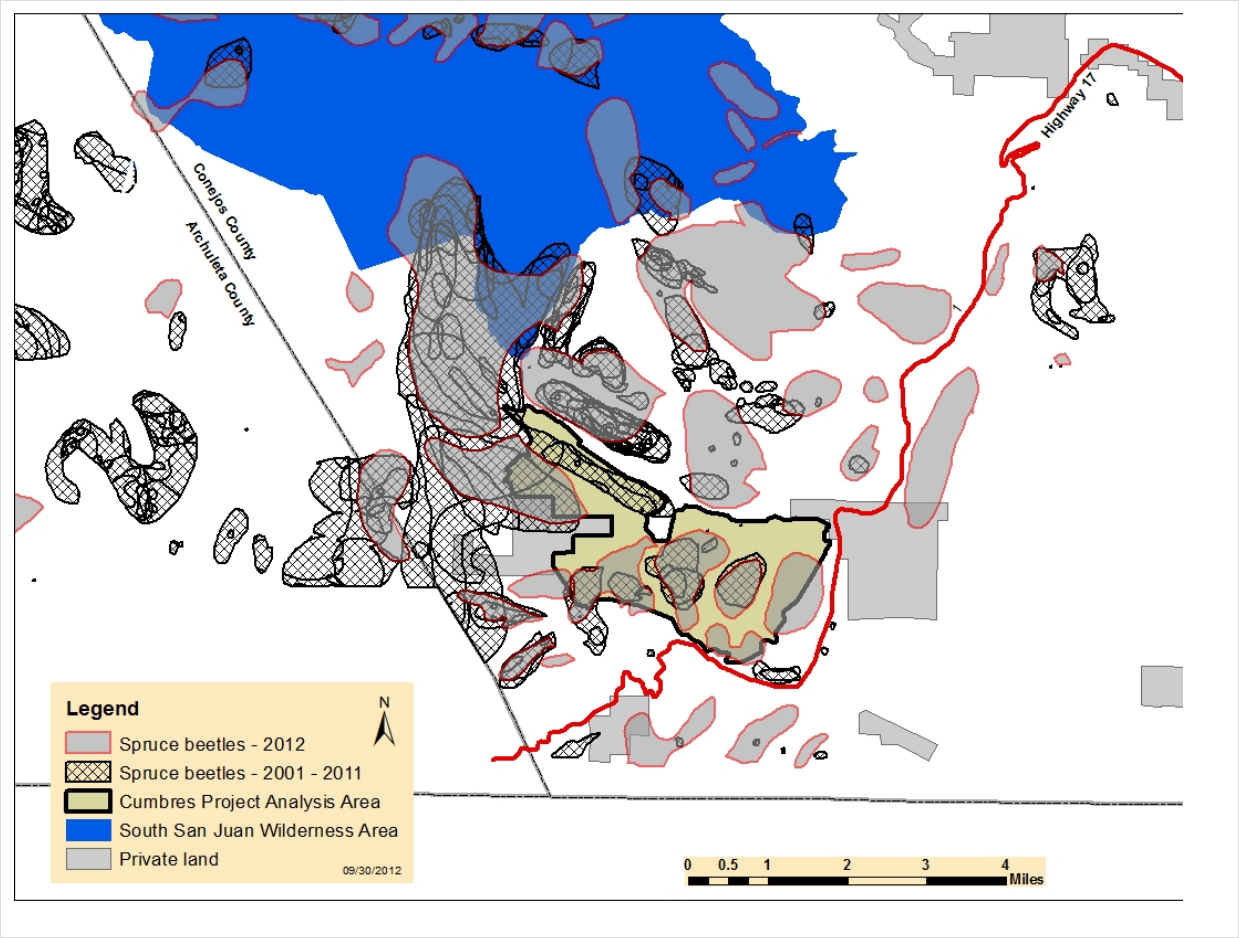

Figure 2-1. Cumulative spruce beetle infested stands, Cumbres project vicinity, 2001 through 2012.

Alternative 2 - Proposed Action (*Preferred Alternative*)

Proposed treatment areas and road system needed under this alternative are shown in figure 2-2. Under this alternative, salvage harvest would be implemented to recover wood product value from dead and dying spruce. Trees would be harvested only on slopes less than 40 percent and suitable for ground-based logging equipment. Merchantable trees, 8 inches diameter breast height (dbh) and larger, would be considered for harvest. All or parts of cut trees would be skid to designated landings. Tons per acre of expected large diameter fuels would be decreased on treated acres. Salvage harvest would occur on up to 2,498 acres. It is estimated that about 22 acres of landings would be needed across the project area. Landings from previous harvests would be re-used as much as possible to minimize additional disturbance.

This alternative would require the following road system:

- Construction of about 0.8 miles of new temporary road segments[2];
- Reconstruction and use of about 7.5 miles of old, non-system roads from previous harvests;[3]
- Reconstruction of about 5.8 miles of decommissioned NFS (National Forest System) roads;
- Maintenance and use of 5.0 miles of NFS roads currently closed to public travel;
- Maintenance and use of 12.5 miles of NFS roads currently open to public travel.

Following harvest activities, treated areas would be surveyed to evaluate the health, species composition, and distribution of residual trees. Areas not meeting desired forest stocking, composition, or distribution requirements would be hand planted with Engelmann spruce seedlings within 5 years following harvest. Exact planting acres would be determined by the stocking surveys, but it is estimated that about 650 acres would be planted.

Aspen is a minor component in the project area; existing clones would be protected while promoting their expansion to the extent possible. Aspen clones would be maintained and expanded within the treatment areas by reducing conifer encroachment by hand-felling conifers less than about 8 inches dbh growing under the aspen. Clone expansion would be completed by cutting all conifers within one tree-length of aspen clones on up to 20 acres. Salvage activity adjacent to these clones would be intended to stimulate new sprouting and clone expansion. No harvest of aspen trees would occur.

Hazard tree removal would be implemented within a distance up to 2.0 tree heights from open roads, fences, private land, or other infrastructure. Where feasible, these trees would be cut and removed as part of timber harvest activities; otherwise they would be felled, bucked, and left in place.

To improve defensible space, fuel reduction treatments would be implemented within 400 feet of adjacent private land on approximately 171 acres. These treatments would focus on thinning understory trees and shrubs, as needed, to modify potential fire behavior. Treatments could consist of cutting vegetation with chainsaws and handpiling slash or grinding it with mechanized equipment.

Any slash piles created during project activities would be burned during favorable weather conditions.

Three (3) accessible areas adjacent to open roads would be reserved for personal use firewood gathering. This alternative would designate 97 acres for this purpose.

[2] Miles and locations of new temporary roads are best estimates; some minor adjustments may be needed during sale layout.
[3] Old, non-system roads from previous harvests are also temporary roads. However, since the surface area has been previously disturbed their re-use does not add substantial additional disturbance, they are tracked separately from potential new disturbed areas.

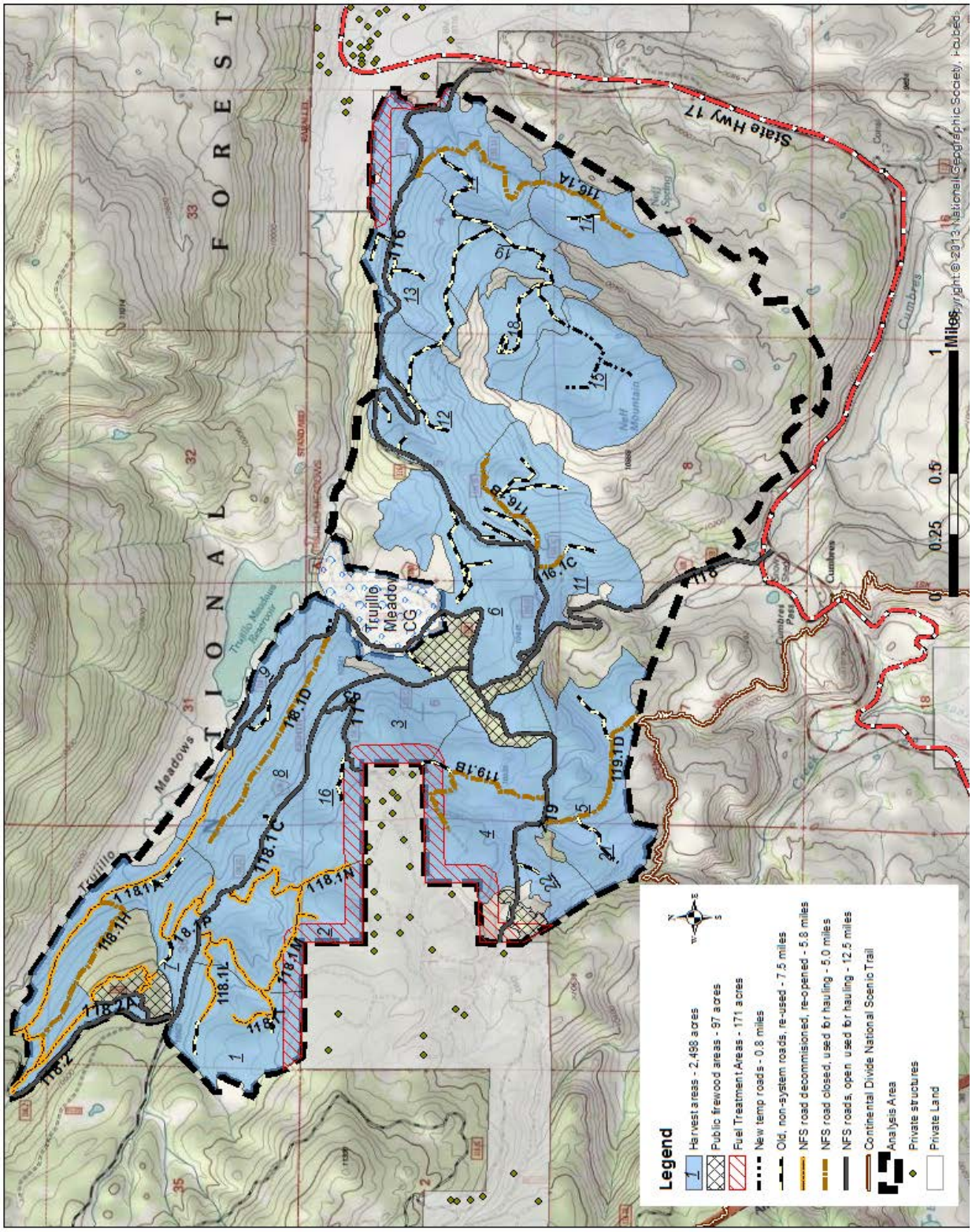

Figure 2-2. Proposed harvest areas and road system, Alternative 2.

Alternative 3 – Limited Action

Proposed treatment areas and road system needed under this alternative are shown in figure 2-3. All activities described under Alternative 2, Proposed Action, would occur under this Alternative, except fewer acres would be harvested and fewer acres would be planted. Tons per acre of expected large diameter fuels would be decreased, but on fewer treated acres. Since fewer acres would be harvested, fewer acres would be needed for landings and fewer miles of system and non-system roads would be required. Salvage harvest would occur on up to 1,549 acres. It is estimated that about 15 acres of landings would be needed across the project area. Landings from previous harvests would be re-used as much as possible to minimize additional disturbance.

As with alternative 2, aspen clones would be maintained and expanded within the treatment areas by reducing conifer encroachment by hand-felling conifers less than about 8 inches dbh growing under the aspen. Clone expansion would be completed by cutting all conifers within one tree-length of aspen clones on up to 20 acres. Salvage activity adjacent to these clones would be intended to stimulate new sprouting and clone expansion. No harvest of aspen trees would occur.

This alternative would require the following road system:

- Construction of about 0.1 miles of new temporary road segments[4];
- Maintenance/reconstruction and use of about 4.3 miles of old, non-system roads from previous harvests;[5]
- Maintenance and reconstruction of about 0.6 miles of previously decommissioned NFS roads;
- Maintenance and use of 4.9 miles of NFS roads currently closed to public travel;
- Maintenance and use of 10.9 miles of NFS roads currently open to public travel.

Following harvest activities, harvested areas would be surveyed to evaluate the health, species composition, and distribution of residual trees. Exact planting acres would be determined with stocking surveys following harvest, but it is estimated that about 170 acres would be planted.

Any slash piles created during project activities would be burned during favorable weather conditions. Hazard tree removal and fuel reduction treatments would be the same as described under the Proposed Action. Two (2) accessible areas adjacent to open roads would be reserved for personal use firewood gathering. This alternative would designate 73 acres for this purpose.

[4] Miles and locations of new temporary roads are best estimates; some minor adjustments may be needed during sale layout.
[5] Old, non-system roads from previous harvests are also temporary roads. However, since the surface area has been previously disturbed their re-use does not add substantial additional disturbance, they are tracked separately from potential new disturbed areas.

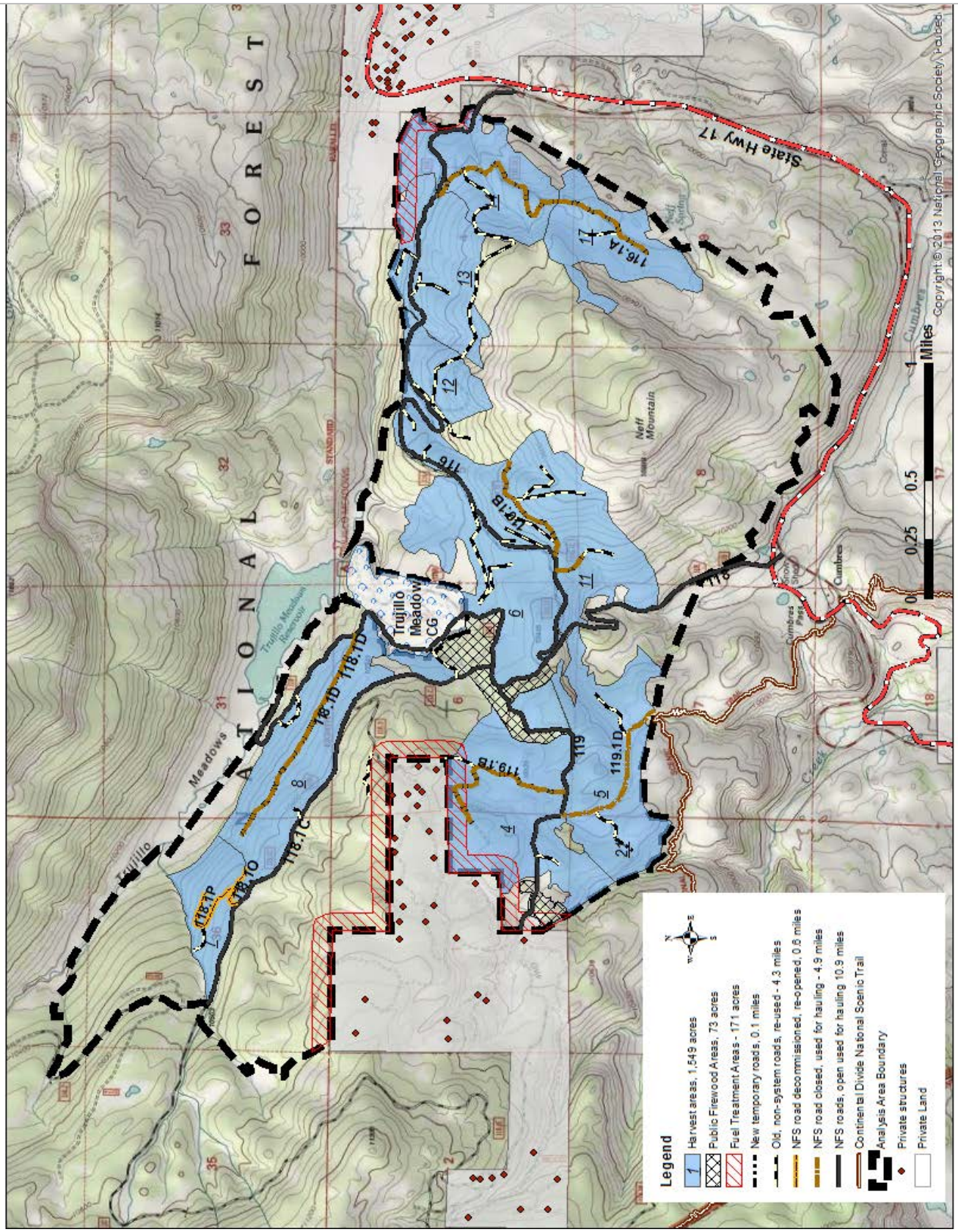

Figure 2-3. Proposed harvest areas and road system, Alternative 3

2.3 Project Design Criteria and Mitigation Common to All Action Alternatives

The Forest Service uses many measures to reduce or prevent negative impacts to the environment in the planning and implementation of management activities. The application of these measures begins at the project planning and design phase. Forest Plan Standards and Guidelines and Best Management Practices (BMPs) as incorporated in the R2 Watershed Conservation Practices Handbook (FSH 2509.25), are the first protection measures to be applied. Both of these sources are incorporated by reference. Other Project Design Criteria (PDC) has been included, as needed. The PDC listed in table 2-1 have been found to be effective in reducing potential impacts. Each PDC statement would apply to both Alternative 2 and 3.

Table 2-1. Project Design Criteria for Alternatives 2 and 3.

Action
Timing of Operations
No hauling during July 3rd through the 5th or weekends from Friday noon to Sunday midnight during big game rifle season.
Under most conditions and unless approved by the District Ranger, logging operations will not be permitted from December 15 to April 1 to reduce potential conflicts with winter recreation activities.
Wildlife/TES/MIS
The project has been surveyed for TES and MIS species. Surveys will continue during project implementation and any potential denning (lynx or wolverine primarily), burrowing, or nesting sites will be protected as determined by Wildlife personnel. If a TES species is discovered, they will be protected as indicated in the Forest Plan with consultation with the U.S. Fish and Wildlife Service, as necessary.
Gated roads or other closed roads utilized during logging activities and following logging will remain closed to the general public to minimize wildlife disturbance (and for public safety). An exception may be temporarily opening roads for public firewood collection following harvest.
Noxious Weed Management
All organic material used for rehabilitation: seed, straw, erosion control material, or other, will be certified weed free.
By use of standard contract provisions, the timber purchaser or other contractors will be required to clean all logging and construction equipment that operates off roads, prior to entry to the project area.
Prior to the start of logging or other new ground disturbance activities, areas will be surveyed and treated for existing populations of weeds.
Haul routes and highly disturbed areas, such as landings, will be treated for noxious weed infestations, as needed, for five years following harvest.
Road fill and road base material brought in off site will come from a borrow source free of State Listed Noxious Weeds. The Forest Service will inspect and approve the borrow source location prior to materials being hauled to the project area; areas where borrow material is applied will be documented and inspected for weeds for three years following application.
Livestock Management
Forest regeneration will be protected from livestock grazing by using adaptive strategies such as reducing cattle concentrations by avoiding salt/supplement placement in regenerating areas, avoid pushing large numbers of cattle into the area, use riders if needed to disperse large numbers, and maintaining pasture rotation to avoid season-long grazing.
If current natural barriers are made ineffective by skid trails or tree removal, new fence locations would be identified on a sale area basis. Fences would be constructed as necessary to ensure allotment rotations are in compliance with individual Allotment Management Plans and Annual Operating Instructions.
Protect Improvements
Protected improvements such as fences, gates, water developments, and recreation facilities (ski yurts, Trujillo Meadows water system) will be identified on sale area maps or in fuel treatment areas during harvest or treatment activities. Damaged improvements will be repaired or replaced, depending upon the amount of damage.
Potential hazard trees within 2 tree lengths of the Trujillo Meadows Campground well head and other water system components, or other improvements will be cut and removed.
Hazard Trees/WUI Thinning
Hand felling of hazard trees is permitted in the WIZ. Trees shall be directionally felled and may be left in place to maintain or improve stream and riparian health. If necessary, felled trees may be stabilized to prevent movement. The Forest timber sale or contract administrator shall consult the Forest hydrologist or wildlife/fish biologist prior to granting approval to remove hazard trees from WIZ areas along intermittent and perennial streams.

Action
Any hazard tree, and associated slash, cut and lying within 100 feet upstream of a perennial or intermittent culvert/bridge crossing and within 25 feet from the stream edge that has the potential to obstruct the crossing shall be stabilized, removed, or moved at least 50 feet upslope away from the stream.
Felled hazard trees and slash shall be removed from roadside ditches and culverts, including removing from cross drains and sediment traps.
Felled hazard trees may be removed from stream corridors or riparian areas with Forest Service approval when they create unacceptable fuel loading; fail to meet visual objectives; or create unacceptable limits to human, livestock, or wildlife movement.
Hazard trees shall not be skidded across perennial or intermittent stream channels.
If hazard trees need to be removed from WIZ areas, use at least one-end suspension and felled in a way that protects vegetation from damage.
If chipping/grinding or other mastication method is used to treat understory fuels in WUI areas, slash shall not cover more than 50% of ground surface and depth shall not exceed 4 inches to minimize impacts to understory vegetation. Mastication equipment will not be used in WIZ areas.
If WUI thinning areas intersect a WIZ, hand thinning with chainsaws may be used. Hand piles will be located at least 50 feet upslope from perennial or intermittent streams or riparian areas and outside of the channel/swale for ephemeral drainages.
Soil and Water Protection
If whole tree yarding is used, limbs and/or tops shall be returned to the unit if 15% or more of the unit has exposed mineral soil; this material shall be distributed in areas primarily comprised of bare mineral soils.
Operate heavy equipment for land treatments only when soils are dry, soil moisture is below the plastic limit, or protected by at least 1 foot of packed snow or 2 inches of frozen soil.
Reuse existing skid trails and landings whenever practical.
Skid trail locations will be agreed to by the Forest Service in advance of construction; spacing will be approximately 100 feet apart, allowing for topographic variation and skid trail convergence; skid trails will be waterbarred at least every 100 feet on gradients greater than 20 percent, otherwise where needed depending on slope and ground conditions as per BMPs; slash will be placed on main skid trails as needed to control erosion.
Skidding equipment will generally be restricted to slopes <35%.
During project implementation, temporary roads will be outsloped, covered with slash (when needed), and blocked to vehicle access after the harvest season and before onset of the wet season.
Units with an existing detrimental soil disturbance level ≥12% will be treated as necessary to ensure post-treatment forest plan compliance, as determined by Forest Soil Scientist. ***Detrimental disturbance levels will be brought within the 15% standard through post-harvest subsoiling/ripping of primary skid trails, landing, and/or temporary roads to a depth of 12 to 24 inches and seeded or covered with slash after harvest, as needed. If harvested, <u>these treatments will occur on units 1, 2, 6, 7, 11, and 20.</u> It will also include any other units which are determined to exceed 15% detrimental disturbance after harvest.***
Temporary stream crossing structures (i.e. culverts, bridges, etc.) will be designed to provide for passage of flows and sediment, withstand expected flood flows, and allow free movement of resident aquatic life. Upon project completion, remove all temporary crossings, restore the channel morphology, and revegetate channel banks.
Slash piles and landings shall be located at least 50 feet (hand piles) or 200 feet (machine piles) from perennial streams, lakes, ponds, wetlands, or riparian areas.
A 100 foot no timber harvest buffer has been established along both sides of all intermittent and perennial stream channels, wetlands, ponds, or lakes. No heavy equipment will operate within this buffer except at designated crossings, unless authorized by the Forest Service where site-specific conditions would minimize stream and riparian impacts.
No timber harvest would occur in the channel/swale of ephemeral channels; Harvest may occur outside the channel, but no skid trails or mechanical disturbance would be permitted within 25 feet of both sides of the channel.
Hydrology, soils specialists, or their designees will inspect harvest units for seepages or riparian areas. Where found, these features will be protected through sale marking and layout; a 100 ft. no-harvest or skidding buffer will be maintained from the edge of all wetlands.
All roads (existing, new temporary, or old non-system) used for the project will be evaluated to identify and correct erosion or sediment problems. Additional cross drains or other standard measures will be used as appropriate to divert any road drainage into buffer/filter strips and minimize road drainage into steam channels.
Existing vegetation on cut and fill slopes would be retained as much as possible to limit sediment movement away from road.

Action
Where existing roads will be reconstructed within 100 feet of intermittent or perennial streams, hydrology, soil specialists or their designees will be consulted to ensure sediment sources are disconnected from stream channels. If necessary, hardening, filter fence, straw wattles, timber slash windrows, or other measures will be used as appropriate to prevent sediment from entering a stream course.
Following logging and/or reforestation operations, all temporary roads used for this project will be closed and rehabilitated.
Scenic Resources
Visible stumps within the immediate foreground (0-100 feet) of FSRs 118, 118.1C, and Trujillo Meadows campground should be cut as close to the ground as practicable, a maximum stump height of 6 inches is recommended.
Avoid creating open linear corridors when removing hazard trees along roads, fences or other linear infrastructure; vary corridor width considering natural vegetation patterns and topography to blend treatments into local landscape.
Logging activities will not occur within 200 feet of the Continental Divide National Scenic Trail.
Landings or log decks will not be approved within 100 feet of ski yurts and logging slash will be removed in this area to the extent feasible.
Vegetation Protection/Biodiversity/Regeneration
In all salvage stands that exceed 50 percent removal of overstory spruce, reforestation surveys will be conducted, and if the survey indicates that Forest Plan stocking Standards will not be met, these stands will be artificially reforested to meet or exceed Forest Plan Standards.
To protect soil, leave trees, and advanced regeneration, tractor skid trails will be located and approved in advance of falling and logs will be skidded with the leading end free of the ground to reduce ground disturbance.
Protect existing aspen clones from damage and encourage clone expansion by removing encroaching conifers within a tree height of the mature aspen stems.
Trees with known active bird nests, any cavities, or those otherwise marked as wildlife trees will be designated for retention.
Retain all live/uninfested trees in salvage units, except for trees that need to be removed for operational/safety purposes.
Effects to understory vegetation and dense horizontal cover will be minimized to benefit snowshoe hare and lynx by identifying skid trail locations away from dense understory and spacing skid trails at least 100 feet apart, allowing for topographic variation and skid trail convergence; Incidental damage will be limited to a maximum of 30% of DHC.
Place landings in open areas if available, to protect understory.
Retain patches of overstory trees with dense understory.
Leave sufficient trees or retain existing large woody debris (a minimum of 10-15 tons per acre in spruce fir) on harvested sites to retain moisture, trap soil movement, provide microsites for establishment of forbs, grasses, shrubs and trees, and to provide habitat for wildlife.
Retain a minimum of 4 spruce snags per acre in various conditions of decay and distribution. Retain the largest snags possible with those > 11 inches dbh being most desirable. Retain all soft snags unless they are a safety hazard.
Seeding of disturbed sites would utilize a native subalpine grass mix and application prescriptions.
Public Safety
Roads used for vegetation treatment and log haul would be maintained in accordance with the contract requirements. Temporary traffic control in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) would be utilized for roads open to public motor vehicle use.
Notify the public of logging and/or burning activities through media such as local newspapers, radio, and the Forest website.
Caution signs notifying public of logging activities will be prominently displayed at start of all open roads and all junctions.
All gated roads will remain closed during harvest activities.
Dust abatement will be required on FSR 118 during July and August, as needed.
Hazard trees up to 2.0 tree heights will be removed along open roads and roads used for project implementation. Hazard trees will be removed within 2 tree heights of ski yurts.
Heritage
The Discovery and Education stipulation below will be emphasized in areas with large aspen to avoid and protect undocumented arborglyphs.

Action
Any new road construction or improvements not previously analyzed within this environmental analysis will require a review and potential inventory by Forest Service archaeologists.
All persons associated with operations under this authorization must be informed that any objects or sites of cultural, paleontological, or scientific value such as historic or prehistoric resources, graves or grave markers, human remains, ruins, cabins, rock art, fossils, or artifacts shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered, the proponent shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the Rio Grande National Forest authorized officer of the findings. The discovery must be protected until notified in writing to proceed by the authorized officer (36 CFR 800.110 & 112, 43 CFR 10.4).

2.4 Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. These alternative(s) were considered, but dismissed from detailed consideration for reasons summarized below:

1. **Remove hazard trees only to protect infrastructure** – this alternative would not meet the Purpose and Need for the project for recovering the value of wood products or accelerating the rate of forest recovery to meet the long term desired conditions.

2. **Use trap trees to reduce beetle populations** – the epidemic population levels in the vicinity would make this technique ineffective for protecting residual trees. If suitable trees are available, beetles from surrounding areas are likely to find them.

2.5 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the tables is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2-2 provides a comparison of the alternatives by issue statement followed by a brief summary of the effects discussions as related to the issues and table 2-3 provides a comparison summary of effects by resource, as described in chapter 3.

Table 2-2. Comparison of alternatives by issue statement.

Issue	Indicator(s)	ALTERNATIVES								
		1 No Action			2 Proposed Action			3 Limited Action		
Issue 1-*Spruce beetle populations have exceeded endemic levels and may have moved forest stands away from Forest Plan Desired Conditions of protecting and promoting forest products, while peretuating landscape diversity*	Acres, distribution, and species composition of stands regenerated to desired stocking levels within 5 years after harvest	N/A			2,498			1,549		
	Tons/acre of large diameter fuels removed Potential fire severity	0 High			32 Decreased			32 Decreased		
	Acres salvaged	469[1]			2,498			1,549		
	Volume of commercial forest products recovered.	0			40,000 to 60,000 CCF 20-30 MMBF			30,000 to 40,000 CCF 12-20 MMBF		
Issue 2 *-- Project activities may impact watershed condition, water quality, and site productivity by increasing soil compaction, erosion, sedimentation, and altering water flows.*	Total acres treated	0			2,498			1,793		
	Percent area surface disturbance by watershed[A,B,C]	***A***	***B***	***C***	***A***	***B***	***C***	***A***	***B***	***C***
		0	0	0	9.4	2.6	1.4	6.07	1.41	1.87
	% increase in connected disturbed area [A,B,C]	***A***	***B***	***C***	***A***	***B***	***C***	***A***	***B***	***C***
		0	0	0	13	8	0	0	8	0
	Miles of old, non-system roads re-opened.	0			7.5			4.3		
	Miles of new temporary road construction.	0			0.8			0.1		
	Miles of road maintenance.	3.8[2]			30.8			20.7		
Issue 3- *Project activities may impact lynx habitat diversity.*	Total acres of suitable lynx habitat affected in the LAU.	0			1,983			1,352		
	Acres of incidental impacts to dense horizontal cover.	0			99			43		
	Acres of suitable habitat converted to stand initiation structural stage (SISS)	0			1,291			942		

[1] Firewood cutting of standing dead trees is permitted within 300 ft. of open roads. A value of 150 ft. was used to estimate acres affected, since many areas are not accessible due to topography and not all acres adjacent to open roads are forested.
[2]NFSR 118 is maintained annually, other open roads are usually maintained at 5 to 7 year intervals.
[A]Headwaters Rio de Los Pinos; [B]Toltec Creek-Rio de Los Pinos; [C]Wolf Creek

Alternative 1 – No Action

Issue 1: This alternative would not meet the concern expressed by this issue. Existing forest conditions would persist, which would consist of forested stands with an increasing numbers of dead trees due to spruce beetle activity. Long-term potential to meet Forest Plan desired conditions and many objectives for the analysis area would not be met. The short term potential to produce commercial forest products from these lands designated for that purpose in the Forest Plan would not occur. Commercial timber products would not be produced for approximately 150 years. Reforestation activities to ensure forest stocking and improve the potential to diversify vegetation composition in this landscape would not occur. Dead trees would continue to accumulate and fall over time, increasing the potential for a high severity wildfire and

reduce options for fire suppression due to concerns for fire fighter safety, should a fire start. Large numbers of dead trees would also increase the potential for damaging existing infrastructure.

Issue 2: This alternative would best meet this issue, at least in the short-term. No additional ground disturbance would occur. The continuing spruce mortality could alter water flows, but this would not be expected to impact streams in the analysis areas, since overall stream health is good and streambanks are stable. Reduction in transpiration as spruce die could potentially increase water quantity in heavy precipitation years. Standing and down trees would continue to intercept precipitation and understory vegetation would release as water and light increases. Compacted areas that may be affecting site productivity would continue to improve very slowly over time. As trees fall and fuel loading increases, the potential for a high severity fire increases, should a fire occur. A high severity fire would likely be detrimental to both watershed condition and soils.

Issue 3: This alternative would best meet this issue, at least in the short-term. The lack of additional disturbance to vegetation would reduce potential impacts to the Canada lynx and snowshoe hare. The changing habitat conditions caused by the spruce beetles would favor some wildlife more than others. Red squirrels, an important secondary lynx prey, that depend on cones for food could be adversely affected. There would be minor impacts to existing understory seedlings and saplings from natural blowdown as dead trees fall. Should a large wildfire occur, it would be detrimental to important habitat components for many wildlife species including Canada lynx and snowshoe hare, their primary prey.

Alternative 2 – Proposed Action (*Preferred Alternative*)

Issue 1: This alternative would contribute the most to meeting the concerns expressed by this issue. It proposes to implement salvage harvests to recover the value from dead and dying spruce on up to 2,498 acres from lands designated for this purpose under the Forest Plan. The opportunity to harvest these trees would meet the intent of the desired conditions and many objectives of the Forest Plan for providing commercial forest products and supporting local economies. This alternative would also provide the opportunity to facilitate forest stand regeneration and diversity by both artificial and natural regeneration methods across the most acres. Removal of a portion of the dead and dying trees on the salvaged acres would also preempt the eventual buildup of large amounts of down wood fuels that could contribute to a high severity wildfire and likely allow for more suppression options by fire fighters due to fewer snags, if a fire started. Fuel reduction treatments and hazard tree removals would help reduce risks to adjacent private property and protect existing infrastructure.

Issue 2: Under this alternative, watershed condition would remain good. Best Management Practices (BMPs) and other Project Design Criteria (PDC) would protect the Water Influence Zone (WIZ) and water quality. Following implementation, site productivity would meet Forest Plan Standards. Road maintenance would fix areas where active erosion is creating sediment near streams. However, re-opening decommissioned road 118.1A could have water quality concerns, if PDC and BMPs are not carefully adhered to. Harvesting of dead trees may potentially increase water quantity and flows in years with heavy precipitation though remaining live trees, young trees, and understory vegetation would lessen increases. Since stream and stream banks are healthy, any increases in water should not cause adverse effects. Increases in compaction would be minimized by re-using skid trails and landings from previous harvests where possible, and where necessary, subsoiling would be implemented following harvest to ensure forest plan standards are met. Erosion and sedimentation would be minimized by PDC; streamside buffers would minimize potential for sediment to enter streams. This alternative would have to most potential to decrease the potential effects of a high severity wildfire, should one occur, by preempting the accumulation of large numbers of down trees.

Issue 3: This alternative would have the most potential impacts to Canada lynx and some of other varieties of wildlife evaluated, since it proposes the most acres of disturbance by harvest and related

activities. This alternative would have the most impacts to acres of Dense Horizontal Cover (DHC) important to lynx and other wildlife and would also change the most acres into a temporarily unsuitable Stand Initiation Structural Stage (SISS). Reforestation activities on harvested acres to ensure forest re-stocking would benefit lynx and many other species of wildlife over the long term. PDC would help minimize damage to understory vegetation and retain other structural elements which would help reduce adverse effects, but the temporary loss of DHC in salvage and Wildland-Urban interface areas would reduce the amount of high quality winter snowshoe hare habitat in the analysis area; the effects would still be within those analyzed under the Southern Rockies Lynx Amendment (SRLA) to the Forest Plan.

Alternative 3 – Limited Action

Issue 1: This alternative would contribute to meeting the concerns expressed by this issue, though to a lesser extent than Alternative 2. It proposes to implement salvage harvest to recover the value from dead and dying spruce on up to 1,549 acres from lands designated for this purpose under the Forest Plan. The opportunity to harvest these trees would meet the intent of the desired conditions and many of the objectives in the Forest Plan for providing commercial forest products and supporting local economies. This alternative would also provide the opportunity to facilitate forest stand regeneration and diversity by both artificial and natural regeneration methods, but on fewer acres than Alternative 2. Removal of a portion of the dead and dying trees on the salvaged acres would also help preempt the eventual buildup of large amounts of down wood fuels that could contribute to high severity effects from wildfires and likely allow for more suppression options by fire fighters, if a fire started. However, unharvested areas could result in additional fire behavior complexities.

Issue 2: This alternative would have fewer potential impacts to watersheds and soils due to less surface disturbance. Fewer temporary roads (including decommissioned roads) would be opened and in need of rehabilitation. Watershed condition would remain good. Best Management Practices and other Project Design Criteria (PDC) would protect the Water Influence Zone (WIZ) and water quality. Erosion and sedimentation would be minimized by PDC; streamside buffers would minimize potential for sediment to enter streams. Road maintenance would fix most areas where active erosion is creating sediment near streams. Harvesting of dead trees may potentially increase water quantity and flows in years with heavy precipitation though remaining live trees, young trees, and understory vegetation would lessen increases. This alternative would have mixed effects since more areas would remain unharvested, however since stream and stream banks are healthy, any increases in water should not cause any adverse effects. Following implementation, site soil productivity would meet Forest Plan Standards. Increases in compaction would be minimized by PDC such as re-using skid trails and landings from previous harvests where possible, and where necessary, subsoiling would be implemented following harvest to ensure forest plan standards are met.

Issue 3: This alternative would have fewer impacts to Canada lynx and the some of the other varieties of wildlife evaluated, since it proposes fewer acres of disturbance by harvest and associated activities. This alternative would retain additional acres of DHC and reduce the number of acres that left in a temporarily unsuitable Stand Initiation Structural Stage (SISS). Reforestation activities would occur on fewer harvested acres to ensure forest re-stocking that would benefit lynx and many other species of wildlife over the long term. PDC would help minimize damage to understory vegetation and retain other structural elements which would help reduce adverse effects, but the temporary loss of DHC in salvage and Wildland-Urban interface areas would reduce the amount of high quality winter snowshoe hare habitat in the analysis area; the effects would still be within those analyzed under the Southern Rockies Lynx Amendment (SRLA) to the Forest Plan.

Table 2-3. Comparison of alternatives by resource area.

Resource and Unit of Measure	ALTERNATIVES		
	1 - No Action	2 - Proposed Action	3- Limited Action
Forested acres NOT treated in analysis area	2,447	51	898
Acres Treated			
Salvage	469[a]	2,498	1,549
WUI Fuel Treatments	0	171	171
Pile burning	0	31	24
Volume of commercial wood products recovered	0	20-30 MMBF 40,000 - 60,000 CCF	15-20 MMBF 30,000 – 40,000 CCF
Hazard tree removal – infrastructure protection	As needed	Up to 2.0 tree heights to protect infrastructure	Up to 2.0 tree heights to protect infrastructure
Acres Regenerated			
Planted Engelmann spruce	0	650	170
Aspen sprouting	Minor	20	20
Stocking met by Advanced Regeneration (residual seedlings/saplings)	2,447	1,828	1,359
Road System (miles)			
Open NFS roads used & maintained	3.8[b]	12.5	10.9
Closed NFSRs maintained	0	5.0	4.9
NFSRs decommissioned roads-reopened & used	0	5.8	0.6
New temporary road constructed	0	0.8	0.1
Old Non-system roads re-opened	0	7.5	4.3
--- WATERSHED and AQUATIC RESOURCES --- Percent Disturbance by Watershed			
Headwaters Rio de Los Pinos (130100050201)	0	9.4	6.07
Toltec Creek-Rio de Los Pinos (130100050203)	0	2.6	1.41
Wolf Creek (130201020203)	0	1.93	0.94
7th level HUC of Concern 13010005050101	0	11.7	0
--- SOIL RESOURCES ---			
Total acres treated	0	2,498	1,549
Acres of Units ≥12% disturbance requiring subsoiling	0	117	48
---WILDLIFE---			
Threatened, Endangered, Proposed (5 species; 3 species: No habitat)	Lynx – No Effect Wolverine – No Effect	Lynx - May Affect; Likely to Adversely Affect. Wolverine – no jeopardy	Lynx - May Affect; Likely to Adversely Affect. Wolverine – no jeopardy
Sensitive Wildlife Species (29 species;22 species No habitat)	7 species- No Impact.	7 species -May Impact individuals, but not affect population viability.	7 species -May Impact individuals, but not affect population viability.
Management Indicator Species (9 species; 4 species No habitat)	5 species -No discernible change in population levels	5 species-– No discernible change in population levels	5 species-–No discernible change in population levels.
Neotropical migratory land birds	No Effect	Minor disturbance and/or displacement.	Minor disturbance and/or displacement.
---STREAMS AND AQUATIC HABITAT---			
Potential risk to stream & riparian health	Low	Low to Moderate FSR 118.1A re-opening	Low

Table 2-3. Comparison of alternatives by resource area.

Resource and Unit of Measure	ALTERNATIVES		
	1 - No Action	2 - Proposed Action	3- Limited Action
---SCENIC RESOURCES ---			
Scenery Integrity Objectives	Mod. & High	Moderate	Moderate
--- SENSITIVE PLANT SPECIES ---			
Sensitive Plant Species- 5 species with potential habitat	No Impacts	No Impact to 4 species; 1 species -May Adversely Impact Individuals, no trend toward loss of viability	No Impact to 4 species; 1 species -May Adversely Impact Individuals, but no trend toward loss of viability
--- RANGELAND RESOURCES and NOXIOUS WEEDS ---			
Risk of Noxious Weed establishment / expansion	Low	Moderate	Moderate
--- RECREATION ---			
Continental Divide National Scenic Trail	No effect	Low	Low
Recreational Impacts - winter	Some effect – falling & down trees	Less effect in longer term	Mixed effects – less in harvested areas; some in non-harvest areas
--- SOCIAL & ECONOMICS ---			
Net Present Value	-$250,000	-$533,712	-$410,924
Benefit/Cost Ratio	0	0.42	0.36
Benefits to the San Luis Valley	Negative	Some Benefit	Some Benefit
--- HERITAGE RESOURCES ---			
Risk to Identified & Unidentified Cultural Resources	No risk	Very low risk	Very low risk
Osha plant	No effect	Longer term- positive effect	Longer term-some positive effect
--AIR QUALITY--			
Impacts to local air quality	No effect	Minor – localized, short term	Minor – localized, short term

[a] Firewood cutting of standing dead trees is permitted within 300 ft. of open roads. A value of 150 ft. was used to estimate acres affected, since many areas are not accessible due to topography and not all acres adjacent to open roads are forested.
[b] NFSR 118 is maintained annually, other open roads are usually maintained at 5-7 year intervals.

2.6 Monitoring Measures

Monitoring is gathering information, observing processes, and examining the results of management activities to provide a basis for evaluation. Monitoring is done at both the project and Forest Plan level. The Cumbres Project contains project specific monitoring. It also includes Forest Plan monitoring and evaluation items. Monitoring includes implementation monitoring and evaluation to ensure that Standards and Guidelines are being incorporated during the project activities, as well as effectiveness monitoring and evaluation to determine whether project objectives are being met and if Project Design Criteria (PDC) are effective. Below are listed the monitoring measures that were recommended for incorporation into this project. Ensuring that sufficient monitoring is completed to meet objectives would be the responsibility of the District Ranger in cooperation with appropriate Forest staff.

Timber Resources

Objective: In conjunction with other resource specialists, ensure that all resource protection measures in the Decision are included in the timber sale contract and properly implemented.
Method: A detailed review and monitoring process will be utilized to ensure protection measures are incorporated and implemented.

- **Action:** Timber sale contracts will be reviewed and certified by the District Ranger to ensure conformance with the Decision prior to advertisement of timber sales, ensuring that required protection measures are included in the timber sale contract.
- **Action**: Implementation monitoring will be conducted through harvest inspections. As a routine part of project implementation, contract administrators monitor harvest and construction activities to ensure that project elements and Forest Plan Standards and Guidelines (S&Gs) are followed as designed.
- **Action:** The Timber Sale Administration team is responsible for administering the contract. If required, the team will initiate action to repair resource damage and suspend operations until problems have been corrected.

Objective: Ensure that the treated stands are reforested to at least Forest Plan standards.
Method: Stocking surveys will be conducted the first, third and fifth year (if necessary) after project implementation to evaluate regeneration distribution, species mix, and trees per acre to ensure that the areas are successfully reforested.

- **Action:** If existing regeneration is inadequate, artificial planting would be implemented.

Wildlife

Objective: Evaluate whether Forest Plan S&Gs and project specific wildlife design criteria are being implemented and determine whether a need exists to amend them to increase effectiveness for future projects.
Method: Perform site inspections during and/or following the vegetative management activities to determine compliance with project design criteria. Items important to monitor include:

- ✓ Impacts to understory vegetation
  - Acres of suitable lynx habitat conversion to the Stand Initiation Structure Stage (SISS)
  - Percentage of damage to Dense Horizontal Cover *
  - Compliance with Project Design Criteria

Additional items that may be monitored include:

- ✓ Percentage of damage to developing understory*
- ✓ TES species monitoring

* Post-harvest monitoring will be implemented to assess actual incidental damage to the understory. If damage is substantially different (+/- 50 percent of the original acreage estimate) than the 30% being estimated, impacts to lynx habitat will be re-evaluated in an addendum to the Biological Assessment. Post-harvest monitoring will also be useful for evaluating anticipated effects of future vegetation management projects to lynx habitat.

- **Action:** Take corrective action as needed to meet Forest Plan Standards and Guidelines. Consult with the necessary managers as needed to take corrective measures if necessary.

Soil Resources

Objective: Ensure that PDC are being properly implemented and Forest Plan S&Gs are being met in regards to soils.
Method: Soil moisture conditions will be monitored during harvest activities by Forest Service personnel.

- **Action:** Ensure that timber harvesting operations are being suspended when soil conditions are too wet to operate and would result in resource damage.

Method: Use accepted soil monitoring techniques to assess overall cumulative soil impacts following harvest completion.

- **Action**: Conduct traverses, spot soil sampling, or other soil management handbook methods to assess soil productivity and amount of subsoiling needed on units that are currently above 12 percent detrimental soil disturbance (DSD) within 1 year of harvest (if approved for harvest, this includes units 1, 2, 6, 7, 11, and 20). Complete any rehabilitation measures needed within 5 years of harvest.

Watershed Resources

Objective: Ensure that PDC are being properly implemented and that Forest Plan Standards and Guidelines are being met in regards to stream health.
Method: Conduct site inspections along affected streams in the project area during and after vegetation management and road activities to assess changes in stream conditions.

- **Action:** Additional monitoring of stream channels would be focused on sub-watershed 13010005050101 to verify PDC effectiveness and assess any changes in stream conditions.

Method: Inspect road segments near and at stream crossings after reconstruction/maintenance operations have been completed. Inspections will occur prior to, during, and following vegetation management activities.

- **Action:** Work with the Timber Sale Administration team to ensure that contract provisions are being implemented. Implement additional mitigation if necessary to minimize sediment or other negative impacts to streams.

Scenic Resources

Objective: Ensure that PDC are being properly implemented and that Forest Plan S&Gs are being met in regards to scenic resources.
Method: Conduct site inspections to ensure prescribed PDC are being implemented.

- **Action:** Visually review stump heights along NFSRs 118, 118.1C and near Trujillo Meadows CG to ensure they meet objectives. Work with Timber Sale Administration team to ensure landing locations are away from yurts and unit layout meets visual objectives.

Travel Management

Objective: Survey area roads to determine if logging has removed travel barriers and to determine if illegal off-highway vehicle use is occurring as a result of treatments.
Method: Periodic visual inspection

- **Action:** Install additional signs, barriers, and increase law enforcement efforts, as appropriate.

Noxious Weeds

Objective: Ensure that PDC are effective and that no additional noxious weed infestations occur within the project area.
Method: Site inspections during and after project implementation to ensure that design criteria are fully implemented. Perform annual surveys for noxious weeds in disturbed areas for up to 5 growing seasons to ensure new weed populations are not being established and if any existing populations are discovered, they are controlled and do not spread.

- **Action:** Treat identified noxious weeds in a timely manner as part of the forest noxious weed treatment program.

Range Resources

Objective: Ensure that range PDC are effective.
Method: Site inspections during and after project implementation to ensure that design criteria are fully implemented.

- **Action:** Perform site inspections during and after the project is complete to ensure livestock are not impacting regeneration within the project area and fences are still functional.

Heritage Resources

Objective: Protect known and undiscovered heritage resources.
Method: Newly constructed temporary roads should be monitored for erosion and potential impacts to undocumented heritage resources.

- **Action:** Appropriate action will be determined and implemented to protect affected heritage resources.

Objective: Facilitate completion of the multi-year *Osha* study by University of Kansas.
Method: Assist Kansas University with the *Osha* study to evaluate changes in plant abundance due to logging or other disturbance activities and plant collecting.

- **Action:** Support the monitoring of established study plots over the next 5 years to gauge potential effects to individual plants resulting from timber harvest activities and plant harvest activities.

CHAPTER 3. Affected Environment and Environmental Consequences

3.1 Introduction

This chapter summarizes the existing conditions and the potential effects due to the implementation of alternatives. It also presents a brief summary of the scientific and analytical basis for comparison of alternatives presented in chapter 2. Each resource discussion addresses the following components: 1) Scope of the analysis; 2) Existing condition relating to each resource; 3) Direct and indirect effects by each alternative; and 4) Cumulative effects.

Based on CEQ definitions (40 CFR part 1508), direct effects are those which are caused by the action and occur at the same time and place. Indirect effects are caused by the action, but are later in time or further removed in distance, but are still reasonably foreseeable. Effects may be either beneficial or detrimental. Cumulative effects result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of who implements the action (Federal, non-Federal, or individuals); the effects of these actions must overlap in space and time (considering the duration of effects) for a particular resource for there to be potential cumulative effects.

A list of terms and definitions used in the analysis and a list of common acronyms is located in appendix A.

The analysis area is located on National Forest System lands designated for multiple-use. The transportation system in the Cumbres analysis area was constructed to allow access for recreation, timber harvest, range management, private land access, and fire suppression. Road construction occurred in stages beginning in the early 1950s. Trujillo Meadows Reservoir was constructed in 1955. The area is used for livestock grazing, developed and dispersed recreation, and to provide forest products. Most of the proposed harvest units have been harvested previously. The summary tables of past forest management activities are located in appendix C.

Biological Resources

This section includes a summary of the analysis of potential effects on biological resources. Complete reports are located in the project record.

3.2 Forest Health

Scope of the Analysis

This section summarizes the forest health[6] conditions within the Cumbres project analysis area and the potential for the alternatives to affect forest health. The forest health analysis focuses primarily on the Engelmann spruce-subalpine fir (spruce/fir) dominated stands in the analysis area. Forested stands represent 69 percent of the land cover within the analysis area and are all of the spruce/fir forest type at elevations ranging from 10,000-10,800 feet. Other cover types represented include grasses/forb (24 percent), rock (4 percent), and shrubs (3 percent). Figure 3-1 shows the mapped dominant vegetation cover types in the area. Aspen is a minor component in the analysis areas and is found in scattered patches, primarily south and east of Neff Mountain.

[6] For the purposes of this analysis, forest health is defined by the Forest Plan, specifically as "A condition where biotic and abiotic influences on the forest (i.e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives for a given Forest unit now or in the future" (USDA Forest Service 1996, p M-9).

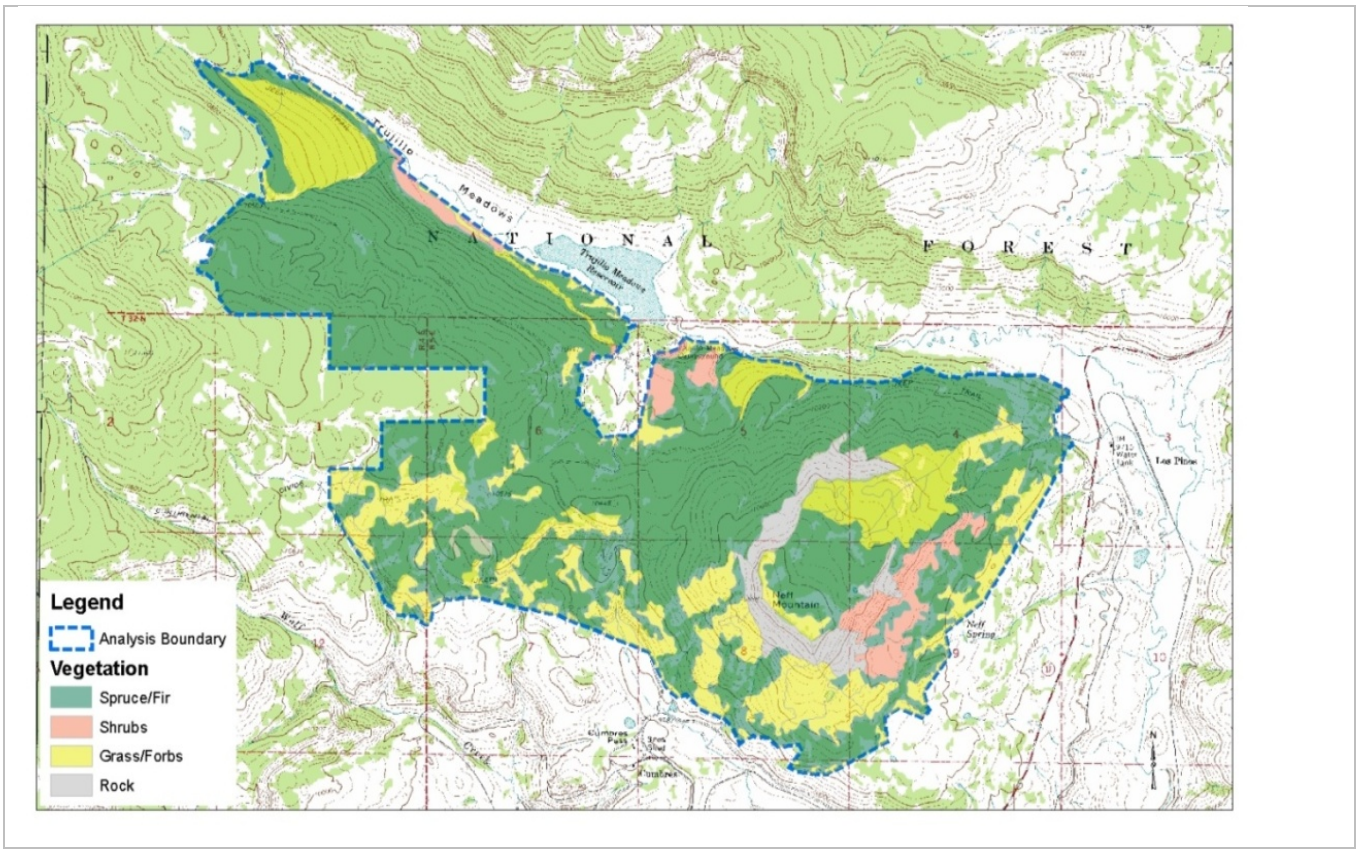

Figure 3-1. Dominant vegetation cover types, Cumbres project area (Source: FSVeg database).

Existing Conditions

This analysis will address forest conditions related to the interaction of human activity with four common biotic and abiotic influences that affect these stands: spruce beetle (*Dendroctonus rufipennis*), western spruce budworm (*Choristoneura occidentalis*), armillaria root disease (*Armillaria ostoyae*), and windthrow.

Influence 1: Spruce Beetle

The spruce beetle is a native insect to Colorado, generally occurring at endemic levels (Schmid and Mata 1996). In recent years, however, it has become the greatest impact on forest condition within the analysis area. Spruce beetles have also been responsible for substantial tree mortality across the Rio Grande National Forest. Like other bark beetles, these insects cause mortality in spruce trees by feeding upon the cambium, which is the growth zone directly underneath the bark.

The potential for an outbreak of bark beetles is determined by three primary factors: current bark beetle population levels, the susceptibility of individual stands, and weather patterns. The status of these driving forces reflects the currently large amount of spruce beetle activity on the Conejos Peak Ranger District.

Populations: In order for a bark beetle outbreak to occur, there must be a sufficient beetle population to respond to favorable conditions. The extent of recent spruce beetle-caused mortality both within the analysis area and across the Forest indicates that spruce beetle populations are at an epidemic level (Eager 2012).

Susceptibility: Stand conditions are also a primary determinant of bark beetle activity. Stands that are old and dense are generally more susceptible to bark beetles. In the case of Engelmann spruce, a risk rating system derived by Schmid and Frye (1976) documented that mortality as a result of spruce beetle activity is

most likely to be initiated in stands that: a) consist of larger size classes, b) are more dense (more trees per acre), c) have a higher percentage of spruce and d) are located on highly productive sites. Stands in the Cumbres Project analysis area meet most of the criteria for stands conducive to beetle activity. The susceptibility of high-risk stands can be attributed to large dense trees competing for sunlight and (more importantly) moisture. This "competition" for moisture is naturally more intense among older, denser stands of trees.

Weather Patterns: The Rio Grande National Forest experienced a severe drought within the early 2000s (Webb et. al. 2004) which has extended to the present. Low availability of moisture has generally reduced the tree's ability to resist bark beetle attack. The overall lack of moisture allowed spruce beetle populations to increase, and has also increased the susceptibility of adjacent stands. For some insects, the end of the drought usually means the end of the outbreak. However, with mountain pine beetles and spruce beetles, once the beetles have killed a large number of trees and produced abundant offspring, their numbers may become so great that they can overwhelm even healthy trees (Romme et al. 2006). This phenomenon appears to be occurring on the Rio Grande National Forest (Eager 2012).

There was no evidence of significant spruce beetle activity occurring in the analysis area until fairly recently. Increased spruce beetle activity was noted in the local Wolf Creek drainage and Neff Mountain areas in 2003. A small salvage sale was implemented on Neff Mountain in 2004 and the *County Line Vegetation Management Project* was initiated the same year. Spruce beetle activity increased dramatically in the County Line area until 2010 and has spread into and across the analysis area from the west at epidemic rates. This activity has also coincided with population increases in the Neff Mountain area.

Human activity, specifically forest management, can provide both positive and negative feedback to a stand's resistance and resiliency to spruce beetle activity. On the positive side, management activities can increase stand resistance to beetle spread prior to an outbreak by influencing the size classes, density, and species composition: three of four factors in the Schmid/Frye risk rating. Stand resiliency can also be increased through these activities by establishing younger cohorts within the stand which are not susceptible to beetle infestation. Such treatments must be done proactively, but as noted above cannot always stem the tide of an epidemic beetle population. Management activity can also reduce beetle spread reactively through sanitation treatments or beetle trap trees. Sanitation treatments remove insect brood by taking out recently-killed trees and/or currently-infested trees. Trap trees are utilized to draw in an existing beetle population and remove them from the stand along with the logs. These treatments are generally applied when an increase in endemic population is observed and/or windthrow has been caused by a wind event.

Past timber management treatments within the Cumbres analysis area are listed in Appendix C. Past management activities did reduce the risk of spruce beetle affecting these stands under *endemic* populations, but could not protect against epidemic beetle populations and drought-related stress.

On the negative side, management activity can have the potential to increase spruce beetle activity, but only if it is affecting green spruce trees. Examples of this feedback include harvest-generated windthrow in the residual or adjacent stands or increased food sources by cutting, but not removing, live spruce trees (Schmid and Mata 1996). This sort of feedback can generally be addressed through prompt follow-up treatments, but it is important that the original treatment be carefully planned and properly executed.

Records from past timber management activities noted events of minor windthrow resulting from management activities. An increase of endemic beetle activity was also observed in 1985 as a result of the defaulted Flat Timber Sale which had down green timber and log decks. In both instances (windthrow and down green timber), sanitation/salvage treatment was utilized to minimize the feedback and no spruce beetle outbreaks were experienced. These events overlap with current beetle activity in space (location), but not in time and are unrelated to the current epidemic.

Field surveys were completed in 2010 and 2011 by Rio Grande National Forest timber personnel and Gunnison Service Center personnel. Spruce beetles were found throughout the analysis area in large numbers, increasing steadily from west to the east. In 2011, spruce infestation rates ranged from 90 percent in the west to 30 percent in the east; additional spot ground surveys in 2013 have indicated that most spruce in the project are currently infested (see table 3-1, Forest Management section). According to Forest Service Entomologist Tom Eager, mortality of every infested spruce tree is a near certainty because of the immense population of beetles present. Susceptible spruce trees currently not infested are also very likely to become infested for the same reason.

The dramatic increase in spruce beetle activity in the area highlights the severity of the prior drought conditions in this area and across the Forest, as well as extremely high spruce beetle populations to the west of the project. Various indicators of drought severity including water yields, fuel moisture content, and plant physiology indicators all set records in 2002. It is likely that these conditions facilitated the rapid increase in beetle population and activity when this outbreak first began. Prolonged drought conditions through 2006, further endangered the stands and promoted beetle population growth.

Large spruce beetle populations directly to the west of the analysis area are proving to be detrimental to these stands. Once a full-blown outbreak is underway, the huge beetle populations can engulf entire landscapes and kill practically all spruce. Such intense outbreaks are not unheard of. Landscape scale outbreaks of spruce beetle have been recorded throughout the range of spruce, including locations in Alaska, New Mexico and Utah as well as numerous examples in Colorado. On the Rio Grande National Forest, we have experienced these phenomena in the County Line, Burro-Blowout, Big Moose, and Black Mesa project areas. Due to the predominant presence of spruce stands within the analysis area, this outbreak is expected to have broad impacts across the landscape.

Influence 2: Western Spruce Budworm (WSBW)

WSBW is also a native insect to the analysis area, but it alters stand structure by defoliating host trees rather than attacking the tree's cambium. WSBW impacts a wide variety of hosts including Douglas-fir (*Pseudotsuga menziesi*), subalpine fir (*Abies lasiocarpa*), and Engelmann spruce (*Picea engelmannii*) (Fellin and Dewey 1982). Spruce budworm alters stand structure by defoliating understory trees, predisposing larger trees to bark beetle attack, and by diminishing the available seed sources of the host species (Hadley and Veblen 1992). Generally, budworm outbreaks are most severe in dense, multi-storied stands as suppressed understory trees intercept budworm populations dispersing from overstory trees, thus making them more susceptible to defoliation damage and high mortality rates (Hadley and Veblen 1992).

There has been no evidence of significant WSBW activity occurring within the analysis area. Minor amounts of activity have been noted in and around the area, but not to an extent that would affect tree vigor or form. Likewise, no records from past timber management activities (including Common Stand Exam data collected as recently as 2011) have documented any concerns over budworm. Therefore, no impacts from WSBW are expected to result in tree mortality considering either advance natural regeneration, any artificial regeneration, or residual overstory trees.

Past timber management activities may or may not have affected the current WSBW populations. The removal of some over-story trees with the past shelterwood preparatory cuts and shelterwood establishment cuts opened up stands and increased the dispersal distances of budworm populations from overstory trees to understory trees, thus increasing the likelihood of predation. Past clearcuts and overstory removal prescriptions eliminated the host trees for western spruce budworm, greatly decreasing budworm activity and limiting it to the stand periphery.

Recent stand data show WSBW has impacted some of the eastern units, although not to an extent that would affect tree vigor or form. These denser stands provide adequate habitat for larvae to disperse downward through the canopy to understory trees and are at a slightly lower elevation than other sites. Overall, budworm is not considered a concern to forest health within this project.

Influence 3: Armillaria Root Disease

Armillaria root disease is also a native pathogen that is present in most spruce/fir stands in the Southern Rockies and usually results in scattered, isolated pockets of mortality and windthrow in older stands. Like western spruce budworm, *armillaria* may have contributed to increased susceptibility of some stands to spruce beetle.

There has been some evidence of past *armillaria* occurrence within the analysis area as would be anticipated, although records did not documented management concerns. A service trip report prepared by Entomologist Roy Mask and Forest Pathologist Jim Worrall also noted presence of *armillaria* within the adjacent *Trujillo Meadows Campground Vegetation Management Project*, although not extensive (Mask and Worrall 2011).

Past timber management activities may or may not have affected the occurrence of *armillaria* root disease within the analysis area. Partial cutting likely had multiple, conflicting influences on disease dynamics. On one hand, stumps may provide increased food to the pathogen and more energy to attack neighboring trees, but on the other hand, partial cutting can lead to increased vigor and resistance of residual trees (Mask and Worrall 2011). *Armillaria* root disease is believed to be at only endemic levels within the analysis area.

It appears through field reconnaissance that the *armillaria* root disease in the analysis area is likely at, or near, endemic levels. Overall, *armillaria* is not considered a concern to forest health within this project nor to be outside the range of natural occurrence. Scattered windthrow and tree stress caused by *armillaria* could have contributed to the buildup of spruce beetle populations within the analysis area.

Influence 4: Windthrow

Windthrow, also known as blowdown, are trees felled or broken off by wind. This event is common in spruce/fir stands, which are characteristically shallow-rooted. It can result from natural events alone, involving weather events and/or disease interplay, or can be precipitated by management activity. Windthrow primarily affects forest health by harboring endemic populations of spruce beetle and providing opportunity for population growth to epidemic levels within an otherwise healthy stand. As a disturbance agent, windthrow also provides a medium for stand dynamics by stimulating pockets of regeneration within a mature stand or even regenerating large areas through landscape-scale disturbance.

There has been some evidence of recent minor windthrow within the analysis area, as well as record of past minor windthrow events, as noted. Wind risk within this area is rated from low to high, according to a stand's specific slope position and aspect.

Windthrow risk has been generally decreased as a result of past management activities. These treatments have gradually opened up the stand structure and increased tree stability and wind firmness.

Evidence of recent windthrow pockets has been observed and single-tree windthrow events are anticipated each spring in high elevation spruce/fir stands. However, no large-scale events were observed at last survey, and windthrow is not considered a concern to forest health at present. Pockets of windthrow could have been a contributing factor to the overall build-up of spruce beetle within the analysis area, but were not a driving force of their success.

Evaluation of Existing Conditions- When evaluating these existing conditions of the analysis area in terms of forest health, it is important to understand what standard the conditions are being measured against. The Forest Plan definition of forest health is a condition where influences do not threaten management objectives for a given Forest unit now or in the future (text abbreviated and emphasized for clarity). With the definition, the standard for forest health is determined by the management objectives for the Management Area Prescription (MAP) under consideration. If the existing condition is in alignment with the objectives for the MAP, then forest health meets the standard. If the existing condition is not in alignment with the objectives for the MAP, then there is a disparity to be addressed. Some management MAPs within the Forest are intended for events to be heavily managed for certain goals, while other MAPs are intended to be very lightly management for other goals. This definition does not deny the benefits of natural processes, but tends to the overlap between natural processes and desired conditions.

Within the analysis area, units fall within two Management Area Prescriptions (MAPs) defined by the Forest Plan. The majority of the area falls within MAP 5.11- *General Forest and Intermingled Rangelands*, and the remainder falls within MAP 5.13- *Forest Products*. Within both of these prescriptions, forest insect or disease infestations are to be evaluated against the potential for loss of commercial forest resources, with management emphasis on protecting the commercial resources (USDA Forest Service 1996, p IV-26, p IV-28). When measured against this standard, a disparity exists concerning forest health.

Direct and Indirect Effects

Under all alternatives, units that currently have large beetle populations would continue to experience rapid, extensive mortality, most likely until most of the mature spruce component is killed. During intense beetle outbreaks, the outbreak ends only when the beetles deplete their host food supply. This scenario is expected to occur and to be duplicated in most stands that have any spruce beetle activity at all, assuming that the impacts of prior and current drought conditions continue. Even without continued drought, the currently elevated state of the spruce beetle population will likely persist in this area for some time. Due to current stand structure and conditions created by the spruce beetle; these areas will be either even-aged or two-aged, whether or not management activities are applied.

The spruce beetle outbreak currently extends beyond the analysis area boundary and into Wilderness areas, backcountry areas, and into other inaccessible or inoperable spruce stands within and adjacent to the analysis area. Relatively contiguous suitable spruce beetle habitat is present around the analysis area and it is reasonable to expect spruce beetle activity to continue to increase within the analysis area.

Alternative 1 – No Action

As mature stands are killed by spruce beetle, two influences will work together to shift species composition within the affected stands both now and into the future. First, the species-specific mortality would shift current overstory composition strongly toward subalpine fir, while the predominantly fir understory (advanced regeneration) would be released to grow. Second, the subalpine fir seed source would be sustained for continued propagation, while the Engelmann spruce seed source will be greatly diminished. This aggregate affect would favor current and future stands dominated by subalpine fir. This shift in both stand structure and species composition has been observed before and could last as long as 125 to 175 years (Schmid and Mata 1996). Units toward the eastern side of the analysis area may experience a limited expansion of aspen clones, although this will likely be regulated by ungulate browsing pressure.

Various effects on WSBW and *armillaria* root disease occurrence could result from these shifts in species composition. In the short-term (50 years), the death of overstory spruce would increase dispersal distance of budworm from remaining overstory fir trees, thereby reducing insect survival. The loss of overstory would also release the suppressed understory making the understory more resilient to WSBW. In the long-term (50+ years), future occurrence of WSBW could actually be increased in subalpine fir-dominated stands as a

preferred habitat develops. Subalpine fir is also less resistant to *armillaria* root disease than Engelmann spruce, which could potentially increase the future occurrence of *armillaria* root disease within the analysis area. Windthrow risk would be slightly increased for residual overstory trees in each stand due to the loss of wind protection.

Figure 3-2 shows the FVS (Forest Vegetation Simulator) representation of expected changes under No Action. As the mature stands are killed by spruce beetle, the structure and appearance of stands would also change drastically. The stands would become more open, with little canopy closure for the next 30 years. Post-outbreak canopy closure is expected to drop to about 17 percent before increasing again. Snags would increase, giving the landscape a grey tone. Such transition can be observed in the adjacent El Gato Salvage Sale, which has not yet been harvested. Averages of 50-60 snags/acre are expected to result from the spruce beetle epidemic within the next 2 to 3 years, maintaining horizontal cover within the stand. The forest structure would close in over the next 30-50 years, and an overstory would be re-established within the next 100 years.

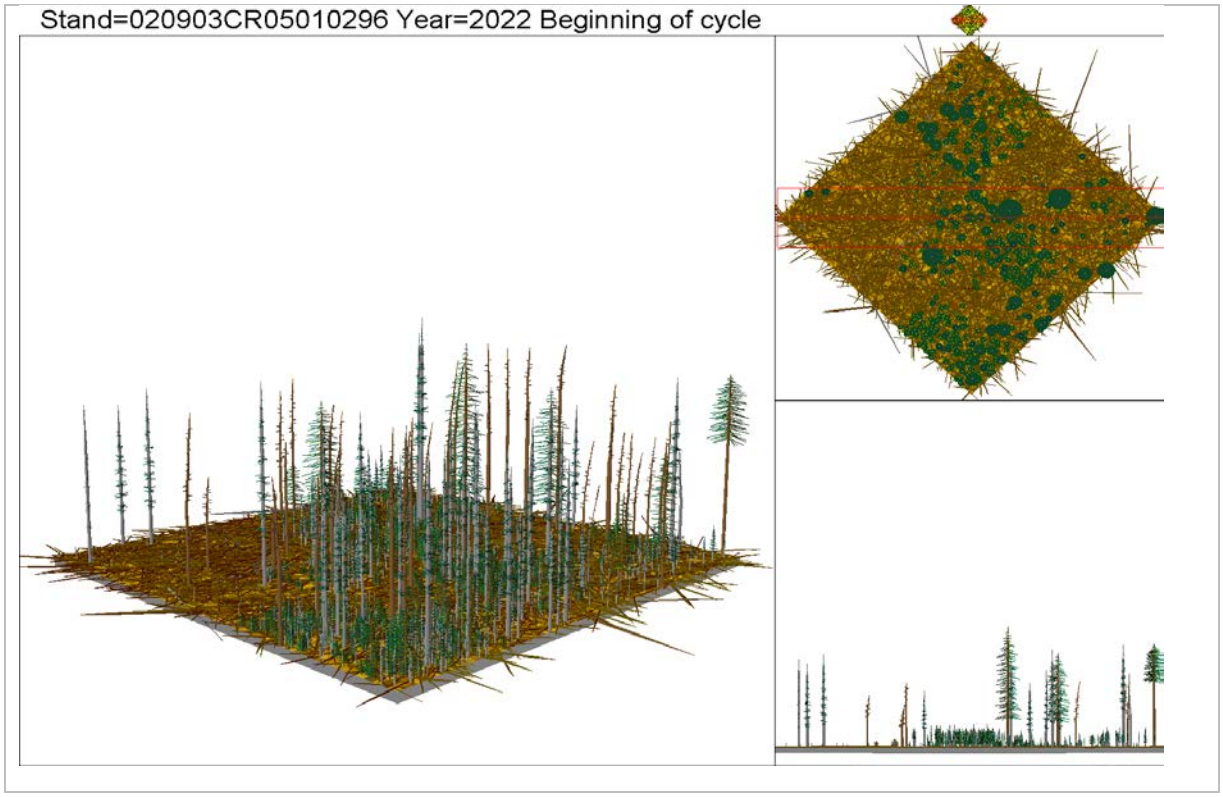

Figure 3-2. Forest Vegetation Simulation (FVS), 10 years post spruce beetle outbreak, Alternative 1.

The majority snags are expected to fall within the next 50 years, producing large fuel loads (coarse woody debris (CWD)). Moderate levels of coarse woody debris are desirable for soil development and regeneration establishment (shading), but excessive amounts of debris can diminish natural regeneration establishment (rooting) and increase burn severity, should a fire occur. Further discussion of CWD can be found in the Fire/Fuels section.

Under Alternative 1, firewood gathering would still occur along open roads and within permitted areas, on approximately 469 acres. Impacts upon forest vegetation and recovery are expected to be extensive within these areas, due to increased access needs and uncontrolled felling operations. These activities would remain

within the scope of the management objectives for the affected units, and impacted areas would still be re-established with forest vegetation.

Alternative 2 – Proposed Action

This alternative proposes to perform salvage operations on up to 2,498 acres through a variety of silvicultural systems. Salvage would include the removal of dead or infested trees that have been impacted by spruce beetles. It would have minimal impact on overall beetle numbers, but would provide opportunity for economic recovery of forest products, while allowing influence on the establishment of the new forest through the manipulation of structure, species composition mix, and the distribution and loading of CWD. These management activities would promote conditions within the future forest that would continue to be in alignment with the management objectives for the area. Salvage could potentially reduce the rate of spread of the beetles at the stand level, but it is not likely nor is it realistic to think that the proposed treatments would control the spruce beetle outbreak over vast areas adjacent to the treated units.

Because of the scale of the epidemic and resulting mortality, salvage harvesting within each affected unit would generally be extensive and the resulting stand structure would appear open as a result of removing an average of 50-60 dead and dying spruce per acre. Figure 3-3 shows and FVS simulations of post-harvest stand conditions. Post-treatment canopy closure is expected to drop to about 7 percent, before increasing again. A minimum of 4 snags per acre would be retained for wildlife habitat, as well as subalpine fir and any uninfested spruce. Forest structure would close in over the next 30 to 50 years, and an overstory would be re-established within the next 100 years. Future fuel loads (CWD) resulting from snag fall would be greatly reduced, but logging debris would still be evident within the stand. Windthrow risk of residual trees would be increased by the removal of the snag wind protection, particularly on southwesterly exposures. This risk has been partially mitigated by past management activities, but would still be anticipated. Although undesirable, this event would create good microsites for natural and artificial regeneration establishment and would not contribute toward any additional insect or disease outbreaks.

Under Alternative 2, artificial regeneration by planting Engelmann spruce would be planned for on approximately 650 acres. Actual planting acres would be determined through post-treatment evaluations based upon desired species composition, distribution, and stocking levels, in an effort to maintain landscape diversity in composition, structure, and function. Desired stocking levels would likely be higher than, but would not be less than, the Forest Plan restocking standards of 150 trees per acre.

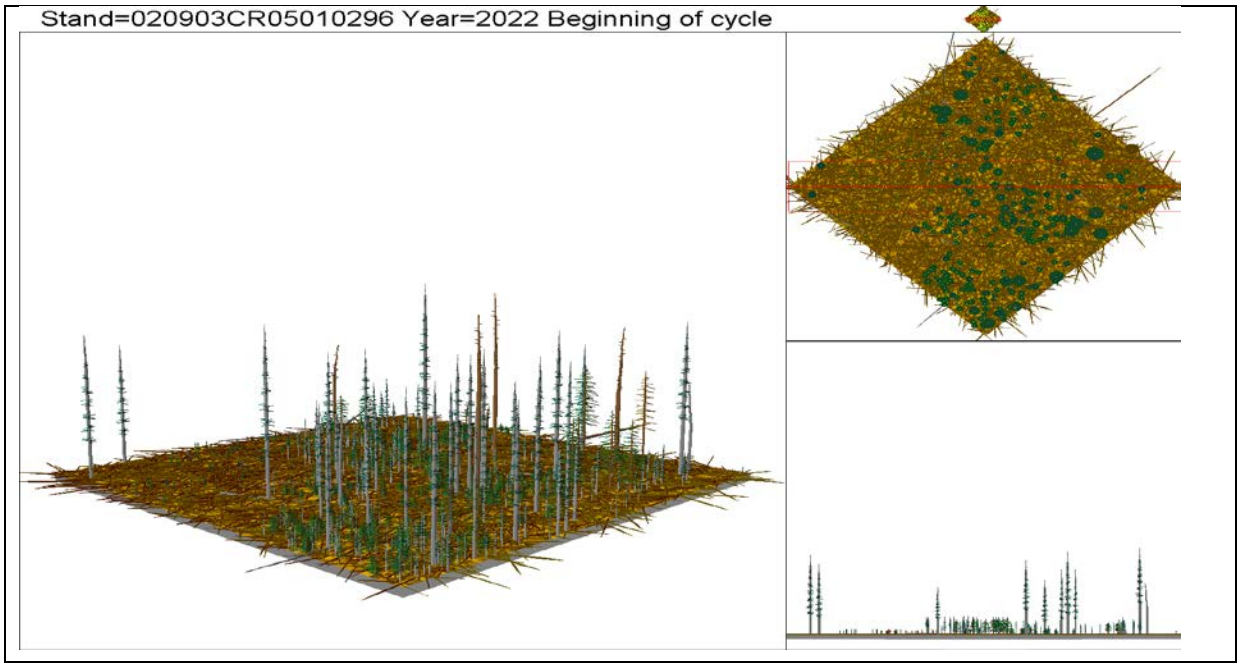

Figure 3-3. FVS depiction of a stand 10 years after salvage harvest and regeneration treatment.

Engelmann spruce is susceptible to *armillaria* root disease, but this disease usually does not affect the tree until it reaches later seral stages. Engelmann spruce shows greater resistance to *armillaria* than subalpine fir, which would otherwise be regenerated on these sites. Any increase in *armillaria* root disease following salvage harvesting would not be the result of removing beetle infested or beetle killed trees. Root systems of beetle-killed trees would not be affected in their suitability as a food base by removal of the stem. Project design criteria (PDC) for protecting existing regeneration and establishing new regeneration (chapter 2) would be applied to all action alternatives.

Alternative 2 also proposes hazard tree removal up to 2.0 tree heights of open roads, fences, private land, cabins or other infrastructure. The removal of hazard trees within this zone would have the same effect as the salvage harvest, but would also remove live trees prone to windthrow which could cause harm or damage infrastructure.

In addition, alternative 2 proposes fuels treatment to improve defensible space in WUI areas up to 400 feet from adjacent private land or other structures on approximately 171 acres. These treatments would focus on thinning understory trees (<8” dbh) and shrubs, as needed, to modify potential fire behavior. The effects of this action on spruce beetle would be insignificant as the spruce beetles preferred habitat is trees greater than 8 inch dbh, although some trees as small as 4 to 5 inches are being infested and killed by spruce beetle. Removing some of the dense smaller trees, especially subalpine fir, would help reduce spruce budworm host trees, thereby making these treated areas less susceptible to the insect.

Part of the design for alternative 2 is to set aside 97 acres for public firewood gathering, where no commercial harvest would occur. Impacts upon forest vegetation and recovery are expected to be greatest within these units, due to increased access needs and uncontrolled felling operations. These activities and effects, however, would be identical to the firewood gathering performed under alternative 1, except that vehicles could be allowed further off open roads within these specific areas. Activities would remain within the scope of the management objectives for the affected units, and these areas would still be re-established with forest vegetation over time.

Alternative 3 – Limited Action

Like Alternative 2, this alternative would designate units where dead and dying Engelmann spruce are removed for the primary purpose of recovering the economic value of dead and dying trees while allowing influence on the establishment of the new forest. The effects of salvage harvest would be the same as those described in Alternative 2, but would affect fewer acres. Only 1,549 acres would be treated through salvage operations under this alternative. Effects in unharvested areas would be similar to conditions described under Alternative 1.

Under Alternative 3, artificial regeneration by planting Engelmann spruce is planned for approximately 170 acres. Actual planting acres would be determined through post-treatment evaluations based upon desired species composition, distribution, and stocking levels, in an effort to maintain landscape diversity in composition, structure, and function. Desired stocking levels would likely be higher than, but would not be less than, Forest Plan restocking standards. The effects of *armillaria* root disease would be the same as those described under Alternative 2, but over a smaller area.

Both hazard tree removal and fuels reduction treatments would be the same as described in Alternative 2.

Cumulative Effects

The cumulative effects analysis for forest health includes all of the spruce/fir forest stands on public and private lands within and adjacent to the analysis area. The analysis considers spruce beetle infestations that have been observed in this area during the last seven years and the potential for continued outbreaks over the next 5 years. The probability for ongoing spruce beetle outbreaks is high over the next 5 years due to the current weather patterns, spruce beetle populations in the area, and stand conditions. The spruce/fir forests across the Rio Grande are currently undergoing a large amount of spruce beetle activity where thousands of acres are being affected.

The Cumbres project analysis area is bounded on the north by Backcountry Area (MAP 3.3), on the east by Scenic Byways (MAP 4.21), and on the west and east by private property. On the west is also the Rio de los Pinos project area, which is adjacent to the South San Juan Wilderness Area and Backcountry Areas. Significant spruce beetle mortality has been observed in all areas to the west excluding some private, which was cut heavily within the past 20 years. Backcountry and wilderness areas would remain untreated and natural processes would continue in these areas without human intervention, while some degree of salvage activity could be expected on private land.

Nearby efforts to treat spruce beetle activity include the County Line Vegetation Management Project, the Rio de los Pinos Vegetation Management Project, and the Trujillo Meadows Campground Vegetation Management Project. All of these projects would contribute toward removing some spruce beetle from the forest, but it is probable that the sum total of these efforts would have little impact on bark beetle populations. These sales may temper beetle-caused mortality on a localized (stand) level and allow some portions of the older age class spruce to survive the current wave of mortality, but this is result is unlikely.

The action alternatives are, however, expected to improve forest conditions in the future by increasing heterogeneity within a landscape that is experiencing a broad scale disturbance event. This influence would affect stand structure, species composition mix, and CWD distribution and loading within the treated areas. As a result, improved resiliency to insect and plant pathogens and changes in climate pattern is expected. None of the alternatives are expected to result in significant impacts to the presence and persistence of forest vegetation across the landscape.

3.3 Forest Management

Scope of Analysis

The forest management analysis focuses on the proposed management activities within the Analysis Area to address the spruce beetle infestation and timber productivity. Forest management refers to the harvesting practices and other silvicultural treatments intended to manipulate forest vegetation for specific management objectives as well as the associate goal of a sustained yield of forest products. See the Forest Health section for a review of vegetation types and extent of the analysis area.

Existing Conditions

The majority of the analysis area has been harvested and/or had other silvicultural treatments in the past. The listing of past timber management and other activities that have occurred in the analysis area that influenced the existing condition are located in appendix C, tables C-1 and C-2.

Shelterwood preparatory cuts (light partial cuts) make up the largest portion of the previous timber harvest activity that occurred in the analysis area. These treatments opened up the stands (removing about 1/3 of the basal area) to allow the present abundant natural regeneration of spruce and fir to become established. Shelterwood establishment cuts removed approximately 50 percent of the original basal area to promote regeneration establishment. Shelterwood removal cuts and overstory removal cuts released the advanced regeneration from overstory competition and increased sapling growth and vigor.

Abundant regeneration has also developed in most of these stands, including the patch and stand clearcuts. Even with all the previous harvest and salvage operations within the analysis area, the epidemic populations of spruce beetle has infested almost all spruce greater than 6 inches in diameter within most stands. Table 3-1 shows the estimated increase in the percent of overstory spruce in the different units infested by spruce beetle between 2011 and 2013 field surveys. The bark beetles have affected the majority of overstory spruce in all units and surrounding stands.

Past conifer clearcuts have been successfully regenerated to dense spruce and fir saplings and pole size trees. As a result, these stands are fairly resistant to spruce beetle infestation and will most likely remain as green islands within the project area.

The analysis area contains some of the most productive timber growing sites found on the Rio Grande National Forest. The current structure of the majority of stands within the analysis area is primarily mature spruce/fir, although some are in the stand initiation structural stage. The average age of the dominate and co-dominant trees within the spruce/fir stands varies between 150 to 200 years. The stands may be characterized as sparse to dense, mature to over-mature Engelmann spruce/subalpine fir timber stands, with a range of basal areas generally between 100 and 200 square feet per acre. A minor component of aspen is present within some stands near the eastern edge of the analysis area. The stand age and high percentage of spruce in the overstory made these stands susceptible to spruce beetle attack under drought conditions. Openings created by past timber harvest have regenerated to a mix of spruce and subalpine fir saplings, but predominantly fir. See table 3-1 for stand composition by species.

Table 3-1. Stand conditions by proposed harvest unit number.

Harvest Unit	Acres	Current Regeneration (tree/acre)	Overstory Composition by Species, ≥ 8" dbh	% Mortality of Spruce ≥ 8" dbh		Estimated Planting Acres
				2011	2013	
1	122.3	333	ES-81%, TF-19%	90%	95%	122
2	142.9	565	ES-68%, TF-32%	65%	95%	143
3	94.3	565	ES-68%, TF-32%	65%	95%	94.3
4	193.7	925	ES-62%, TF-38%	80%	95%	0
5	105	925	ES-62%, TF-38%	95%	95%	0
6	165.8	240	ES-58%, TF-42%	70%	95%	166
7	154.1	925	ES-62%, TF-38%	90%	95%	0
8	197.2	925	ES-62%, TF-38%	80%	95%	0
9	40.5	861	ES-92%, TF-8%	80%	95%	0
10	13.2	925	ES-62%, TF-38%	75%	95%	0
11	149.2	1043	ES-92%, TF-8%	75%	95%	0
12	183.7	981	ES-75%, TF-25%	70%	95%	0
13	135.8	1314	ES-62%, TF-38%	65%	95%	0
14	140	1067	ES-100%	30%	95%	0
15	147.4	1113	ES-70%, TF-30%	75%	95%	0
16	124.3	565	ES-68%, TF-32%	65%	95%	124
17	95.7	700	ES-94%, TF-6%	30%	95%	0
18	67.6	1850	ES-100%	70%	95%	0
19	70.2	700	ES-73%, TF-27%	40%	95%	0
20	39.3	925	ES-62%, TF-38%	70%	95%	0
21	74.7	925	ES-62%, TF-38%	80%	95%	0
22	41.2	925	ES-62%, TF-38%	80%	95%	0

Old Growth

None of the forested stands proposed for treatment meet the criteria for old growth as defined by Mehl (1992). Presently, the spruce stands do not meet the minimum age, size, and live tree density requirements to be old growth due to the extensive spruce beetle mortality.

Direct and Indirect Effects

Alternative 1 – No Action

Under this alternative, no salvage of beetle infested or killed timber would occur. Public firewood gathering would still occur on approximately 469 acres. The economic value of spruce beetle-killed/infested trees would not be realized and some Forest Objectives listed in chapter 1 would not be met.

With the loss of the Engelmann spruce seed source due to beetle kill, it can be expected that many residual stands would be dominated by subalpine fir. Some openings (gaps) would be created when dead trees fall, although individual gaps in the canopy would generally be rare, due to the widespread loss of canopy closure. An opening in a forest canopy is associated with the death, blow-down, or other removal of all or a significant portion of the overstory trees. These gaps are often characterized by high structural and species

diversity due to the growth of understory flora and colonization of new species, which are facilitated by the microclimatic conditions of the gap (Dunstar 1996). Overall, loss of canopy closure would reduce the opportunities for protected microclimatic conditions that provide gap dynamics.

Aspen, where present, may regenerate in openings created by the mortality of spruce, as permitted by ungulate browse pressure. In stands where timber production is the objective, stands dominated by subalpine fir rather than Engelmann spruce are less desirable for the following reasons: a) fir has a shorter life span than spruce, b) fir is more susceptible to more insect and disease attacks than spruce, c) the structural characteristics of the wood fiber are inferior to spruce, and d) it has less economic value than spruce. Forest Plan desired conditions for MAP 5.11 and 5.13 would not be addressed under this alternative.

By not salvaging the dead spruce, approximately 20 to 30 MMBF of National Forest timber would not be utilized for wood products or contribute to sustained yield of forest products. The public would most likely obtain an equivalent amount of wood products from other sources, including private land or other countries.

Fuels reduction treatments would not occur within WUI areas up to 400 feet from adjacent private land or other infrastructure. Fuels treatment areas along roads and private boundaries would retain dense understory vegetation and fuel loadings, except where influenced by public firewood gathering.

Hazard tree removal may not occur up to 2.0 tree heights of open roads, fences, private land, cabins or other infrastructure such as campgrounds or developed sites unless authorized by another decision. Some of these hazards trees would be mitigated through public firewood gathering.

Alternative 2 – Proposed Action

This alternative provides the opportunity to salvage dead and dying Engelmann spruce, perform fuel reduction treatments within WUI areas, and remove hazard trees around infrastructure. Harvest would be accomplished with ground-based (tractor) logging methods through a variety of large and/or small sales, including public/commercial firewood-gathering areas.

The intent of the salvage is to place timber on the market for the American public in time to capture the value of the beetle-killed spruce trees, before the effects of wood decay eliminates that value. The objective of the silvicultural prescription would be to harvest spruce trees 8 inches Diameter at Breast Height (dbh) and larger within the salvage units, which were recently killed by, or are currently infested with, spruce beetle. Conifer removal from selected aspen clones may also increase the vigor and persistence of these on the landscape. In spruce/fir stands, a minimum of 4 snags per acre would be retained for wildlife habitat, as well as fir and uninfested spruce. Exceptions to this are those trees that must be removed from skid trails, landings, or for safety reasons. The removal of hazard trees would include live trees prone to windthrow which could cause harm or damage infrastructure.

The minimum number of spruce/fir snags, live subalpine fir, and live uninfected spruce to be left is specified in the Project Design Criteria (PDC), chapter 2. Treated stands are expected to have an average susceptibility of windfall risk; having been previously managed, these trees have been exposed to lower stocking densities and have developed wind firmness over time. However, some windthrow is expected to result from this treatment due to the extensive nature of the mortality and resulting salvage. Trees most susceptible to windthrow would be residual live overstory fir, which have greater wind resistance than snags. A loss of these trees to windfall would not affect management objectives or future management activities within the analysis area.

Following removal of the dead or dying spruce, the Forest Service would plant Engelmann spruce seedlings on those areas where post-sale reforestation surveys indicate that species composition, distribution, and/or stocking is below desired levels. The desired species mix and stocking levels will be determined on a stand-

by-stand basis, but will be not less than the minimum Forest Plan standard of 150 trees per acre. Although stand averages are good across most units, not every acre is uniformly stocked; some areas are high, some areas are low. Harvest activities are generally not expected to create under-stocked areas. The logging process itself would provide the necessary soil scarification, allowing available seed to reach mineral soil, and helping prepare the sites for planting. Light logging slash left in the woods would be used to benefit young seedlings by protecting them from excessive sunlight, extremes of temperature, desiccation, and grazing animals (Smith et al. 1997). It is anticipated that about 650 acres could require planting based existing stand data. Actual planting acres will be determined through regenerations surveys following management activities. Forest Plan desired conditions for MAP 5.11 and 5.13 would be addressed under this alternative.

Openings (gaps) would be created in the units more rapidly than Alternative 1, although individual gaps in the canopy would generally be rare, due to the widespread loss of canopy closure. Overall stand structure would be open for the next 30 years (see additional discussion in the Forest Health section).

In this alternative, approximately 20 to 30 MMBF would be harvested from up to 2,498 acres. Between all alternatives, this alternative would contribute the most to long term sustained yield of forest products. The estimation of timber volume that would be removed is derived from three sources: 1) stand exam and pre-cruise data taken in 2011; 2) this stand exam data projected to 2012 by the Forest Vegetation Simulation (FVS), Central Rockies Variant; and 3) field surveys in 2010-2011, which estimated the percent of infested spruce trees. All of these sources are subject to some error. There is also the uncertainty whether or not the beetles will attack 100 percent of the mature spruce trees within these stands. Therefore, these volumes must be considered a best estimate and subject to change. More precise data would come when the timber is actually cruised during the sale preparation process.

Also within this alternative, about 171 acres of fuels reduction treatments is planned within WUI areas up to 400 feet from adjacent private land. Treatments would reduce surface, ladder, and canopy fuels (i.e. fuel loading) to decrease the potential for severe wildfire and the likelihood of wildfire spreading between National Forest and private lands. Ladder and canopy fuels (shrubs as well as seedling, sapling, and pole sized trees) would be thinned by hand-felling techniques and pile burning or, where practical, machinery equipped with cutting or grinding heads. The effects of this action on existing vegetation would decrease tree density and improve tree vigor of the remaining trees, making them more resistant to insects and disease.

Hazard tree removal would be implemented within a distance of up to 2.0 tree heights from open roads, fences, private land, cabins, or other infrastructure. Hazard distance would depend on localized factors such as slope, topography, and/or the number and arrangement of potentially hazardous trees. Where feasible, these trees would be cut and removed as part of timber harvest activities or removed as firewood by adjacent landowners; otherwise they would be felled, bucked, and left in place, unless otherwise specified. Both fuels treatment and hazard trees could consist of cutting vegetation with chainsaws and handpiling slash or grinding it with mechanized equipment. Any slash piles created would be burned during favorable weather conditions.

The designated firewood gathering areas (97 acres) are intended to meet specific product needs, but are expected to have greater overall resource impacts. These impacts will result from increased access needs and uncontrolled felling operations, but would be no greater than impacts from firewood gathering under Alternative 1.

The PDC for timber/silviculture (chapter 2) are routinely implemented in timber sales on the Forest. The design criteria are feasible because they can be incorporated into existing timber sale contract provisions. The design criteria have proven to be an effective means of assuring regeneration and providing for resource protection.

Alternative 3 – Limited Action

As with Alternative 2, this alternative provides the opportunity to salvage dead and dying Engelmann Spruce (up to 1,549 acres) along with fuel reduction treatment within WUI areas (171 acres) and removing of hazard trees around infrastructure.

This alternative would produce an estimated volume of 15 to 20 MMBF. Reforestation through artificial regeneration may occur on approximately 170 acres of non-stocked or under-stocked areas. Actual planting acres would be determined through regenerations surveys following management activities. Harvesting would be accomplished with ground-based (tractor) logging methods through a variety of large and/or small sales, including public/commercial firewood-gathering areas.

The difference between Alternative 3 and Alternative 2 is that Alternative 3 would propose salvage on about 949 fewer acres and regenerate approximately 480 fewer acres through harvest activities, thereby addressing the project purpose to a lesser degree.

Although fewer acres are being treated within this alternative, the effects of salvage harvest for the removal of trees killed or infested by spruce beetle have already been described under Alternative 2. The reduction in designated public firewood gathering areas would not limit the public, as firewood gathering would still be permitted along roads in areas not under a timber sale contract.

The effects of fuels reduction treatment and hazard tree removal are the same as described in Alternative 2.

Cumulative Effects

When evaluating the effects of management activities, two aspects must be considered: the effect of salvage on current forest management goals, as well as the potential impact upon future forest goals. Both action alternatives would contribute toward providing a sustainable supply of forest product to timber industry in the present, as well as into the future. When added to other past, present and future sales, the proposed harvest activities would help meet, but not exceed, annual Forest Plan Allowable Sale Quantity for softwoods. These actions, therefore, would remain within the FEIS analysis for the Forest Plan.

Since most of the roads needed to harvest the timber are already in place, new road construction would not be a major factor affecting forest management decisions and alternative viability. Prompt removal of the dead trees, followed by replanting new trees where needed, would accelerate the process towards getting these units back to the desired condition.

Alternative 1, on the other hand, would address the disparity between existing conditions and management objectives only to the extent to which public firewood gathering would occur. A majority of the existing commercial resources would be lost as a result of mortality and deterioration. Likewise, future commercial resources are expected to be lost, as future stand composition would promote less-desirable species which are more susceptible to insect and disease influences. These conditions could extend into the next 125 to 175 years.

With the possible exception of minor amounts of blow-down salvage, no future timber harvests are anticipated in the in the immediate future. Additional harvesting and hazard tree removal may occur on private land to protect private land resources and infrastructures, but the extent is unknown and would not impact forest management decisions on federal lands. Table 3-2 presents a summary of the acres of treatment for present and future timber harvest within the analysis area.

Table 3-2. Present and future timber harvest activity.

Timber Sale	Acres	Year	Harvest Objective
Present	2,498	2014-2019	Salvage

Past management activities have created age, structural, and species diversity throughout the analysis area (appendix C – tables C-1 and C-2). The proposed actions are expected to continue to promote these attributes across the landscape.

3.4 Wildlife

Scope of Analysis

The scope of this analysis discusses Threatened, Endangered, Proposed, and Region 2 designated Sensitive terrestrial wildlife. Aquatic species are addressed in the Fisheries section. The analysis was conducted for various species at the appropriate scale as follows:

- Canada lynx – the analysis area is the Rito Archuleta Lynx Analysis Unit (LAU).
- All other terrestrial TES species are analyzed within the Cumbres Vegetation Management analysis area boundary.
- Management Indicator Species (MIS) are analyzed at the Forest Level
- Migratory Birds - Potential influences on migratory birds were tiered to conservation objectives at the Forest-wide scale and the Southern Rockies Colorado Plateau Bird Conservation Region (BCR) 16 (additional information on BCR 16 is available online at: http://www.nabcius.org/bcrs.htmo).
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This section summarizes a more detailed analysis contained in the wildlife Biological Assessment (BA) and Biological Evaluation (BE), and wildlife specialist report which is located in the project record.

Existing Conditions

The existing condition of the Cumbres Analysis Area has been impacted by historic activities; including timber, grazing, and recreation, in addition to the extensive spruce infestation and mortality in the Cumbres, Trujillo Meadow, and Neff Mountain areas. Beetle infestations has also occurred in the South San Juan Wilderness area (figure 2-1).

Wildlife species that have habitat and occur or may occur within the Cumbres Vegetation Management analysis area involve those species that are most commonly associated with the spruce-fir cover type. Riparian vegetation also occurs within or adjacent to the analysis area in association with stream and river channels and small ponds and wetlands. A representative sample of these species groups is as follows:

- *Reptile and Amphibian Species:* Reptile species are relatively scarce in the spruce-fir cover types of Colorado, with the western terrestrial garter snake being the only common species. This garter snake has semi-aquatic life history needs and could be expected to respond to habitat changes in a manner similar to amphibians. The tiger salamander is likely to be found within the analysis area.
- *Avian Species:* There are at least 17 species of birds that are primarily associated with spruce-fir forests in the Southern Rocky Mountains of Colorado (Beidleman 2000). An additional 11 species are common in mixed-conifer forests, many of which also occur in the spruce-fir system on the Rio Grande National Forest. Avian species of management interest include the: Olive-sided flycatcher (R2 Sensitive and Colorado Bird Conservation Plan {BCP} Priority Species), boreal owl (R2

Sensitive and Colorado BCP Priority Species), hermit thrush (management indicator species (MIS)), brown creeper (MIS) and the Hammond's flycatcher (Colorado BCP Priority Species). Other spruce-fir associated species that occur or may occur in the Analysis Area include the mountain chickadee, red-breasted nuthatch, pine grosbeak, pine siskin, and ruby-crowned and golden-crowned kinglets.

- *Mammal Species:* Some mammals that occur or may occur in the Cumbres Vegetation Management Analysis Area include Rocky Mountain elk (MIS), mule deer (MIS), Canada lynx (Federally Threatened), American marten (R2 Sensitive), black bear, short-tailed and long-tailed weasels, southern red-backed vole, least chipmunk, red squirrel, snowshoe hare, porcupine, heather vole, hoary bat, and little-brown bat.

Overall, the spruce beetle epidemic, and previous timber operations including all associated activities (i.e. logging roads, skid trails, landings and tree harvesting) have been the pre-dominant factors that have influenced the current existing condition and wildlife habitat throughout the analysis area. To a lesser extent, recreational activities and cattle grazing have had an impact on the area, but more so at the species disturbance level and not the physical landscape. It's anticipated that all of the activities within analysis area have had some level of impact on wildlife and their biological requirements.

Federally Listed Species

Table 3-3 includes a description of general habitat for listed species along with the summary of the findings for Threatened, Endangered, or Proposed Wildlife Species.

The Biological Assessment prepared for Threatened and Endangered (T&E) species considered four species and determined that suitable habitat exists for only one, the Canada lynx. Canada lynx is further analyzed in each alternative for the Cumbres Vegetation Management Project. Mexican Spotted Owl, Southwestern Willow Flycatcher, and Uncompaghre Fritillary Butterfly were not further analyzed due to lack of suitable habitat within the analysis area. *For this project, there will be No effect to the Mexican Spotted Owl, Southwestern Willow Flycatcher, or Uncompaghre Fritillary Butterfly or their habitat.*

Table 3-3. Summary of findings for threatened, endangered, or proposed species.

Species	General Habitat	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Limited Action
Canada lynx *Felix lynx canadensis*	Mixed conifer forests and aspen/willow/shrub-steppe.	NE	LAA	LAA
Mexican spotted owl *Strix Occidentalis lucida*	Steep canyons with a Douglas-fir, white fir, Ponderosa pine/ pinyon- juniper component	NE	NE	NE
Southwestern willow flycatcher *Emidonax trailii extimus*	Riparian habitats along rivers, streams or other wetlands, where dense growths of willows or other shrub and medium-sized trees are present	NE	NE	NE
Uncompahgre Fritillary butterfly *Boloria acrocnema*	Alpine habitat above 11,000 feet with a snow willow component	NE	NE	NE
North American Wolverine (P) *Gulo gulo luscus*	Primarily associated with remote subalpine and alpine habitats, utilizes large rock talus areas for denning; may utilize spruce-fir forests. Marmots and carrion possible key food resources. Utilizes a wide range of upper montane habitat types due to mobility and large home range.	NE	No Jeopardy	No Jeopardy

NE – No Effect; **LAA** – May affect, likely to adversely affect; **NLAA** = Not likely to adversely affect.

Direct and Indirect Effects

Canada Lynx

The Cumbres Vegetation Management Area occurs within the Rito Archuleta Lynx Analysis Unit (LAU). This LAU encompasses approximately 87,002 acres in size. Figure 3-4 shows the LAU boundary in relation to the Cumbres project area.

Effects on the Canada lynx were assessed by comparing the LAU baseline conditions to changes predicted from the alternatives, in addition to analyzing how the project meets the Objectives, Standards, and Guidelines in the Southern Rockies Lynx Amendment to the Forest Plan (2008).

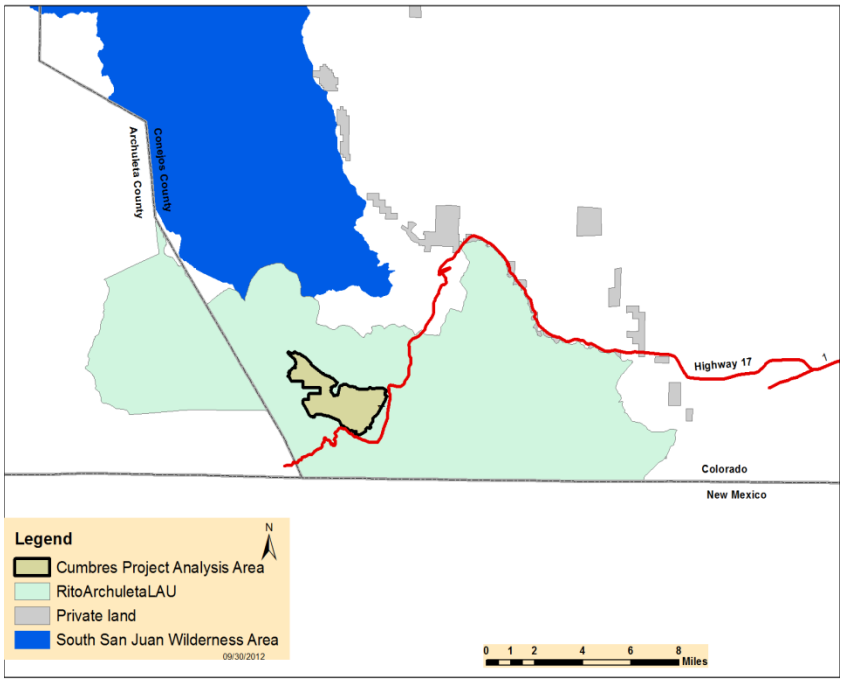

Figure 3-4. Rito Archuleta LAU in relation to Cumbres project area.

The purpose and need for the amendment was 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 plans. ***Objectives and Standards in the SRLA pertaining to the Cumbres Project include:***

- **Objective VEG O1:** Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.
- **Objective VEG O2:** Provide a mosaic of habitat conditions through time that support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe hare habitat in both the stand initiation structural stage and in mature, multi-story conifer vegetation.
- **Objective VEG 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.
- **Standard VEG S1:** 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:** Timber management projects shall not regenerate more than 15% of lynx habitat on NFS lands within an LAU in a ten-year period (salvage harvest within stands killed by beetles does not add to the 15 percent, unless the harvest treatment changes the habitat to unsuitable).
- **Standard VEG S6:** Vegetation management projects that reduce winter snowshoe hare habitats in multi-story mature or late successional conifer forests may occur only under Exception 3 – for incidental removal during salvage (e.g. removal due to location of skid trails)

Alternative 1 – No Action

Under this alternative, there is no potential for direct or indirect effects from project activities as no project will occur. Existing canopy cover will still continue to degrade as a result of the spruce beetle infestation. However in all units, existing and future canopy cover is estimated to continue supporting primary suitable habitat for lynx. High quality dense horizontal cover (DHC) and lesser quality horizontal cover will continue to provide winter snowshoe hare habitat, as well as summer foraging habitat. Through time, the forest will provide a patchy distribution of deadfall, standing dead and newly regenerating trees and shrubs across the landscape.

Forest regeneration is expected to improve as the overhead canopy is opened up in random areas and release occurs. Subalpine fir may predominate in future stands but will still provide valuable habitat to lynx in addition to aspen and spruce. Coarse woody debris (CWD) will accumulate on the forest floor in large amounts in some areas. This in combination with new regeneration of various species, will provide visual obscurity, cover, foraging habitat and security for movement, and may provide opportunities for future denning. Lynx will not be disturbed and/or displaced from any road construction; WUI fuels reduction or hazard tree removals. This alternative may decrease hiker, ATV or snowmobile activity, because of CWD accumulation. Thus it should also decrease the potential for more snow compaction or predatory advantage.

If a large high intensity wildfire would occur, the impacts to lynx habitat would be immediately detrimental. As discussed in the Fire and Fuels section, large wildfires in the spruce/fir vegetation type are infrequent except under extreme weather conditions. If a large wildfire were to occur, all understory vegetation, CWD, mature trees and multistoried attributes if present, would be temporary lost which could have major adverse effects on lynx habitat. However, because this is only speculative in consideration, a determination will not be presented.

Overall, under a non-wildfire scenario, this alternative would allow natural disturbances such as spruce beetles to slowly re-shape the forest; providing the best opportunity for a continued and naturally created mosaic pattern across the landscape that would continue to provide suitable habitat for lynx as natural processes continue.

DETERMINATION FOR ALTERNATIVE 1 "No Action" (No Project Activity): For this alternative, there will be No Effect on Canada Lynx, as no project activities will occur.

Alternative 2 – Proposed Action

Effects of salvage harvest in lynx quality habitat: If present, lynx are expected to be disturbed and displaced from salvage activities. Disturbance and/or displacement is not expected immediately throughout the entire analysis area, as harvest activities would occur overtime (over 5 plus years), as each individual sale initiates and progresses. Overtime, lynx should move out of the area of disturbance into more suitable adjacent habitat. However, because of the extensive beetle infestations within the area and surrounding forest, quality lynx habitat is expected to be more difficult to find. Lynx may move back into post-harvested areas that still contain good amounts of DHC (i.e. winter snowshoe hare habitat) that supports habitat suitability, but this depends upon the level of other/new disturbances present as a consequence of harvest created openings (i.e. new snowmobile use).

Most salvaging activity is expected to occur later in the summer (late June/early July) as lingering snow accumulations melt and allow access into the area. If a denning lynx was present, she and her kittens should have already left the area to another location. However, if salvage activities could resume earlier (snow conditions warranting) during the May/June kitten birth time period, denning disturbance would be expected to occur. Parent lynx may then abruptly move kittens in order to avoid such disturbance. Progressively, it's expected that lynx would remove themselves from disturbance and not occupy, or greatly limit their presence within the analysis area.

Lynx preferentially forage in spruce-fir forest with high horizontal cover, abundant hares, deep snow and large diameter trees during the winter (Squires et.al. 2006). Indirect effects of timber salvage are expected to reduce the amount of mature overstory trees and DHC horizontal cover habitat, down woody-debris (CWD) and consequently reduce the stands capacity to remain suitable and support snowshoe hares. Mature tree canopy cover is being reduced currently by the beetle epidemic however; these units are still maintaining their suitability of lynx habitat. Post-salvage canopy conditions are not expected to support lynx habitat suitability in most units as they will be returned to the Stand Initiation Structural Stage (SISS), except where DHC can maintain suitability. These effects are expected to occur over time as salvaging completes within each sale area. Indirect effects within each completed salvage unit could last up to 30 years depending on pre/post-harvest site conditions.

Mature late successional stands with closed canopy conditions are not expected for over 100 years. Although, within some of the harvest units, lynx habitat would be expected to remain in a suitable condition overall, if there are mature multi-storied trees and/or DHC present to support snowshoe hares. In the long-term (30-50 years post-harvest), improvements in understory composition and regeneration, stem densities, forest maturity and canopy cover, and overall forest diversity should have occurred along with a stand capacity that can support habitat suitability, lynx and its prey base.

Effects of salvage harvest on prey-base resources: Lynx are expected to see a reduction in the amount of prey that's available with the area from the reduction in the stands capacity to support snowshoe hares, because of the removal of mature trees and DHC. Concurrently, the effects from harvesting and the spruce beetle infestation are expected to cause a reduction in red squirrel densities. Overall, these changes in prey abundance (primary and secondary) are be expected to result in very low to no lynx reproduction that could

cause lynx to abandon their home range and look for prey resources elsewhere. For snowshoe hare and consequently lynx, these effects would be up to 30 years or until understory conditions provide visual obscurity, forage and overall *quality winter snowshoe hare habitat* (generally 30-50 years), depending on site conditions. Improvements in red squirrel densities are also not expected for up to 40 years, or until trees reach the reproductive capacity to bear cones. The remaining suitable habitat that is not impacted from timber harvest (as noted in above paragraph) could be expected to support hare populations at a smaller capacity that may allow lynx to incidentally forage in some harvest units.

Effects of salvage harvest on lower quality horizontal cover (not DHC): Incidental damage from salvage harvesting in mature stands where DHC is not predominant can still result in the reduction of snowshoe hare habitat. However, these reductions would occur in lesser quality foraging (i.e. summer forage) habitat that likely contains a lower density of snowshoe hares. Damage and reductions in this type of habitat can have effects on lynx because it will also reduce the timber stands capacity to support snowshoe hares. For these alternatives; units that do not contain winter snowshoe hare habitat, (i.e. dense horizontal cover, 1 to 2 meters above average snow levels) are also documented as having some horizontal cover that is fully capable of supporting hares at a lower density, and providing forage opportunities for lynx. The effects to these units would be identical to effects of quality DHC habitat and also estimated at approximately 30 percent of the unit's acreage. Overall, the reduction of horizontal cover by incidental impacts of the developing understory can impede the future development of these stands into quality winter snowshoe hare habitat and overall a mature multi-storied stand. This can also prevent or delay habitat suitability, and future occupancy of lynx and associated prey.

For all horizontal cover (DHC and summer), the 30 percent incidental calculation is only a current estimation used for monitoring purposes. Actual incidental removal would be calculated in post-harvest monitoring and is expected to actually range from 15 to 60 percent incidental removal. This will provide a baseline percentage for future harvesting in lynx habitat.

Effects of salvage harvest on habitat connectivity: Objective ALL01 of the SRLA is to maintain or restore lynx habitat connectivity in and between LAUs and in linkage areas.

Following the Project Planning Standards identified in the Southern Rockies Lynx Amendment (SRLA), this analysis addresses connectivity and proposes to maintain habitat linkages through "no entry" Water Influence Zones (WIZs) distributed throughout the analysis area. These riparian buffers would be 200 feet wide, 100 feet on either side of intermittent or perennial stream channels. In addition, all live spruce trees (trees not dying from infestation); all subalpine fir and aspen would not be harvested except where safety and operational conditions warrant. These could provide sufficient cover and security for movement across the area. In addition, remaining DHC greater than 35 percent and lower quality summer foraging habitat should not only provide snowshoe hare habitat, but could also provide some level of cover and habitat connectivity.

Effects from roads on lynx and prey-bases: Road construction/maintenance is expected to add to species disturbance and displacement, and increase the potential for more reductions in prey species. Approximately, 1 acre of new road construction has been accounted for in the temporary loss of suitable habitat. In addition, road construction would likely increase the presence of humans if access is available. However, lynx may have already been disturbed by the initial road construction activities and therefore may have already left the area. Constructed and re-constructed roads, even if closed post-project may result in access routes for hikers and snowmobilers, and even all-terrain vehicles (permitted or non-permitted use).

Snowmobile use may have the most influential effect on lynx and their habitat during and post-harvest, because of road construction and fewer trees overall. Repeated snowmobile traffic does result in compaction and may improve the ability of competitive predators such as the coyote to access lynx habitat. In addition, road construction will increase the access of snowmobilers into post salvage units, which are expected to

provide more play areas. An increase in snowmobile traffic and compaction in the area would increase the potential for lynx disturbance and potentially hinder regeneration efforts. Overall, no permanent roads will be added to the area. Post sale, all roads will be closed, except for those roads that have currently open to travel used. However, the effects from any new, re-opened or decommissioned road could linger up 30 years post-harvest, depending on human use and regeneration success.

Effects of WUI Treatment on lynx and prey bases: Wildland Urban Interface treatments (figure 2-2) will focus on thinning of understory trees and shrubs, as needed, to modify potential fire behavior. Only 71 acres of this treatment would be in lynx habitat. The intent of this treatment is primarily to benefit private land owners in the immediate and long term by creating defensible space and reducing the potential for wildfire spread. Treatments are expected to consist primarily of cutting vegetation with chainsaws and hand piling slash, or grinding it with mechanized equipment.

Understory habitat consisting of smaller diameter trees, saplings and seedlings would be specifically targeted for removal. Any slash piles created would be burned during accumulated snow conditions. In addition, salvage operations, which are an allowable tool in WUI areas, will also occur in each unit as part of the initial salvage project. The understory habitat within the WUI treatment areas is in the early stages of development, thus it does not contain any quality winter snowshoe hare habitat. However, it does provide some level of habitat for lynx that can be expected to support snowshoe hares at lower densities. Therefore effects of these treatments would be nearly identical to effects from harvest activities discussed in previous sections, where lynx would be affected through the reduction of the quality and productivity of their habitat, and the habitat of snowshoe hares.

Overall, the impacts from WUI operations within these units are expected to impede future development of winter snowshoe hare habitat reduce the capacity of the stand to support any hares, and consequently convert 160 acres to unsuitable lynx habitat (approximately 11 acres of the proposed 171 WUI treatment areas is not considered lynx habitat).

DETERMINATION FOR ALTERNATIVE 2: implementation of this alternative; *May Affect, Likely to Adversely Affect the Canada Lynx*

Rationale for the determination:

- Timber salvage is expected to reduce the amount of mature overstory trees and dense horizontal cover habitat and consequently reduce the stands capacity to remain suitable and support snowshoe hares.
- Wildlife PDC is in place to limit the amount of disturbance to lynx and their habitat, live trees, understories and DHC however, it is not expected to reduce the overall impacts to where the effects to lynx are proven insignificant and discountable.
- Future regeneration and replanting are expected to be beneficial in long-term (30-50 years), however prior to that timeframe the capacity of these timber stands to support snowshoe hare populations would be reduced for some time.
- The average spruce mortality within the entire project area is over 70 percent and rising annually. Red squirrel population abundance is reduced when there is high spruce mortality.
- Lower population densities of the red squirrel, associated with mature spruce mortality, are a significant factor in the existing conditions of the environmental baseline, affecting lynx within the project area and surrounding Rito Archuleta LAU.

- Low snowshoe hare abundance is expected to be concurrent with low red squirrel abundance, which can result in no or low lynx reproduction, and consequently may force lynx to leave and expand their home range as necessary to look for food resources elsewhere.
- Alternative 2 would impact a total of about **1,983 total acres**[7] (79 percent) of lynx habitat within the project area, which is about 5 percent of total lynx habitat within the Rito Archuleta LAU.
- Additional reduction of snowshoe hare habitat and overall suitable lynx habitat described in the biological assessment constitutes a measureable and/or detectable effect

Alternative 3 – Limited Action

For Alternative 3 the effects to lynx would be the same as alternative 2 in harvested areas. However, since harvest is proposed on fewer acres effects would occur on a smaller footprint of lynx habitat and be at a lesser magnitude as shown in table 3-4.

DETERMINATION FOR ALTERNATIVE 3: implementation of this alternative; *May Affect, Likely to Adversely Affect the Canada Lynx*

Rationale for determination:

- Timber salvage is expected to reduce the amount of mature overstory trees and dense horizontal cover and consequently reduce the stand's capacity to remain suitable and support snowshoe hares.
- Wildlife PDC is in place to limit the amount of disturbance to lynx and their habitat, live trees, understories and DHC however, it is not expected to reduce the overall impacts to where the effects to lynx are proven insignificant and discountable.
- Future regeneration and replanting are expected to be beneficial in the long-term (30-50 years), however prior to that timeframe the capacity of these timber stands to support snowshoe hare populations will be reduced for some time.
- The average spruce mortality within the entire project area is over 70 percent and rising annually. Red squirrel population abundance is reduced when there is high spruce mortality.
- Lower population densities of the red squirrel, associated with mature spruce mortality, are a significant factor in the existing conditions of the environmental baseline, affecting lynx within the project area and surrounding Rito Archuleta LAU.
- Low snowshoe hare abundance is expected to be concurrent with low red squirrel abundance, which can result in no or low lynx reproduction, and consequently may force lynx to leave and expand their home range as necessary to look for food resources elsewhere.
- Alternative 3 would impact a total of about **1,352 total acres**[8] (83 percent) of lynx habitat within the project area which is about **3%** of the total lynx habitat within the Rito Archuleta LAU.
- Additional reduction of snowshoe hare habitat and overall suitable lynx habitat described in the biological assessment would be expected to constitute a measureable and/or detectable effect on lynx

[7] Note that total acres affected consider all lynx habitat, not just acres applying to SRLA Exemptions and Exceptions which are accounted for in table 3.4.
[8] Note that total acres affected consider all lynx habitat, not just acres applying to SRLA Exemptions and Exceptions which are accounted for in table 3.4.

Table 3-4. Comparison of expected changes in SRLA baseline by alternative.

Rito Archuleta LAU Alternative Comparison	**Existing Baseline**	**Alternative 2**	**Alternative 3**
Description	**Acres (%)**	**Acres (%)**	**Acres (%)**
Total Acres	87,002 (100%)	87,002 (100%)	87,002 (100%)
Total Acres of Lynx Habitat	41,676 (48%)	41,676 (48%)	41,676 (48%)
Acres of Suitable Habitat	41,658 (99%)	40,367 (95%) (1,291 ac. impacted includes 160 ac WUI & 1 ac. new road)	40,716 (97%) (942 ac. impacted includes 160 ac WUI & 1 ac. new road)
Acres of Unsuitable Habitat / Stand Initiation Structural Stage (SISS).	SISS = 18 ac. (0.043%)	SISS = 1,309 ac. (3.0%) 1,291 ac. Impacted;	SISS = 960 ac. (2.0%) 942 ac. Impacted;
Meets VEG S1 – No more than 30% of the lynx habitat in an LAU currently in SISS	Yes – 0.043%	Yes – 3.0%	Yes – 2.0%
Meets VEG S2 – Timber mgmt. projects shall not regenerate more than 15% of lynx habitat in a ten-year period.	Yes	Yes	Yes
Dense Horizontal Cover; Acres of treatments under Exceptions 1-3 in VEG S5 and Exceptions 1-3 in VEG S6 (0.5%). Forest-Wide current cap of 3,135 (Black Mesa project - 2013).	3,135 acre cap	3,036 acre new cap (99 acres impacted)	3,092 acre new cap (43 acres impacted)
Conifer removal in aspen: Acres of treatment under exception 5 in VEG S5 (1% of lynx habitat/LAU). Forest-wide cap of 10,354 ac.	417 acre cap for LAU	397 acre new LAU cap 10,334 new Forest-wide cap (20 acres impacted)	397 acre new LAU cap 10,334 new Forest-wide cap (20 acres impacted)
Wildland Urban Interface; Acres of treatment within WUIs under exemptions to VEG S1, S2, S5 or S6 (3.0%). Forest-wide cap of 25,360 ac. (Black Mesa).	26,360 acre cap	26,200 acre new cap (160 acres impacted)	26,200 acre new cap (160 acres impacted)
Acres total treatment under Exemptions & Exceptions to VEG S1, S2, S5, or S6 (4.5%) of 39,108 ac (Black Mesa project)	39,108 acre cap	38,849 acre new cap (259 acres impacted)[A]	38,885 acre new cap (223 acres impacted)

[A] *Value reflects acres of DHC impacted, acres of conifer removal in aspen, and acres of WUI treatment affecting lynx habitat.*

Effects summary for action alternatives: This project is expected to have effects to some degree on lynx considering all project design criteria in place. However, alternative 3 would be expected to impact lynx at a lesser magnitude. Direct effects to lynx could include disturbance and/or displacement from the project area, if using or present. Currently, this analysis area does contain a density of snowshoe hares however; project activities are expected to reduce the timber stands capacity to support these hares and thus reduce their densities to some level. In addition, considering the current spruce beetle outbreak, and the rate of which tree mortality is occurring, it would also be expected that the red squirrels (lynx most important secondary prey-base) abundance has been and will continue to be negatively impacted by the beetle epidemic. The implementation of this project would only add to the current impacts upon local red squirrel populations. However, as said above alternative 3 overall effects would add to a lesser degree.

Future conditions of the project area are primarily dependent on each unit's ability to regenerate and/or maintain their residual habitat after harvest. However, future beetle outbreaks could be a limiting factor in

this development. Considering healthy regeneration efforts; forest growth and habitat suitability for lynx and its prey-bases should improve in the long-term (30 to 50 years), and untouched suitable habitat should still remain within the nearby South San Juan Wilderness. However, that will be relatively dependent upon the level of spruce beetle infestation on the Rio Grande National Forest.

The Standards and Guidelines of the Southern Rockies Lynx Amendment (SRLA) 2008 would still be met with the implementation of this project. However, considering the effects from the existing conditions that include the beetle infestation within the analysis area, past harvests and recreational activities—the inclusion and effects of the Cumbres Vegetation Management Project are expected to be additive. These effects would not be insignificant and/or discountable from alternative 2 and therefore, would be expected to have a measurable effect upon the Canada lynx and its habitat. However for alternative 3 the effects from this project would be questionable as to whether they would have a measureable effect on lynx. That determination would be dependent on whether the effects from alternative 3 could be proven to be insignificant and discountable -- this may not be possible to conclude. Thus this analysis will err on the side of the species for alternative 3.

Cumulative Effects

Under the ESA, for listed species, cumulative effects include any reasonably foreseeable actions undertaken by State, private, or tribal entities in the Rito Archuleta LAU. Any future federal action(s) would be addressed separately though additional section 7 consultations.

Seventeen previous timber sales have occurred within the area dating back to 1939. In the last 40 years 2,848 acres have had some type of timber harvest activity. The most recent harvest completions in the last 10 years includes Neff Mountain salvage 2004, Neff II salvage 2008, Trujillo Meadows Campground Hazard trees in 2010 and 2011, the Wolf Beetle salvage which is part of the County-line analysis area in 2012, along with the Rio de Los Pinos analysis (2010). Consultation with the USFWS has occurred on these and other projects prior to their decisions being signed. Effects to lynx habitat were accounted for and carried forward into the current Forest environmental baselines for analyzing lynx habitat, accounting for cumulative impacts to lynx.

Private lands encompass approximately 6,000 acres and State Lands of 640 acres within the Rito Archuleta LAU. Known current and future activities within these two ownerships are annual grazing. Effects from grazing upon lynx and their habitat are mostly associated with minor disturbance and forage competitions between cattle and snowshoe hare. Disturbance of lynx may occur from cattle but more likely from riders. This disturbance is expected to be very minor and quite possibly non-existent because of the infrequent presence and low number of riders (1-2). Snowshoe hare could experience some minor temporary competition with livestock for foraging resources especially in meadows and willow/riparian areas. In addition, livestock overuse (i.e. grazing and trampling) could have minor effects on shrub and foraging habitat for snowshoe hare. However, the existing range conditions within the Rito Archuleta LAU are good and overall far better than historic conditions.

There are no other known projects or activities planned on private or state land within the Rito Archuleta LAU, in the foreseeable future which might impact lynx, their habitat, or the environmental baseline. In consideration of this cumulative effects analysis, all standards, guidelines, exemptions and exceptions within the SRLA pertaining to habitat would be met with the implementation of the Cumbres Vegetation Management Project. Therefore, the potential for cumulative effects from *future State and private land, tribal or non-Federal activities would not influence the overall determination.*

North American Wolverine (Proposed)

The wolverine is included in this analysis of federally-listed species because of a recent status change. On February 4, 2013, the U.S. Fish and Wildlife Service (FWS) issued a proposed rule to list the Distinct

Population Segment (DPS) of the wolverine that occurs in the contiguous U.S. as a threatened species under the ESA (78 FR 7864). Also on February 4, 2013 the FWS published a proposed special rule under Section 4(d) of the ESA outlining the prohibitions necessary and advisable for the conservation of the wolverine (78 FR 7864). This proposed Section 4(d) rule would prohibit take of wolverine from trapping, hunting, shooting, etc., while allowing incidental take associated with management activities such as dispersed recreation, timber harvest, mining etc., if those activities are conducted in accordance with applicable laws and regulations (78 FR 7890). In the same federal register document the FWS also proposed to establish a nonessential experimental population (NEP) area for the wolverine in the southern Rocky Mountains of Colorado, northern New Mexico, and southern Wyoming. The FWS is not proposing critical habitat at this time.

Given that all potential habitat associated with the project areas is currently unoccupied by wolverines, there would be no effect on the species. However, even if the species is eventually reintroduced to or recolonizes Colorado, activities such as timber harvest are not expected to have any measureable influences on wolverines because they are not mentioned as a potential threat to the species and are included in the proposed Section 4(d) incidental take allowances

DETERMINATION FOR ALLALTERNATIVES: implementation of these alternatives; *"would not jeopardize" the wolverine* or influence any future options for achieving a self-sustaining population in the Southern Rocky Mountains.

R2 Sensitive species

The Biological Evaluation for Sensitive species considered 29 species. Species having no suitable habitat within the analysis area are not analyzed in further detail. This project would have no impact on the Great Basin silverspot butterfly, bald eagle, black swift, burrowing owl, ferruginous hawk, flammulated owl, sage sparrow, Brewers sparrow, Lewis' woodpecker, loggerhead shrike, northern harrier, American peregrine falcon, yellow-billed cuckoo, white-tailed ptarmigan, Gunnison sage grouse, mountain plover, Townsend's big-eared bat, fringed myotis, hoary bat, Gunnison's prairie dog, Rocky Mountain bighorn sheep, New Mexico meadow jumping mouse; or their habitat.

Pre-field and habitat surveys determined that suitable habitat exists for six sensitive species within the Cumbres project area (table 3-5). By category, these six species are:

- Amphibians – Boreal Toad, Northern Leopard Frog
- Avian – Northern Goshawk, Boreal Owl, Olive-Sided Flycatcher
- Mammals –American marten

These six species are further analyzed in each alternative for the Cumbres Vegetation Management Project. A more detailed analysis is included in the project Biological Evaluation.

Table 3-5-Summary of findings for Region 2 terrestrial sensitive species.

Species	General Habitat	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3- Limited Action
INSECTS				
Great Basin silverspot butterfly	Spring fed and/or subirrigated wetlands at low (7500 feet or less) elevation; larval food plant Viola nephrophylla; wet meadows interspersed with willows and other woody wetland species; adult nectar sources mostly composites .	NI	NI	NI
AMPHIBIANS				
Boreal toad *Bufo boreas boreas*	Spruce/fir near water and alpine meadows.	NI	MI	MI
Northern leopard frog *Rana pipiens*	Riparian and wetland areas.	NI	MI	MI
BIRDS				
Bald eagle *Haliaeetus leucocephalus*	Nests and roosts are usually found in open-branched trees near larger lakes, streams, rivers and reservoirs.	NI	NI	NI
Black swift Cypseloides niger	Nests behind or next to waterfalls and wet cliffs. Forages over forests and open areas.	NI	NI	NI
Boreal owl *Aegolius funereus*	Mature spruce/fir and mixed conifer forested areas with preference for wet situations (bogs or streams) for foraging	NI	MI	MI
Burrowing owl *Athene cunicularia*	Open grasslands associated with prairie dogs. Nests and roosts in burrows dug by mammals or other animals.	NI	NI	NI
Ferruginous hawk *Buteo regalis*	Open grasslands and shrub steppe communities. Nests in tall trees or shrubs along streams or on steep slopes	NI	NI	NI
Flammulated owl *Otus flamineolus*	Depend on cavities for nesting, open forests for foraging, brush for roosting. Occupy open ponderosa pine or forests with similar features (dry montane conifer or aspen, with dense saplings).	NI	NI	NI
Sage sparrow *Amphispiza belli*	Grasslands and open situations with scattered brush and riparian scrub; preferring to feed near woody cover; strongly associated with sagebrush for breeding. Positively correlated with big sagebrush, shrub cover, bare ground, above-average shrub height, and horizontal patchiness; negatively correlated with grass cover.	NI	NI	NI
Brewer's sparrow *Spizella breweri*	Strongly associated with sagebrush in areas with scattered shrubs and short grass; to lesser extent in mountain mahogany, rabbit brush, and bunchgrass grasslands with shrubs or large openings in pinyon-juniper.	NI	NI	NI

Table 3-5-Summary of findings for Region 2 terrestrial sensitive species.

Species	General Habitat	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3-Limited Action
Northern goshawk *Accipter gentiles*	Mature forest generalist. On the Rio Grande, often found in mixed conifer/aspen stands.	NI	MI	MI
Lewis's woodpecker *Melanerpes lewis*	Open pine forests, burnt over areas with snags and stumps, riparian and rural cottonwoods, and pinyon-juniper woodlands.	NI	NI	NI
Loggerhead shrike Lanius ludovicianus	Grassy pastures that are well grazed. Nests in shrubs or small trees, preferably thorny such as hawthorn.	NI	NI	NI
Olive-sided flycatcher *Contopus cooperi*	Mature spruce/fir or Douglas-fir forests with preference for natural clearings, bogs, and stream and lake shores with water-killed trees, forest burns and logged areas with standing dead trees.	NI	MI	MI
Northern harrier *Circus cyaneus*	Marshes, meadows, grasslands, and cultivated fields. Nests on the ground, commonly near low shrubs, in tall weeds or reeds, sometimes in bog; or on top of low bush above water, or on knoll of dry ground, or on higher shrubby ground near water, or on dry marsh vegetation.	NI	NI	NI
American peregrine falcon *Falco peregrinus anatum*	Cliff habitat over 200 feet high with suitable ledges for nest construction.	NI	NI	NI
Yellow-billed cuckoo (FC) *Coccyzus americanus*	Open woodland, parks, deciduous riparian woodland; nests in tall cottonwood and willow riparian woodland.	NI	NI	NI
White-tailed ptarmigan *Lagopus leucurus*	Alpine tundra, especially in rocky areas with sparse vegetation. Summer habitats include moist, low-growing alpine vegetation. Canopy cover of willow at winter feeding sites preferred.	NI	NI	NI
Gunnison sage-grouse *Centrocercus minimus*	Lek sites are characterized by low vegetation with sparse shrubs often surrounded by big sagebrush dominated plant communities below 9200' elevation. Brood rearing habitat is characterized by riparian vegetation of intermittent and perennial streams, springs, seeps and meadows within upland vegetation communities.	NI	NI	NI
Mountain plover *Charadrius montanus*	High plains/short grass prairie habitats, often associated with prairie dog towns. Nesting areas characterized by very short vegetation with significant areas of bare ground	NI	NI	NI
MAMMALS				
American marten *Martes americana*	Spruce/fir and mixed conifer forests with complex physical structure.	NI	MI	MI
Townsend's big-eared bat *Corynorhinus townsendii*	Forages in semi-desert shrublands, pinyon-juniper woodlands and open montane forests. Roosts in caves, mines and mature forests.	NI	NI	NI

Table 3-5-Summary of findings for Region 2 terrestrial sensitive species.

Species	General Habitat	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3- Limited Action
Fringed myotis *Myotis thysanodes*	Desert, grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites.	NI	NI	NI
Hoary Bat *Lasiurus cinereous*	Primarily a solitary tree-foliage roosting bat; may be associated with any habitat type that contains trees, up to timberline (Primarily Ponderosa pine). The hoary bat probably occurs throughout Colorado in suitable habitat from the eastern plains to elevation of 10,000 in the mountains.	NI	NI	NI
Gunnison's prairie dog *Cynomys gunnisoni*	High mountain valleys and plateaus at 1830-3660 m; open or slightly brushy country, scattered junipers and pines. Burrows usually on slopes or in hummocks.	NI	NI	NI
Rocky Mountain Bighorn Sheep Ovis canadensis	Open areas next to steep escape cover (low elevation to alpine).	NI	NI	NI
New Mexico Meadow Jumping Mouse *Zapus hudsonius luteus*	Primarily associated with tall grass and sedge component in riparian areas along perennial streams; upper elevation limit suspected to be about 9000 feet.	NI	NI	NI
River Otter *Lontra canadensis*	Major river drainages, larger perennial streams with at least 10 cfs of stream flow (generally 4th order or larger); lakes and reservoirs.	NI	NI	NI
NI – No Impact; MI – May impact individuals, but not likely to result in loss of viability or cause a trend toward federal listing				

Direct and Indirect Effects

Alternative 1– No Action

Under this alternative, there is no potential for direct or indirect impacts from project activities as no project would occur. None of the sensitive species analyzed would be disturbed and/or displaced. Existing canopy cover would still continue to degrade as a result of the spruce beetle infestation. However, through time, the forest would provide a patchy distribution of deadfall, standing dead and newly regenerating trees and shrubs across the landscape. Forest regeneration is expected to improve as the overhead canopy is opened and release occurs.

Large standing snags and coarse woody debris (CWD) would accumulate within the forest in large amounts in some areas. Coarse woody debris plays a critical role in supplying the type of structure needed for forested species such as the American martin, boreal owl and olive-sided flycatcher. In addition, decomposing CWD can improve soil nutrient composition and moisture retention and overall forest regeneration of herbaceous vegetation. This can provide micro habitats and burrow opportunities for the boreal toad, and improve prey species abundance for the Northern goshawk. In addition, herbaceous regeneration, especially around small bodies of water, can improve moist soil environments for the Northern leopard frog, decreasing the potential for desiccation. This alternative may decrease hiker, ATV, or snowmobile activity, because of CWD accumulation.

Overall, this alternative would allow natural disturbances such as spruce beetles to slowly re-shape the forest; providing the best opportunity for a continued and naturally created mosaic pattern across the landscape that would provide sensitive species habitat as natural processes proceed to occur.

DETERMINATION FOR ALL SENSITIVE SPECIES FOR ALTERNATIVE 1: For this project, implementation of this project provides the best alternative for forest health by allowing natural disturbances such as spruce beetles and processes too slowly shape the over health and function of the forest. Providing sensitive species and their habitat the best opportunity for a continued naturally created mosaic pattern across the landscape, providing a heterogeneous collection of habitat types as natural processes proceed to occur. Therefore, it is determined that the implementation of **alternative 1 would have No Impact on the six species analyzed**

Alternative 2 – Proposed Action

Removal of dead and dying trees could degrade habitat for boreal owl, northern goshawk and the olive-sided flycatcher within the project area. For the boreal owl, the most likely direct effect that could occur outside of the nesting season from salvage activities would be disturbance (leaving the area). However, during the nesting season (mid-April to late May), nest destruction, displacement and/or adult and nestling mortality could also occur if nesting trees are felled. Indirect effects could include the reduction in existing large diameter snags and future snag recruitment, which may influence potential nesting habitat and occupancy. The reduction of understory components such as surface litter and CWD, could also reduce habitat of the boreal owls primary prey species--the red-backed vole. However, future improvements in understory regeneration and composition due to natural regeneration and replanting can improve habitat for the red-backed vole (10 years or less) and thus improve foraging habitat for the boreal owl.

Disturbance of species such as the northern goshawk around the breeding season can be very detrimental to reproductive success. Northern goshawks are very sensitive to human disturbance within the breeding season, as goshawks can be very aggressive to any disturbance during this time period. Harvest activities during the breeding season (May thru early July) may inhibit breeding activity, cause nest abandonment or mortality and failure. However, it is expected that harvest activities would not occur until very late in the breeding season (July) when snowmelt has almost ceased and young are beginning to fledge the nest. In addition, 70 percent of goshawk occurrences on the Forest have occurred within large mature aspen zones. Species habitat preference is expected to play a crucial role in the potential for impacts to the northern goshawks. Within the Cumbres analysis area, the predominant timber type is Engelmann spruce/subalpine fir. Goshawks will utilize this timber however, to a much lesser extent. The preferred timber type aspen is only found in small pockets and quantities with the project area. Aspen would not be harvested under any action alternative.

Indirectly, the removal of beetle killed trees, understories, regeneration and any vegetative components that might support prey base resources, could impact the northern goshawk. Reductions in prey could induce displacement of the goshawk into other areas in search of food. However, the reductions in resources are expected to be temporary. Harvested areas should rapidly convert into more open habitat in the short term and this impact could be beneficial to several avian species (goshawk and olive-sided flycatcher), because herbaceous vegetation should start to regenerate quickly. Through time, a patchy distribution of deadfall, dead standing and newly regenerating trees and shrubs would likely occur across the landscape, which should provide prey base resources for avian species.

Some areas may continue to provide suitable habitat for those species requiring closed-canopy forested areas and may even improve in quality as more CWD becomes available and the understory vegetation is released. Harvest activities can potentially cause disturbance to avian species during project implementation. There is a potential for nesting raptors and birds such as the olive-sided flycatcher to be disturbed or suffer direct mortality as the result of tree felling activities. However, this potential can be decreased by project design

criteria (PDC) for avian species by the protection of active bird nests, cavities and soft snags. Habitat effectiveness may be impacted but overall the analysis area would continue to provide adequate habitat for many avian species.

Sensitive Amphibians - There is a possibility that direct boreal toad mortality could occur during harvest operations through crushing of individuals, eggs, or underground burrows by vehicles or heavy equipment. The potential for crushing can increase with the re-construction and re-opening of roads. However, the lack of both current and historic boreal toad documentation in the analysis area, this likelihood is very low. Leopard frogs are much more restricted to water than are boreal toads and are less impacted by the effects of timber harvest activity, particularly given the harvest restrictions in riparian areas.

Indirectly, the removal of a large amount of overstory would change habitat conditions on the ground and could impact boreal toad survival and reproduction by changing the microclimate within the understory. Harvest would result in a more open canopy. More openings could impact toad habitat by increasing the risk of predation and decreasing surface moisture. The loss of micro habitats and burrow opportunities may impact future survival and reproduction. In addition, the removal of forest canopies may increase the potential for desiccation in and around northern leopard frog habitat by removing the mature components that provided shade and helped maintain moisture. However, the removal of overhead canopy can subsequently cause understory release and potentially improve herbaceous regeneration, especially around small bodies of water. Therefore, improved regeneration can improve moist soil environments for the Northern leopard frog, decreasing the potential for desiccation in the near future.

Sensitive Mammals – American Martin is suspected to occur in the analysis area, since they have been documented in the Trujillo Meadows Campground. Martins may be disturbed and or displaced by harvest activities. In addition, martins can be impacted from those activities that modify late-successional stand characteristics preferred by the species and/or its food resources. Activities that modify canopy closure, snag densities, and/or ground-level CWD may be particularly detrimental to the American marten (Buskirk 2002). Timber harvest is considered the primary forest management activity that has the potential to affect the marten. The primary impacts include removal of the large tree and/or snag component, reduction in canopy closure, and alteration of ground-level CWD complexes associated with older forest stand conditions.

Under this alternative, sufficient woody debris would remain available on the forest floor for wolverine and marten prey species and for marten denning habitat. The spatial distribution and concentration of trees remaining would continue to provide suitable foraging habitat for these species within the area of influence and project site. Canopy closure would decrease substantially as trees are removed and remaining spruce trees die. This could degrade habitat for martens as they prefer areas with overhead cover, however, they would be expected to disperse to nearby remote areas. Areas that currently have substantial understory/regeneration, preferred by martens, would be expected to release following treatments, improving the overall structural quality of marten habitat in this area within approximately 20-50 years.

Determination for all Sensitive Species for alternative 2: This action alternative would result in a given amount of habitat conversion depending upon acres harvested. For this determination, the amount of acre conversion is not significant enough to warrant a different determination between the two action alternatives. Forest Plan standards and guidelines in addition to Project Design Criteria (PDC) would help reduce potential impacts to all sensitive species. It is determined that implementation of alternative 2 ***May Impact Individuals, but is not likely to cause a trend towards Federal listing or result in loss of viability in the planning area*** (the Forest) for the species evaluated.

Alternative 3 – Limited Action

Effects of this alternative would be similar to alternative 2 for sensitive species.

Determination for all Sensitive Species for alternatives 3: As with alternative 2, this alternative would result in a given amount of habitat conversion depending upon acres harvested. For this determination, the amount of acre conversion is not significant enough to warrant a different determination between the two action alternatives. Forest Plan standards and guidelines in addition to PDC would help reduce potential impacts to all sensitive species. It is determined that implementation of alternative 2 or 3 ***May Impact Individuals, but is not likely to cause a trend towards Federal listing or result in loss of viability in the planning area*** **(**the Forest) for the species evaluated.

Cumulative Effects

The proposed project in addition to other past, present, or reasonably foreseeable activities within the analysis area would be expected to potentially have only minor cumulative impacts such disturbance and/or displacement. However, for some species like the boreal toad; the potential for species impact is unlikely since it has not been found in the area. Other species such as the Northern goshawk generally does not prefer the spruce fir zone; presence has not been documented within the analysis area and is not likely. In addition, the analysis area is adjacent to quality habitat within the surrounding Forest and South San Juan Wilderness area, for all species analyzed.

Overall, for all species, the implementation of PDC would help to alleviate some of the potential for impacts, thus overall reducing any potential for cumulative effects.

Management Indicator species

There are nine MIS species for the Rio Grande National Forest. Of those, four were dismissed from further evaluation due to lack of habitat in the analysis area or since their habitat was not being impacted by the project (Pygmy Nuthatch, Lincoln's Sparrow, Wilson's Sparrow and Vesper Sparrow).

Five species were selected for further evaluation due to both their presence within the Cumbres project area and/or potential impacts upon the habitat that they represent. The Rio Grande Cutthroat trout is addressed in the Fisheries section.

Table 3-6 is a summary of the effects of each alternative upon the MIS evaluated for Cumbres Vegetation project. Additional information for each species can be found in the Forest's MIS Species Assessments (USDA Forest Service 2003).

Table 3-6. Summary of MIS evaluations.

MIS	Habitats Represented	Rationale for Selection in Forest Plan	Rationale for Detailed Evaluation for the Analysis Area	Rationale for Dismissal From Detailed Analysis
Brown creeper	Mature to late successional spruce/fir and mixed conifer (LTAs[1] 1, 3, 13; Structure Class 5) [2]	Species has a close association with structural elements that occur under older forest conditions, including large tree diameters and older snag component. May respond to certain threats, management, and conservation activities in spruce/fir forests (Colorado Bird Conservation Plan). Resident bird less affected by management activities outside of breeding range.	To assist in monitoring whether Forest Plan standards and guidelines for biodiversity are being met, with an emphasis on snag management.	
Hermit thrush	Mature to late successional spruce/fir and mixed	Species primarily associated with spruce/fir and is commonly associated with, but not restricted to, older forest structure. May respond to	To assist in monitoring whether Forest Plan standards and guidelines	

Table 3-6. Summary of MIS evaluations.

MIS	Habitats Represented	Rationale for Selection in Forest Plan	Rationale for Detailed Evaluation for the Analysis Area	Rationale for Dismissal From Detailed Analysis
	conifer (LTAs 1, 3, 13; Structure Class 5)	certain threats, management, and conservation activities in spruce/fir forests (Colorado Bird Conservation Plan). Tied to complex structural forest elements; may represent mature to late successional forest floor characteristics. Timber and/or fire management may affect quantity and/or quality of habitat, such as coarse woody debris.	for biodiversity are being met, with an emphasis on coarse woody debris.	
Elk	Forest-wide (All LTAs)	Special interest locally (i.e., economic and recreational value). May be competing with other native ungulates and livestock. Sensitive to roads and related disturbance.	To assist in monitoring whether Forest Plan standards and guidelines are being met for wildlife, with an emphasis on providing cover to maintain screening along roads.	
Mule deer	Forest-wide (All LTAs)	Special interest locally (economic and recreational value). Sensitive to roads and related disturbance. A habitat generalist but also associated with early successional stages for forage.	To assist in monitoring whether Forest Plan standards and guidelines are being met for wildlife, with an emphasis on forest management issues that influence the early successional stages of plant communities.	
Rio Grande cutthroat trout	Riparian (LTA 10 -- Forest-wide aquatic)	Management indicator of the health of montane aquatic ecosystems Most sensitive of the salmonid species to management activities that increase sediment, reduce stream cover, create barriers to movement, or impact stream flows or water quality.		See Fisheries section.
Pygmy nuthatch	Mature to late successional ponderosa pine (LTA 5; Structure Class 5)	Cavity nester; timber and/or fire management may affect quantity and/or quality of habitat, including snags; may represent effects to other primary and secondary cavity nesters.		No habitat within analysis area.
Lincoln's sparrow	Riparian (LTA 10 -- willow)	Riparian species tied to different structural elements susceptible to grazing and other activities within riparian areas; monitored as a group with Wilson's warbler due to close habitat associations with willow communities at various elevations.		Very limited habitat within analysis area. Habitat within analysis area would not be impacted by timber harvest so no effect
Wilson's warbler	Riparian (LTA 10 -- willow)	Riparian species tied to different structural elements susceptible to grazing and other activities within riparian areas; monitored as a group with Lincoln's sparrow due to close habitat associations with willow communities at various elevations.		Very limited habitat within analysis area. Habitat within analysis area would not be impacted by timber harvest so no effect.
Vesper sparrow	Grasslands (LTAs 8, 9, and 12)	Uses a narrow set of habitat conditions for nesting – sparsely or patchily distributed shrubs with abundant grass cover on the Forest; may be affected by grazing activities. Indicator of upland bunchgrass/shrub communities.		Limited habitat within analysis area. Habitat within analysis area will not be impacted by timber harvest, so no effect.

[1] LTA = Land-type Association (defined in EIS, Appendix B and in the Forest Plan FEIS p. 3-41).
[2] Structure Class (defined in EIS, Appendix C and in the Forest Plan FEIS p. 3-43).

Direct and Indirect Effects

Alternative 1 – No Action

Brown creeper - A percentage of spruce/fir Forestwide will continue to be gradually impacted by beetles. Sufficient snags should remain for brown creepers to nest and forage. Horizontal cover consisting of understory vegetation and small, dense, green trees will remain. It is expected that some individuals will disperse into healthier, mature spruce-fir habitat in adjacent forests. No discernible effect on population persistence or viability at the Forest Level

Hermit thrush- A percentage of spruce/fir Forestwide will continue to be gradually impacted by beetles. The amount of coarse woody debris (CWD) is expected to increase substantially as dead trees fall over time. Horizontal cover consisting of understory vegetation and small, dense, green trees will remain. It is expected that some individuals will disperse into healthier, mature spruce-fir habitat in adjacent forests. No discernible effect on population persistence or viability at the Forest Level.

Elk - Improvement in forage would likely occur. In some areas, large amounts of CWD on the forest floor could decrease habitat effectiveness for elk. This alternative would not result in substantial change in habitat conditions or population trend Forest-wide.

Mule deer - As large spruce trees die and lose foliage, some understory plants would begin to grow, attracting mule deer. Similar to the elk, deer may avoid areas having large amounts of CWD as they would not be able to move around as easily. Overall, would not result in any noticeable change in habitat conditions or population trend.

Alternative 2 – Proposed Action

Brown creeper - Approximately 0.4 percent of spruce fir Forest-wide would be impacted by this alternative. Up to 2,498 total acres of harvesting would occur throughout the analysis area, which could negatively impact the brown creeper. Disturbance could occur from human activity associated with timber harvest. Some nest destruction could also occur with the removal of timber. Sufficient snags should remain for brown creepers to nest and forage. Horizontal cover consisting of understory vegetation and small, dense, green trees would remain. It is expected that some individuals would disperse into healthier, mature spruce-fir habitat in adjacent forests. There would be no discernible effect on population persistence or viability at the Forest Level.

Hermit thrush- Approximately 0.4 percent of spruce fir Forest-wide would be impacted by this alternative, which could negatively impact hermit thrush. Timber harvest may increase the rate of understory release which could benefit hermit thrush. Sufficient amounts CWD would remain for hermit thrush habitat. Horizontal cover consisting of understory vegetation and small, dense, green trees will remain. It is expected that some individuals would disperse into healthier, mature spruce-fir habitat in adjacent forests. There would be no discernible effect on population persistence or viability at the Forest Level.

Elk – This alternative would not result in any noticeable change in habitat conditions or population trend. Forage would improve following timber harvest. In harvested areas, large amounts of CWD that would impede movement would be reduced. Open road density would slightly increase for the duration of the timber sale, (although these roads would not be open to the public) so this may temporarily displace elk, but only for short periods of time.

Mule deer - As large spruce trees are removed, some understory plants would begin to grow, attracting mule deer. Similar to the elk, in harvested areas, large amounts of CWD that would impede movement would be reduced. Open road density would slightly increase for the duration of the timber sale, (although these roads

would not be open to the public) so this may temporarily displace deer, but only for short periods of time. Overall a slight improvement in habitat expected, however, would not result in any noticeable change in habitat conditions or population trend.

Alternative 3 – Limited Action

Brown creeper – Due to fewer acres being proposed for salvage, approximately 0.24 percent of spruce fir Forest-wide would be impacted by this alternative. In harvested areas, effects would be the same as Alternative 2 in unharvested areas; effects would be similar to Alternative 1 with no discernible effect on population persistence or viability at the Forest Level.

Hermit thrush - Due to fewer acres being proposed for salvage, approximately 0.24 percent of spruce fir Forestwide will be impacted by this alternative. In harvested areas, effects would be the same as Alternative 2 in unharvested areas; effects would be similar to Alternative 1 with no discernible effect on population persistence or viability at the Forest Level.

Elk – This alternative would not result in any noticeable change in habitat conditions or population trend. In harvested areas, forage would improve. In some areas, large amounts of coarse woody debris (CWD) could make it more difficult for elk to move around in the area, although timber harvest would decrease the amount of debris in some areas.

Mule deer –This alternative would be the same as alternative 2 in harvested area and similar to alternative 1 in unharvested areas. Overall, a slight improvement in habitat expected, however, would not result in any noticeable change in habitat conditions or population trend.

Cumulative Effects

Cumulatively, implementation of this project in addition to other activities within the analysis area would have minor incremental effects on Forest MIS. Minor cumulative effects may impact individuals but would not likely contribute to a loss of species viability of any animal species that occurs on the Forest.

Migratory Birds

Direct and Indirect Effects

Neotropical migratory landbirds (NTMB) are those that breed in the U.S. and winter south of the border in Mexico, Central and South America. Resident landbirds include those that remain during the winter period, or move to winter habitats that occur primarily within the U.S. border. Landbirds include many of our passerine songbirds, hawks, owls and woodpeckers, but do not include waterfowl, shorebirds, or colonial water birds such as coots and rails. Several landbird species may be experiencing population declines and have become an issue of international concern (Terborgh 1992, Finch and Stangel 1993).

Direction concerning landbird conservation in Forest Service Region 2 is to reference the Birds of Conservation Concern (BCC) list produced by the U.S. Fish and Wildlife Service when completing NEPA evaluations for project activities. There are 37 BCRs in North America with four of these occurring at least partially in Colorado. The Rio Grande National Forest occurs within the Southern Rockies Colorado Plateau Bird Conservation Region (BCR 16), which encompasses portions of Colorado, New Mexico, Arizona, Utah and Wyoming. Information from BCR 16 was synthesized for use in Colorado through the development of the Birds of Conservation Concern list and the Colorado Landbird Conservation Plan.

Bird Conservation Plans (BCPs) have been or are being developed by every state in the nation based on the individual physiographic areas. At the finest scale of analysis, the Rio Grande National Forest occurs within the Southern Rocky Mountains Physiographic Area (Area 62) of the Southern Rockies Colorado Plateau Bird

Conservation Region. Table 3-7 lists the Birds of Conservation Concern for BCR 16 as updated in December 2008, their status within the project area, and projected influence from management activities proposed within the Cumbres analysis area.

Table 3-7. FWS birds of conservation concern for BCR 16 and anticipated effects.

Species	General Habitat	Occurrence in analysis area	Effect of Project
American Bittern	Wetlands	No	Not documented on Forest. (No habitat present)
Bald Eagle	Lakes and rivers	No	Evaluated as an R2 sensitive species
Ferruginous Hawk	Prairie	No	Evaluated as an R2 sensitive species
Golden Eagle	Cliffs/grasslands	No	No habitat present
Peregrine Falcon	Cliffs	No	Evaluated as an R2 sensitive species
Prairie Falcon	Cliffs	No	No habitat present
Gunnison Sage-grouse	Sagebrush	No	Evaluated as an R2 sensitive species
Snowy Plover	Shorelines	No	No habitat present
Mountain Plover	Prairie	No	Evaluated as an R2 sensitive species
Long-billed Curlew	Shorelines	No	Migrant not documented on Forest; (No habitat present).
Willow Flycatcher	Willow-Riparian	No	Evaluated as a R2 T&E species
Juniper Titmouse	Pinyon-Juniper Woodlands	No	Not documented on Forest
Yellow-billed Cuckoo	Deciduous Riparian	No	Evaluated as an R2 sensitive species
Flammulated owl	Ponderosa pine/snags	No	Evaluated as an R2 sensitive species
Burrowing owl	Plains/grasslands	No	Evaluated as an R2 sensitive species
Veery*	Dense riparian thickets, willow-riparian	No	Rare; one 1950 record on Forest. No Effect.
Lewis's Woodpecker	Riparian Cottonwood	No	Evaluated as an R2 sensitive species
Gray Vireo*	Oak woodlands/scrub	No	No habitat present.
Pinyon Jay	Pinyon/Juniper	No	No habitat present
Bendire's Thrasher	Rare species of arid areas	No	No habitat present.
Black Rosy Finch*	Spruce-fir forest; alpine	Unlikely	Presence unlikely, no effects anticipated
Brown-capped rosy Finch	Above timberline in alpine zone in cliffs, crevices; also spruce-fir forest	No	No habitat present.
Cassin's Finch	Primarily spruce-fir, also mixed-conifer forest	**Possible**	Minor disturbance and/or displacement
Grace's Warbler	Ponderosa pine	No	No habitat
Brewer's Sparrow	Sagebrush shrublands	No	Evaluated as an R2 sensitive species
Grasshopper Sparrow	Grasslands	No	Rare in SLV; Not documented on Forest. No habitat present.
Chestnut-collared longspur	Plains	No	No habitat present.

* Excluded from analysis because the species does not occur or has very rare migratory occurrence on the Rio Grande National Forest

A review of the migratory bird table indicates that five species on the Birds of Conservation Concern (BCC) List for BCR 16 are excluded from analysis because they do not occur or are considered accidental on the Forest included: veery, gray vireo, black rosy finch, Grace's warbler, and chestnut collared longspur. Other species that would not be expected to occur or do not have habitat present in the area of influence for this project include: American bittern, bald eagle, ferruginous hawk, golden eagle, peregrine falcon, prairie falcon, Gunnison's sage grouse, snowy plover, mountain plover, long-billed curlew, willow flycatcher, juniper titmouse, yellow billed cuckoo, flammulated owl, burrowing owl, Lewis' woodpecker, pinyon jay, Bendire's thrasher, Brewer's sparrow, and grasshopper sparrow.

The only species likely to occur within the analysis area is Cassin's Finch (USFWS Birds of Conservation Concern for BCR 16). Project design criteria regarding snag retention and not harvesting trees with active bird nests would help to conserve this species.

The Colorado Landbird Conservation Plan (Beidleman 2000) identified priority species and habitats for each physiographic area in the state, based on the Partners-In-Flight Species Prioritization Process. Priority habitats identified for the Southern Rocky Mountains Physiographic Area include: alpine tundra, aspen, cliff/rock, high elevation riparian, lowland riparian, mixed-conifer, mountain shrubland, ponderosa pine, sagebrush shrubland, spruce-fir, and wetlands. Table 3-8 shows the two priority habitat types that occur within the analysis area along with the species of the Southern Rocky Mountains province and their relationship to this assessment.

Table 3-8. Priority bird conservation habitats and species of the Southern Rockies Physiographic Area

Priority Habitats	BCP Priority Species	BCP Potential Issues(s)	Potential Influence from Project Activities	Effect of Alternatives
Aspen	Red-naped sapsucker Purple martin Violet-green swallow	Grazing, snag habitat, Altered disturbance regimes	No issues identified. Minor aspen component in analysis area.	No negative, but potential positive impacts (regeneration) to aspen habitat as a result of this project.
Spruce/Fir	Boreal owl Olive-sided flycatcher Hammond's flycatcher	Timber mgmt., snags, altered disturbance regimes	Timber harvest or natural processes could eliminate snags and/or perches for Boreal owls and olive-sided flycatchers, respectively.	Boreal owl and olive-sided flycatcher evaluated as R2 Sensitive species. Potential for temporary, minor disturbance of individuals of all 3 species. Hammond's flycatcher habitat would be degraded under all alternatives, as they prefer mature and old-growth forests. Natural and management processes change this area to be less favorable for use by this species. If this is the case, individuals would be expected to utilize nearby, more suitable habitat. Harvest of some trees with active nests could occur, causing mortality to individuals and/or eggs. This could have impacts to Hammond's flycatcher within the analysis area. However, PDC include not harvesting trees with active nests which has the potential to reduce occurrence of this type of mortality.

Alternative 1 – No Action

Extensive loss of mature spruce due to spruce beetle activity would have potential negative effects to those birds that depend on live mature or old growth forests (i.e. Hammond's flycatcher). These species would be expected to utilize other suitable habitat for as long as it is available. For species that utilize snags, additional habitat would continue to become available. Under this alternative all trees would be allowed to follow a natural progression and would be present in the area for a longer amount of time (likely 10 to 50 years, with most falling in 20 to 40 years (M. Tooley, personal communication 2010), similar to processes that will occur in adjacent infested backcountry and/or wilderness areas.

Under all alternatives, mature spruce trees and the habitat that they currently provide would be reduced.

Aspen is a minor component in the analysis area. It is expected conifers would continue to encroach into the clones over time though the mortality of much of the overstory conifers may create some opportunity for aspen sprouting.

Alternative 2 – Proposed Action

Under this alternative, only dead and dying spruce trees greater or equal to 8 inch dbh would be harvested; subalpine fir trees would be left, unless a specific hazard or operational purpose is identified.

Proposed harvest activities could cause some disturbance of individuals. There is the potential to impact active nests, if harvest occurred in a unit during breeding season. In harvested areas the number of snags would be reduced following harvest. However, Project Design Criteria (PDC) regarding snag retention and not harvesting trees with active bird nests would help mitigate adverse effects and conserve these species.

This alternative alone would not be expected to impact populations of migratory birds. The aspen treatments though effecting minor number of acres, could help maintain or expend the aspen clones where they now occur, which may have long term benefits.

Alternative 3 – Limited Action

Effects of this alternative would be similar to Alternative 2 for harvested areas. Unharvested units/areas would have effects similar to alternative 1.

Cumulative Effects

Selection of any of the alternatives would be expected to have similar direct or indirect impacts to any migratory birds within the area of influence. Cumulatively, implementation of this project in addition to other activities within the analysis area would have minor incremental effects on migratory birds (i.e. increased cumulative chance for disturbance or displacement. Minor cumulative effects may impact individuals but would not likely contribute to a loss of species viability of any migratory bird that occurs on the Forest.

Cumulatively, the spruce beetle infestation could have impacts to local bird populations (with some local populations increasing and some decreasing). These potential population fluctuations are more impacted by the actual beetle infestation than by associated harvest or other activities.

3.5 Fisheries

Scope of Analysis

The scope of this analysis discusses the fishery resources within the Cumbres project area. The analysis is restricted to the Cumbres analysis area boundary.

Existing Conditions

As described elsewhere in this document, there have been numerous previous activities in this analysis area. The most significant past action that has impacted fisheries across the entire forest, including the analysis area, is the stocking of non-native trout. The first documented nonnative trout stockings on the Forest occurred in 1891. Brook trout, brown trout, rainbow trout, and other cutthroat trout subspecies have been stocked in streams and lakes within the analysis area.

The stocking of nonnative trout has had the most significant effect on the current distribution of native fish. Native trout readily hybridize with other spring spawning trout, including rainbow trout and nonnative subspecies of cutthroat trout, resulting in a loss of their genetic integrity and unique phenotypic characteristics. Native trout are also subject to competition and possibly predation by sympatric populations of brook trout and brown trout. Nonnative salmonids pose a serious threat to native Rio Grande cutthroat trout distribution, although they do provide a valuable recreational fishery.

Currently, the streams and riparian areas within the project area are generally in good condition and are meeting Forest Plan Standards and Guidelines. See chapter 3 Watershed and Aquatic Resources section for detailed information on stream/riparian habitat condition and the Fisheries Biological Evaluation (project record) for project evaluation on sensitive fish species.

There are no native fish populations within the analysis area. There is very limited suitable stream habitat within the analysis area that could support a fishery although small self-sustaining nonnative trout populations are found in a couple of smaller perennial streams. Surveys in 2011 in Rio de los Pinos, located just outside of the eastern boundary of the analysis area, documented a very good brown trout fishery in the stream. Trujillo Meadows Reservoir, also adjacent to but outside of the analysis area, is stocked with various nonnative trout species by Colorado Parks and Wildlife. Surveys conducted within the last 5 years failed to document any native fish in the reservoir.

The self-sustaining nonnative trout populations within the general project area meet Forest Plan Desired Condition for supporting viable populations of desired nonnative species. The well-established non-native trout populations in Rio de los Pinos and Trujillo Meadows Reservoir also support the Regional and Forest Objectives for maintaining sport fish opportunities.

Direct and Indirect Effects

Timber harvest proposed within the analysis area could have negative consequences on trout habitat if the actions result in changed rates of sediment and nutrient delivery, or altered levels of water temperature and dissolved oxygen. Timber harvest can impact the quantity, quality, and timing of runoff. Influences may include alterations to riparian communities, loss of instream and riparian cover, increase in sedimentation, loss of stream complexity, stream fragmentation, stream bank damage, loss of large woody debris recruitment, and changes in flow and temperature regimes. Roads associated with timber harvest can affect streams and fish habitat by changing the runoff characteristics of watersheds and accelerate erosion resulting in stream sediment loading which can lead to changes in channel morphology and create movement barriers. These effects can reduce spawning, rearing, foraging and over-winter habitat by increasing flows which can lead to bank instability resulting in increased sedimentation which can fill pools and degrade spawning habitat.

Increased sediment into streams from harvest activities and road construction or use can also provide suitable habitat for fish diseases and various disease vectors. Currently, whirling disease is not known to occur in any of the streams within the project area.

Alternative 1 – No Action

No new surface disturbances from management activities would occur in any watersheds. Watersheds, stream channels, and riparian areas would be left in their existing condition. No pre-haul maintenance or road reconstruction would occur. Any road drainage problems would be left until they can be dealt with through normal maintenance operations.

The No Action alternative proposes no additional management action, although some hazard trees may be removed on an ongoing basis to protect infrastructure and for human safety. Design criteria would be implemented to address hazard tree removal. Public firewood gathering would be permitted throughout the area along open roads. Since no management actions would be implemented, there would be No Effect on the trout or their habitat within the area from such actions. Although, due to the scale of beetle activity and extensive tree mortality within the analysis area, the trout populations could still be affected by increases in erosion from heavy rainfall events and changes in seasonal run-off and stream flows. See the Watershed and Aquatic Resources section for detailed discussion regarding beetle epidemics and potential effects to watershed hydrology.

Alternative 2 – Proposed Action

This alternative proposes the highest level of management activity with approximately 70 percent of the analysis area proposed for treatment. Most salvage harvest activities, including new road construction, are on

slopes less than 35 percent and would be outside of the water influence zone (WIZ) of most of the fish bearing streams and should therefore have very little direct effect on the fishery resources within the analysis area. There could be some indirect effects from sedimentation due to the increased volume of traffic on NFS roads and the use of approximately 18 miles of previously closed, non-system roads that would be opened to access the harvest areas. High use of these roads could potentially increase sedimentation from road runoff, if Project Design Criteria (PDC) are not implemented correctly.

There could be some hazard tree removal within WIZ areas that should be closely coordinated with the forest hydrologist and/or fisheries biologist as stated in the PDC (chapter 2). There could be instances where felling and leaving trees in riparian areas and/or streams could provide additional protection from high runoff or heavy riparian use and/or improve instream fish habitat. Fuel reduction treatments being proposed are well outside of the WIZs and should have no effect on fisheries.

Road work would cause some surface disturbance during pre-haul road maintenance, old, non-system road reconstruction, and construction of new temporary roads. Short-term impacts that may occur during these activities would be offset by implementing PDC's and Forest Plan standards that are designed to improve/prevent road impacts to streams and correct existing drainage problems. Therefore, it is anticipated that as the roads are upgraded and drainage issues are resolved there would be some long-term benefits to the stream corridors. However, reopening the decommissioned road that parallels Rio de los Pinos (FSR 118.1A), poses serious concern with potential impacts to the stream. This road crosses several small tributaries and numerous seeps/springs that flow directly into Rio de los Pinos; it was previously closed and decommissioned due to impacts to the stream. The old roadbed has re-vegetated and the impacts to Rio de los Pinos have been minimal since the closure. The proposed re-opening of this road is a major concern to the health of Rio de los Pinos and would require careful design and monitoring to ensure impacts to stream habitat are minimized.

Of the two action alternatives, this alternative would have the most potential to impact aquatic resources due to the overall scale of the project and the reopening of NFSR 118.1A. The impacts to overall stream health and trout populations should be minimal with implementation and full compliance with Forest Plan standards and guidelines, PDC, and R2 Watershed Conservation Practices Handbook measures.

Alternative 3 – Limited Action

All activities described under Alternative 2 would occur under this alternative, except that fewer acres and units are proposed for salvage harvest. Since fewer acres would be harvested, fewer acres would be needed for landings and fewer miles of system and non-system roads would be required, resulting in less surface disturbance. Impacts would be similar to those described for Alternative 2 with the same Standards, Guidelines, and PDC incorporated.

The most significant difference from a fishery perspective is NFSR 118.1A would not be reopened and harvest activity would not occur in units 1 and 20, which border Rio de los Pinos and its tributary, therefore potential adverse stream impacts would be minimized.

With this alternative, only 0.1 mile of new temporary road would be constructed, but there could still be some indirect effects from sedimentation from existing roads due to the increased volume of road traffic associated with the project and the use of over 9 miles of previously closed roads accessing the harvest areas.

This alternative would cause less surface disturbance from tree harvest and road construction than Alternative 2 and would therefore pose less risk to aquatic resources. There are no fish populations within the analysis area that would be impacted by management activities and the impacts to stream health should be minimal with implementation and compliance with Forest Plan S&Gs, Project Design Criteria (PDC) and R2 Watershed Conservation Practices Handbook measures.

Cumulative Effects

The stocking of nonnative trout has had the most significant effect on the current distribution of Rio Grande Cutthroat trout (RGCT). RGCT readily hybridize with other spring spawning trout, including rainbow trout and nonnative subspecies of cutthroat trout, resulting in a loss of their genetic integrity and unique phenotypic characteristics. RGCT are also subject to competition and possibly predation by sympatric populations of brook trout and brown trout. Nonnative salmonids pose a serious threat to RGCT existence.

Previous timber harvest in the area has recovered well and no noticeable impacts to the streams were documented after the decommissioning of NFS road 118.1A. Some riparian zones within the analysis area do have roads along the areas and receive recreational use such as hiking, camping, vehicle use, and fishing. These activities can lead to loss of riparian vegetation, soil compaction, and increased sedimentation resulting in degraded fish habitat.

Increased sediment into streams from harvest activities and road construction/use could provide suitable habitat for fish disease and various disease vectors and lead to loss of overwintering and spawning habitat. Colorado Parks & Wildlife has an extensive outreach program informing anglers about aquatic nuisance species and diseases which is aimed at reducing the spread of the species/diseases by outdoor users. Currently, whirling disease is not known from any of the streams within the project area.

3.6 Rangeland

Scope of Analysis

This analysis focuses on the effects to rangeland and rangeland management from the proposed management of timber stands within the project analysis area boundary.

Existing Conditions

Past permitted livestock grazing has been somewhat limited within the analysis area. Permitted livestock grazing has been limited to natural parks, meadows, and previously harvested timber areas. Domestic livestock grazing has occurred in the area of the Cumbres and Wolf Creek Cattle and Horse (C&H) Allotments since the late 1800’s.

There are not any substantial dispersed campsites where horses or other recreational livestock are brought in this analysis area. Therefore, recreational livestock impacts to the vegetation are minimal.

As in the past, current livestock grazing within the analysis area is limited to natural parks, meadows, and previously harvested timber areas. The analysis area lies within the Trujillo Meadows Pasture of the Cumbres C&H Allotment and the northeast corner of Pasture #4 of the Wolf Creek C&H Allotment. Within the analysis area, there are 923 acres mapped as suitable rangeland (Forest Plan Suitability analysis) for cattle. Of these 923 acres, 668 acres are mapped as transitory rangeland and 255 acres are mapped as primary rangeland. Access to the analysis area for livestock management is primarily along the existing road system.

There are 2530 cow/calf pairs that are permitted to graze on the Cumbres-La Manga C&H Allotment and within the Trujillo Meadows Pasture. Currently there are 133 cow/calf pairs permitted on the Wolf Creek C&H Allotment and Pasture #4. Approximately 2,000 to 2,500 Cumbres and 20 to 60 Wolf Creek cow/calf pairs are present in the analysis area during the approximate 25 days each grazing season.

There is a noteworthy livestock management concern within the analysis area. This concern is the interchange of livestock between the Cumbres-La Manga C&H Allotment and the Wolf Creek C&H

Allotment. This may be partially due to cattle's natural instincts to discover new grazing areas. However, it is most likely due to the lack of any real man-made or natural barrier for cattle.

The Cumbres range fence (improvement number F-36), Cumbres/Wolf Creek North Boundary Fence exists between the two allotments. Originally, when this fence was constructed, it tied into what seemed to be a natural barrier of thick timber. After a while, livestock began to circumvent this fence. The fence was no longer serving a purpose. Consequently, the fence was allowed to fall into a state of severe disrepair.

The fence needs to be reconstructed in a more functional location to restrict livestock movement. A new fence would alleviate this problem. See figure 3-5 for the location of the existing fence and the proposed location(s) for a new fence.

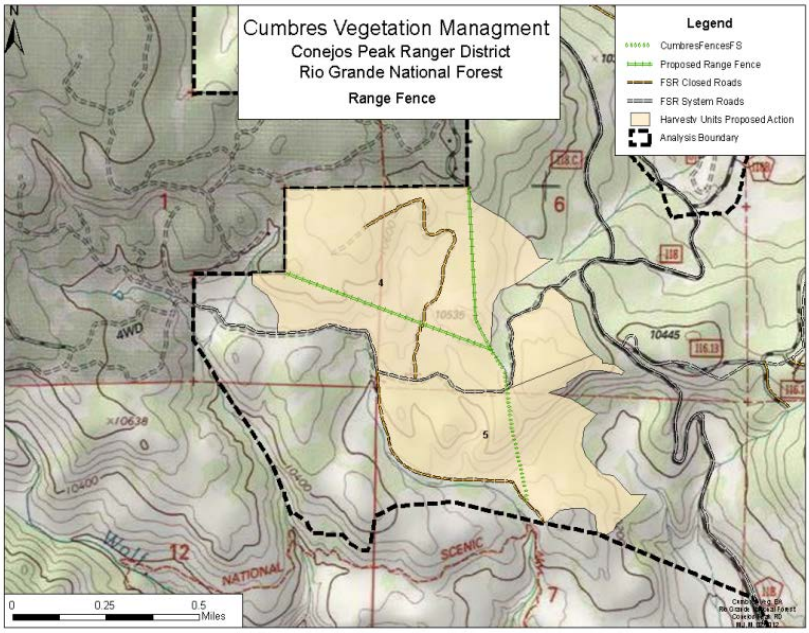

Figure 3-5. Range fence relocation options.

Direct and Indirect Effects

Alternative 1 – No Action

Under Alternative 1, the forested areas heavily impacted by spruce beetle would likely serve as transitory range for several years until the trees begin to fall and livestock can no longer access the area. Some of the existing suitable rangeland may also become inaccessible due to barriers to livestock movement created by falling trees.

If a severe wildfire were to occur in the areas heavily impacted by spruce beetle, a type conversion to grassland similar to the spruce-fir forest burned in the 1870s Osier fire would be a likely outcome. This would result in an increase in primary range in both the Trujillo Meadows pasture and Pasture #4.

The management concern of livestock traversing the allotment boundary would persist if no action is taken. If the existing fence is repaired and a new fence is constructed as planned (figure 3-5), additional work would be required to clear a corridor wide enough to protect the fence from damage from falling dead trees. A swath of cleared timber at least ten feet in width along the length of the fences would be required. Since most or this entire fence is beyond the allowable distance for firewood cutting, the cut timber would most likely go unharvested. The new fence, along with the existing fence would be subject to episodes of downfall by surrounding snags. Therefore, the snags falling would make maintenance on the new and existing fence cost prohibitive.

Alternative 2 – Proposed Action

As timber is harvested, it may open areas to livestock grazing that were not available before. The reduced canopy would allow space and light for increased grass and forb production. Improved roads, as well as

timber removal, would provide new avenues for livestock to access different areas of the pasture. However, increases in forage availability due to timber harvest would not result in an increase livestock numbers. Thus, the abundant forage would only be temporary (transitory rangeland) in nature. These sites would eventually return to timber-dominated stands. (USDA Forest Service 1996).

Even though the newly created transitory rangeland is temporary in nature, it would become a desired grazing location for permitted livestock for many reasons. For example, in times of drought, these areas are less impacted by drought and continually provide lush forage due to the protection from the sun and wind. These areas usually have an ample supply of water in the form of creeks, ponds, springs and seeps, which provide for abundant plant growth as well as providing water for livestock. The increased forage production in these areas would improve livestock distribution within the pasture. The effects of the increased transitory rangeland may carry on for many years though the herbaceous vegetation and increased access would gradually decrease with the process of forest succession.

There would be an indirect effect to rangeland management within the due to the need to manage permitted livestock more intensely to prevent damage to forest regeneration. Project Design Criteria (chapter 2) outline the management tools that would be implemented to protect forest regeneration.

Under this alternative, trees greater than 8 inches dbh could be removed under a timber sale contract in order to protect the existing and planned new livestock fence (figure 3-5) and smaller diameter trees could be cut, lopped, and left in place, as needed, thereby reducing fence maintenance needs and increasing its cost-effectiveness.

Alternative 3 – Limited Action

The same direct and indirect effects as Alternative 2 would apply in the treated areas. The same direct and indirect effects as Alternative 1 would also apply in the untreated areas. However, with a reduced number of acres harvested under this alternative, the magnitude of the direct and indirect effects to rangeland or rangeland management on the Trujillo Meadows pasture of the Cumbres- La Manga C&H Allotment the northeast corner of Pasture #4 of the Wolf Creek C&H Allotment would also be reduced.

Cumulative Effects

There would be no cumulative effects to rangeland or rangeland management within the analysis area.

3.7 Noxious Weeds

Scope of Analysis

The scope of this analysis is for noxious weeds in the Cumbres Vegetation Management Project analysis area and the haul routes to Colorado Highway 17.

Existing Conditions

All infestations that have been located and/or treated within the analysis area have been alongside roads or areas of disturbed soils. Road construction and maintenance is currently the primary activity that has had impacts to the vegetation and soils within the analysis area.

Observations have identified Canada thistle (*Cirsium arvense*) as being the only noxious weed species present in the analysis area. There have been very few sites of Canada thistle located in the analysis area. The treated sites have been very small in size (less than 1 acre). Since this area has relatively small infestations of Canada thistle, the management strategy is eradication rather than containment.

Direct and Indirect Effects

Alternative 1 – No Action

This alternative would have a low risk for noxious weed spread and/or introduction since it would entail the least amount of soil disturbance. Consequently, less equipment and activities in the area would also help diminish opportunities for noxious weed spread and/or introduction.

However, a low risk of spread and/or introduction of noxious weeds would exist. Some of the existing road infrastructure would still be maintained periodically. This involves periodic soil disturbance along roadways by heavy equipment. The machinery may serve as a mechanism for weed seed transport. Established noxious weed infestations, if not treated, would likely continue to spread and provide a seed source for new infestations.

Other activities and users of the area may also be carriers of weed seed and may cause soil disturbance that may contribute to the establishment and/or spread of noxious weeds. There would also be a certain amount of natural soil disturbance from falling trees, wildlife burrowing, and other small disturbances and natural weed seed dispersal from wind, water and wildlife. Consequently, without the project implementation, monitoring of the area would be of lower priority and any additional funding that may be generated by the project would not be available for noxious weed control.

Alternative 2 – Proposed Action

This alternative would have a moderate risk for noxious weed spread and/or introduction. Since there are populations of Canada thistle in and near the area, a seed source is present. Aside from normal road maintenance, there would be an increase in soil disturbance from road reconstruction and maintenance, skidding, landing construction, and pile burning. Logging operations offer several well-known opportunities to increase the potential for weed introduction and spread. These include:

- If road maintenance and construction requires fill and road base material, such as gravel, from an outside source; this material is a potential source of noxious weed seed.
- Increased activity with haul trucks, pickups and heavy equipment can heighten the possibility for transport of weed seed;
- Soil disturbance from log skidding and other off-road equipment can transport seeds into disturbed areas;
- Log skidding may also present an opportunity for noxious weed establishment away from main roads; making it more difficult to locate infestations in their early stages.
- The burning of slash piles is also a disturbance. If the fire is severe, like the burning of landing piles, naturally occurring vegetation can be eliminated, thus rendering those patches of land vulnerable to noxious weed invasion.

Project Design Criteria (PDC) included in chapter 2 have been shown to be effective measures to minimize the risk caused by these activities. The following factors allow the project analysis area to be ranked as moderate risk for noxious weeds rather than high risk are:

- Canada thistle is the only noxious weed known to exist in or near the area;
- Canada thistle is not very common;
- Canada thistle is very treatable and easy to control if caught early;
- PDC are in place to reduce the potential of any new weed species and the spread of Canada thistle;

- Disturbed areas would be monitored for weeds and treated *before and after* the project is completed.

Alternative 3 – Limited Action

This alternative would have the same effects as alternative 2, with a moderate risk for noxious weed spread and/or introduction. However, the since the scope of alternative 3 is only approximately 62 percent of that of alternative 2 there would be less disturbance by logging activities which would reduce the potential for noxious weed spread and establishment.

Cumulative Effects

There may be cumulative adverse effects to the analysis area from all alternatives due to the potential increase of Canada thistle and/or introduction of new species of noxious weeds and considering the other activities in the vicinity. Noxious weeds such as Canada thistle are opportunistic and will establish thriving colonies where the naturally occurring vegetation has been weakened or eliminated. Fire impacted landscapes and mechanically disturbed soil are prime locations for noxious weed establishment. Continually and severely over grazing an area will also create an environment which is conducive for the establishment and spread of noxious weeds. Presently, the most substantial areas of disturbed soil in the analysis area are the regularly maintained NFS roads. There have not been any recent fires of any consequence in the area. However, occasionally lightning will ignite small fires which could potentially become larger. The season of use for permitted livestock in the analysis area is approximately 25 days. Extensive areas of severe over utilization have not been observed.

3.8 Threatened, Endangered, and Sensitive (TES) Plants

Scope of Analysis

This analysis discusses plants that are Threatened (T), Endangered (E), Proposed, or Forest Service designated Sensitive (S). The analysis area for this discussion is defined by the areas proposed for management treatment under the action alternatives

Existing Conditions

Previous timber harvest activities are described in the Forest Management section. Other on-going activities are also described in other sections of chapter 3.

There are presently no reported records or suspected occurrences of T or E plants on this Forest. T and E plants in Colorado have unique habitats or ranges that do not occur on this Forest. There are also no plants Proposed for listing by the US Fish and Wildlife Service that occur on the Forest. Therefore, no further effects analysis was conducted.

None of the areas proposed for management treatment contain documented Sensitive plant species. There are five Sensitive plants suspected to have habitat in the areas proposed for treatment, based on habitat affinity (table 3-9).

Direct and Indirect Effects

The analysis below is a summary from a Biological Assessment / Biological Evaluation (BA/BE) for plants that was prepared specifically for this project and is part of the project record. None of the alternatives would be expected to result in significant direct, indirect, or cumulative effects.

Alternative 1 – No Action

This Alternative proposes no new management actions. There are no current or foreseeable future actions that would be expected to impact sensitive plants. Therefore, there would be no direct, indirect, or cumulative effect anticipated on any Sensitive plant species.

Alternative 2 – Proposed Action

Since both action Alternatives propose some level of timber harvest, planting, and road work, the effects are considered equivalent for this analysis since they affect the same habitat (i.e. there is no real distinction of effects between alternatives for this analysis area). Proposed actions would not impact any documented Sensitive plant populations. Potential habitat exists for five sensitive plants in the proposed treatment areas.

Four species were judged to be at such low risk from the proposed actions due to their habitats that there would be no direct, indirect, or cumulative effect. One species (assuming potential habitat is occupied) was judged to be directly, indirectly, or cumulatively affected (table 3-9). Direct effects from proposed actions could include clipping, crushing, or burning individual plants. Indirect effects could arise from changes in nearby canopy cover of associated vegetation due to direct effects. However, the effects of this are unknown. Most of the analysis area proposed for treatment has had past timber harvest activities.

Table 3-9. Sensitive plants suspected in the treatment areas, effects determination by alternative.

Scientific name	Habitat Description	Determination[1] Alternative 1	Determination[1] Alternative 2 and 3
Eriophorum altaicum var. neogaeum	Subalpine/alpine wetlands & riparian areas > 12,000 ft. on RGNF	NI	Ni
Eriophorum chamissonis	Fens or boggy areas 10,500 to 12,500 ft.	NI	NI
Eriophorum gracile	Fens, wet meadows, pond edges 8,000 to 12,000 ft.	NI	NI
Machaeranthera coloradoensis	Gravelly grassland slopes 8,500 to 12,500 ft.	NI	MAII
Salix arizonica	Subalpine seeps, wet meadows, & along streams. 10,300 to 10,700 ft.	NI	NI

[1] NI = No Impact; ;MAII = May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability range-wide.

Alternative 3 – Limited Action

See discussion under Alternative 2.

Cumulative Effects

Cumulative effects would be a very small, incremental increase in ground disturbance on potential Sensitive plant habitat affecting Federal lands. Implementing any action alternative would likely have a minimal impact on these plant species by following PDC (chapter 2) along with Forest Plan standards and guidelines pertinent to ground-disturbing activities. Overall, cumulative effects tied to other past, present, and foreseeable activities in the analysis area would be expected to be minor.

Physical Resources

This section summarizes the potential effects on physical resources. Complete reports are located in the project record.

3.9 Hydrology, Watershed, Aquatics

Scope of Analysis

The Cumbres project analysis area lies within three, 6th level watersheds: Headwaters Rio de Los Pinos (130100050201), Toltec Creek-Rio de Los Pinos (130100050203), and Wolf Creek (130201020203). All stream channels (perennial, intermittent, and ephemeral) on the National Hydrography dataset (NHD) are shown in figure 3-6. Rainfall, snow melt, and groundwater are the primary components of stream flow in the area. There are also one perennial ponds and one wetland located in the analysis area (units 6 and 12).

Annual precipitation in these watersheds varies from about 24 to 48 inches, with the proposed harvest units receiving about 28 to 40 inches. Snowmelt, during the spring and early summer, is the main source of rise and fall of the hydrograph. During the rest of the seasons, stream flow comes from seepage and groundwater discharge as base flow. Several springs, located at valley bottom, were found to discharge into intermittent/perennial streams.

A method described in the Forest Plan FEIS (pages 3-265 to 3-269) was used to evaluate watershed condition, adding up acreage of surface disturbance. Watershed analysis on the Forest is focused on the 6th level. However, watersheds with high acres of disturbance or with known higher disturbances that could be masked were broken down to the 7th level to ensure watershed protection. The 7th level sub-watershed within the Headwater Rio de los Pinos (HUC: 13010005050101) is the one with known higher disturbance and is designated as a watershed of concern.

Existing Conditions

Current watershed disturbance in the three 6th level watersheds (figure 3-6) is below Forest Plan concern levels (<15% of a watershed area in an equivalent roaded area). The concern level for sensitive watersheds is 10%. If disturbance exceeds concern levels, watershed health must be carefully evaluated to determine current condition; management activities are not constrained beyond normal Forest Plan limitations, if stream and watershed health is good. However, if stream health has been diminished, the Forest must restore impacted areas and prevent new surface disturbance that could degrade stream health further.

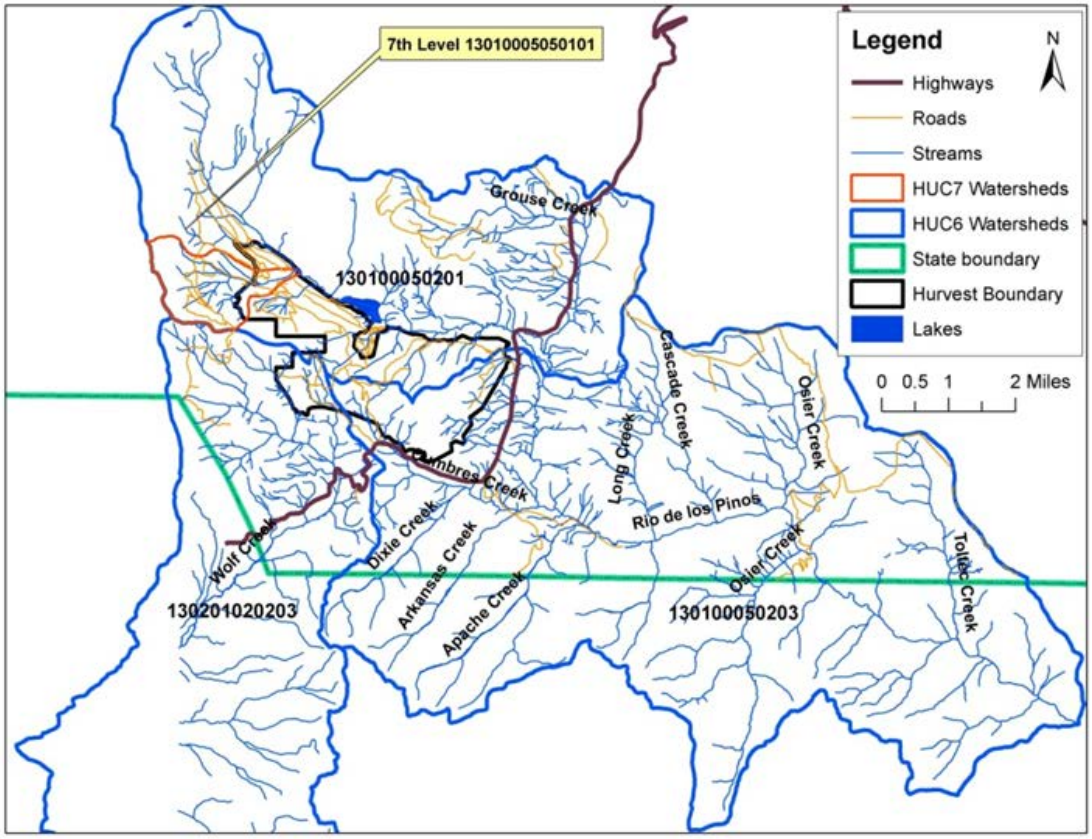

Figure 3-6. Analysis area watersheds showing all stream and drainage channels.

Connected disturbance or connected disturbed area (CDA) was analyzed using a stream crossing count method (new crossings counted, divided by total and multiplied by 100 to get percent increase). Forest service guidelines recommend limiting CDA so that it doesn't expand by more that 10 percent.

HUC 7 Watershed of Concern (13010005050101*)* - This sub-watershed is considered a "watershed of concern" because of past timber harvests and road building. When 50 percent of the total watershed area is within 100 feet of a buffered stream, the watershed is considered as a "sensitive" watershed. This watershed is considered a "sensitive" watershed due to the high percent (50.7 percent) of water influence zone area as compared to the total watershed area. Therefore, the disturbance level for the "watershed of concern" designation is 10 percent instead of 15 percent (RGNF Forest Plan 1996).

The "watershed of concern" designation does not preclude new land disturbance within the watershed, but it does require specific watershed analysis prior to any new land disturbing activities (Dobson 1996). In the summer of 2011, the sub-watershed was assessed to determine current stream health and to identify problem areas that may need restoration or additional Project Design Criteria (PDC) to correct a stream health problem. Spruce beetle mortality has resulted in a high basal areas loss, but streams remain healthy and stable; stream width or gradient have also not been affected to date.

In general, fine sediment sources are limited to a few livestock trail crossings and some steeper slopes where vegetation is sparse. A heavily used dispersed campsite has impacted bank stability on one of the upper stream reaches in the sub-watershed. Rill and gully sources were not seen. Sediment impacts of road crossings on the smaller tributaries are minor. Good vegetation cover is present on several roads in most parts of the watersheds. Stream assessments indicate that current input of fine sediment into streams in this

watershed from previous forest management activities appears to be minor and not a major factor influencing fine bed load in streams.

Road Density – Table 3-10 shows acres, square miles, road miles, and road density for the watersheds in the project analysis area.

Table 3-10. Road density values by watershed.

Watershed Name (HUC#)	Watershed area (miles^2)	Open roads length (miles)	Decommissioned road length (miles)	Total road length (miles)	Road Density	Road Density classi-fication
Headwaters Rio de Los Pinos (130100050201)	25.56	33.70	7.91	41.61	1.63	Moderate
Toltec Creek-Rio de Los Pinos (130100050203)	51.22	1.88	0.00	1.88	0.04	Low
Wolf Creek (130201020203)	28.14	23.34	0.00	23.34	0.83	Moderate
7th Level (13010005050101)	1.67	6.34	0.77	7.11	4.27	High

Streams in the three watersheds drain off the steep areas into the Rio de Los Pinos, Cumbres Creek, and Wolf Creek. The streams typically transition from an A-stream type in the higher elevations and steeper slopes to B- and E-types in the middle and lower reaches. Substrate on the intermittent/perennial streams is dominated by cobble, gravel, boulders, and finer material. Field review shows that the higher elevation A-type channels are predominately steep, without a floodplain, and mostly intermittent on the upstream reaches. These channels, which are dominated by boulder and large cobble substrate and having large woody debris, show stability and are resilient to management.

Stream Channels - Stream health was evaluated by comparing characteristics between streams in the project area and reference streams with the same Rosgen classification or comparing stream reaches above and below Forest management disturbance. Throughout the project area, these streams currently have stable E and A/B channel types. Within the project area, stream banks are meeting Forest Plan guidelines for channel stability; channel substrates are clean from silts and clays with minor exceptions.

Water Quality - The Clean Water Act (CWA) requires that chemical, physical, and biological integrity of all waters, stream channels, and wetlands be protected. There are no water bodies in the analysis area that are listed as impaired or threatened for water quality on the Colorado 303(d) list. No streams in the vicinity of the analysis area were listed on the 305(b) list; therefore meeting designated uses (Colorado Water Quality Control Division 2010).

Water Quantity/Yield -The beetle epidemic is likely to result in some increases in water yield, although this increase is unlikely measurable at this time. Since the spruce trees are in the process of dying, many still have green needles and take-up water for transpiration. As trees start to fade, the water intake is no longer occurring and may result in increased water yield. Field assessments did not find any indicators of negative stream effects from increased water yield. The action alternatives only propose to treat dead and dying stands. Therefore, any potential increases in water yield are likely already being realized from stand mortality.

Steambank Condition – Based on field surveys documented in the project record, overall, streams in the analysis area are in a robust condition with healthy riparian vegetation that provides good stability and has a high buffering capacity (i.e. photo 8 below). Coarse woody debris was prominent in some streams. Exposed

soils were observed on one tributary stream in watershed 130100050201 (photo 11 below). No rills or gullying was found. Fine sediments sources were limited to a few livestock trails or areas with sparse vegetation.

Photo 8 UTM: 373454-4100742 (DS)

Photo 11 UTM: 372152-4100565 (DS)

Road-Stream Interactions -

Watershed 130100050203, tributary to Cumbres Creek (in Unit 11)- a short portion of this intermittent/perennial tributary flows parallel to NFS Road 118, resulting minor sediment impacts on this small tributary of Cumbres Creek (Photo 21 at right).

Watershed 130100050201 tributaries - NFSR 116 – road crosses all tributaries (Units 12 and 13). Riparian vegetation provides a good buffer to fine sediment. Large woody debris is present on most of the channels (no photo).

Photo 21 UTM: 370977-4099405 (DS)

Watershed 130201020203, Wolf Creek Tributary – NFSR 119D - Due to an undersized or improperly installed pipe culvert, streamflow is blocked and the creek runs on the surface of the road, leaving the natural pathway, for about 20 feet. This condition contributes additional sediment load and impacts the water quality of the stream. In addition, excessive sediment deposit, transported from the nearby roads and trail crossing sites, was observed on this tributary (Photos 27 and 28, below).

Photo 27 UTM: 369939-4099286 (DS)

Photo 28 UTM: 5cc 369816-4099274

Table 3-11 below shows the watershed acres, disturbed acres since 1980, and percent of each watershed in the Cumbres analysis area.

Table 3-11. Past and proposed disturbance acres and percentages, by watershed

Watershed HUC	Activities since 1980 (acres)	Watershed area (acres)	Watershed area in analysis area (acres)	Percent of watershed in analysis area	Percent of analysis area in each watershed
Headwaters Rio de Los Pinos (130100050201)	3,594	16,356	1,964	12.0	55.4
Toltec Creek-Rio de Los Pinos (130100050203)	4,112	32,770	335	1.0	35.2
Wolf Creek (130201020203)	355	18,006	1,248	1.9	9.4
Total	**8,061**	**67,131**	**3,546**	**-**	**100.0**
7th Level watershed (13010005050101)	302	1,066	159	14.9	4.5

Overall, streams within watersheds are healthy. Sediment sources associated with current system roads or other surface disturbances are minor. Most stream banks are stable, with healthy riparian vegetation in proper functioning condition present along intermittent and perennial stream reaches.

No unstable stream banks were found from previous harvest activities or within proposed harvest units. Although watershed condition has been affected by past activities, watershed improvement projects completed in the past, and natural recovery since timber operations were conducted, contribute to the present healthy watershed condition

Direct and Indirect Effects

Alternative 1 – No Action

Natural effects to aquatic ecosystem would continue with minor additional disturbance from ongoing activities (firewood cutting, road maintenance, hazard tree cutting, livestock grazing). Vegetation that has become established on some existing gated (closed) or decommissioned roads and skid trails would continue

to contribute to the capture and infiltration of water. Routine road maintenance would occur periodically and be designed to minimize effects on sediment inputs into stream channels. No additional connected disturbance area would be added to any of the watersheds. Stream channels, wetlands, and riparian areas would remain in their existing condition. Less emphasis would be placed on identifying and correcting existing road erosion problems.

There would be an increased public safety hazards and potential damage to infrastructure. Loss of live basal area due to spruce beetles has already occurred to varying degrees. This will eventually increase downed woody material across the area and could result the potential for increased water yield. The effect would be higher for the 7th level watershed of concern, where much of live basal area has been lost.

Snow accumulation and melting is expected to change as the trees die and lose needles (Pugh and Small 2011). The length of time that dead trees continue to have needles that capture snowfall and amount of understory vegetation are key factors that can affect the amount of increase in streamflow. In high snow years, dead stands behave similarly to live stands due to the ability of large snowfalls to exceed the interception capacity of the canopy (Boon 2008). Carlson (2008) summarized research findings related to beetle epidemics and potential effects to watershed hydrology. Overall, effects of tree mortality dependent on forest type, percentage of trees killed, and annual precipitation. Unlike clearcutting or severe wildfire, bark beetle-killed stands can retain a hydrologically functional secondary structure following beetle kill (Schnorbus 2011). The presence of such multi-story secondary structure can mitigate the effects of beetle-kill. However, in any forest area that has high mortality, potential fire effects due to fuel loading are a concern. Although the likelihood of a wildfire start is small, severe watershed damage could be increased as fuel loading increases and a fire would occur. Stream water temperature would increase slightly along reaches where canopy cover is lost due to spruce mortality.

In the Cumbres project area, it is likely that moderate changes in hydrology may occur naturally on the 7th level sub-watershed where mortality is high, but on a 6th level watershed these changes would probably be very low at current infestation rates. However, if infestations spread to large areas of the watersheds, cumulative effects to the hydrologic system are possible. Effects to stream stability due to a moderate increase in flow are dependent on stream and riparian characteristics. Streams with coarse bedload and banks with good riparian vegetation can withstand an increase in flow better than streams with finer bedload, especially if bank stabilizing vegetation is impaired or lacking.

Alternative 2 – Proposed Action

The total watershed area disturbance (dead tree harvest, fuel treatments, and public firewood) for Alternative 2 would be up to 2,766 acres. The areal and percentage disturbance of the watersheds, distributed to each 6th and 7th level watersheds, are shown in table 3-12. Although more area would be disturbed on the Headwater Rio de Los Pinos watershed, higher proportion of disturbance would occur on the 7th level sub-watershed.

Alternative 2 has the most mileage of proposed haul routes, opening of closed roads, and new temporary road construction of the action alternatives and would have the highest total watershed disturbance area. Some surface disturbances would occur from road construction or reconstruction and log skidding. According to the recent Rio de Los Pinos timber harvest analysis (2010), past equivalent road disturbance level on the 7th level watersheds is about 16 percent. Proposed activities would add about 1 percent equivalent road disturbance. Following implementation of this alternative, the cumulative total equivalent road disturbance would be approximately 17 percent, which is greater than the 10% concern level for sensitive watersheds. Another factor used in watershed ratings is amount of disturbance in the water influence zone (WIZ), mainly roads. The amount of road disturbance in the WIZ of the 7th level sub-watershed is 7.4 percent, under the 10 percent concern level for this parameter. Adequate buffering and additional Project Design Criteria in the WIZs would prevent eroded sediments from finding their way into stream channels and wetlands.

The previous timber harvest (Rio De Los Pinos Vegetation Management Project 2010) analysis shows that total disturbance within the Headwater Rio de los Pinos 6th level watershed would remain under the 15 percent concern level. This alternative would add about 1.0 percent equivalent road disturbance, which would add little to the past total disturbance level. The other two 6th level watersheds have much less total disturbance level, well below 15 percent.

Table 3-12. Alternative 2 watershed disturbance acres and percentages.

	Headwater Rio de Los Pinos (130100050201)	Toltec Creek- Rio de Los Pinos (130100050203)	Wolf Creek (130201020203)	7th level sub-Watershed (13010005050101)
Total watershed area (acres)	16,356	32,770	18,006	1,066
Proposed disturbance area (acres)	1,532	974	260	124
Percent proposed disturbance area to watershed area	9.4	2.60	1.4	11.7
*Percent proposed equivalent road disturbance area to watershed area	0.94	0.26	0.14	1.17

** Total equivalent disturbance acreage (as related to road disturbance) within a timber harvest project is calculated as 10% of the total harvest unit area.*

Connected disturbed area (CDA) would increase by 13 percent for the Headwater Rio de Los Pinos, 8 percent in the Toltec Creek – Rio de Los Pinos, and 0% in the Wolf Creek watersheds. The increase in the Headwaters of the Rio de Los Pinos would exceed the recommended increase, while the other two watersheds would remain below this limit. The increase in CDA would occur on currently closed or decommissioned roads; these roads would be closed or decommissioned at the completion of the project which would return the CDAs to existing conditions.

Water Quality - The Clean Water Act requires that chemical, physical, and biological integrity of all waters, stream channels, and wetlands be protected. Forest Plan standards and guidelines and PDC would provide that protection and impacts are expected to be minimal. Standard project design criteria prevents skidding logs down stream courses and keeps heavy equipment a safe distance from channels. All surface disturbances would be adequately buffered to prevent direct impacts to the water influence zone (WIZ), floodplains, wetlands, and riparian areas. Figure 3-7 shows a representation of protected water area buffered as required by PDC.

Water Quantity/Yield - Recent studies show a potential for greater water yields following harvesting of a large percentage of dead trees in a beetle killed forest (Schnorbus 2011; Carlson 2008). However, increases in peak flows usually diminish with decreasing percentage of watershed area harvested (Grant et al. 2008). The harvest of dead trees eliminates interception of precipitation and shading which slow snowmelt. Understory can be removed and the amount of fine and CWD is altered. In addition, compaction in skid trails, landings, and roads can affect overland flow, routing runoff to streams. Although there is an extensive study on forest harvest effects on stream channels, it is uncertain that there is evidence of a direct correlation between peak flow changes due to forest harvest alone and changes to the physical structure of streams (Grant et al. 2008).

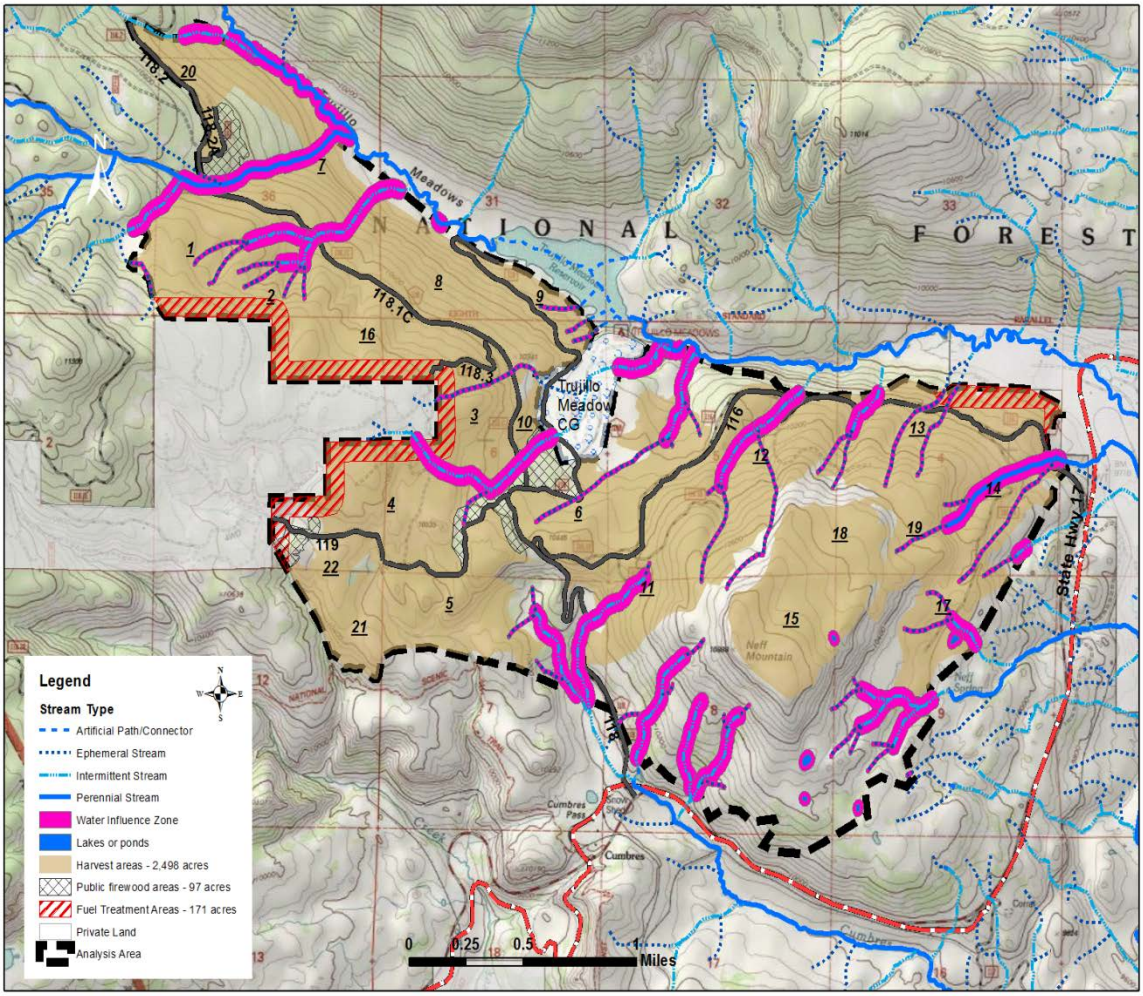

Figure 3-7. Representation of 100 foot Water Influence Zone (WIZ) buffers for wetlands, perennial, and intermittent streams.

Timber harvest alone has rarely initiated large amounts of runoff and surface erosion unless roads and skid trails are connected to streams (Litschert and MacDonald 2009). The proposed salvage cut typically disturbs only a portion of the harvest unit, and this would reduce the likelihood of overland flow and rill initiation. However, roads and skid trails, if connected to streams, may initiate rill and surface erosion and delivery of sediment loaded runoff to streams. Sediment delivery from timber harvest may be further reduced by locating skid trails away from water influence zone (WIZ), increasing the frequency of water bars, maximizing surface roughness downslope of water bars, and promptly decommissioning skid trails following harvest (Litschert and MacDonald 2009).

Few segments of existing system road to be reopened are within the WIZ (within 100 feet) of small perennial streams (see figure 3-7). These areas would be the focus of inspections by hydrology or soils specialists or their designees to ensure sediment sources are disconnected from the stream channels. Hardening, filter fence, timber slash windrows, and straw wattles would be used as appropriate where drainage cannot be directed to adequate buffer strips along these reaches. Following timber and reforestation operations, new temporary roads constructed for this project would be closed and rehabilitated. All temporary roads would be

closed and rehabilitated. This would further reduce long-term sediment sources that could find their way into stream channels.

HUC 7 Watershed of Concern- Disturbance levels in this sub-watershed are greater than the 10 percent concern level for sensitive watersheds and disturbance acreage would increase. Stream health was carefully assessed during the past timber harvest analysis. As described previously, stream health was determined to be robust and has recovered well from past disturbance. Forest Plan standards and guidelines and additional PDC (chapter 2) and monitoring would ensure impacts to stream health in this small watershed are minimal and deteriorated stream health would not be expected.

Alternative 3 – Limited Action

The total watershed area disturbance (dead trees harvest, fuel treatments, and public firewood) for Alternative 3 would be up to 1,793 acres. The areal and percentage disturbance of the watersheds, distributed to each 6th level watersheds, are shown in table 3-13. In this alternative, no disturbance would occur on the 7th level watershed of concern. Eliminating the 7th level watershed and other parts of the watersheds from activities would result in 973 fewer acres of surface disturbance area under this alternative.

Impacts from timber harvest and road work would be similar to impacts described for Alternative 2, except temporary roads needed would be less. Less surface disturbance would occur in the watersheds with most activity occurring in the Headwater Rio de Los Pinos watershed. The risk of direct impacts to watershed and stream health would still be within acceptable limits as current standards and guidelines and PDC are implemented. Similar to alternative 2, Project Design Criteria (PDC), including remedial work, should correct watershed problems from the past and allow stream health to improve over time.

This alternative would affect connected disturbed areas (CDA) as follows: 0 percent increase for the Headwaters Rio de Los Pinos, 8 percent for the Toltec Creek – Rio de Los Pinos, and 0 percent for the Wolf Creek watersheds. None of the watersheds would exceed the recommended 10 percent increase in CDA; this alternative would avoid any increase in CDA in the 7th level watershed of concern. The CDA would occur on currently closed or decommissioned roads. These roads would be closed or decommissioned at the completion of the project, returning CDAs to existing conditions.

Table 3-13. Alternative 3 watershed disturbance acres and percentages.

	Headwater Rio de Los Pinos (130100050201)	Toltec Creek- Rio de Los Pinos (130100050203)	Wolf Creek (130201020203)	Seventh Level Watershed (13010005050101)
Total watershed area (acres)	16,356	32,770	18,006	1,066
Proposed disturbance area(acres)	993	631.14	168.54	0
Percent proposed disturbance area to watershed area	6.07	1.93	0.94	0
*Percent proposed road equivalent disturbance area to watershed area	0.607	0.193	0.094	0

* Total equivalent disturbance acreage (as related to road disturbance) within a timber harvest project is calculated as 10% of the total harvest unit area.

Summary of the direct, indirect, and cumulative effects of the proposed project disturbances on a watershed analysis scale are shown in table 3-14. No alternatives would change the chemical quality of water.

Table 3-14. Direct, indirect, cumulative effects checklist for watershed attributes..

	Alt 1	Alt. 2	Alt. 3
AQUATIC ECOSYSTEMS			
Physical: Sediment	No effect	Minor effect	Minor effect
Bed/bank stability	No effect	Minor effect	Minor effect
Flow regimes	No effect	Minor effect	Minor effect
Chemical: Temperature	No effect	Minor effect	Minor effect
Water Purity	No effect	Minor effect	Minor effect
Biological: Aquatic life	No effect	Minor effect	Minor effect
SPECIAL AREAS			
Riparian ecosystems	No effect	Minor effect	Minor effect
Wetlands	No effect	Minor effect	Minor effect
Floodplains	No effect	Minor effect	Minor effect
CUMULATIVE EFFECTS			
Aquatic ecosystems	Major effect*	Minor effect	Minor effect
Riparian ecosystems	Major effect*	Minor effect	Minor effect

* Major effect determination is based on the likelihood of a more intense and severe fire if one should occur.
Note: This checklist ensures that all required effects are analyzed, gives a snapshot of all effects, and identifies items to dismiss from rigorous analysis. Effects shown assume full implementation of protection measures.

Cumulative Effects

The major disturbances in the 6th level watersheds have included timber harvest and associated road building. A total of 8,061 acres[9] have been harvested (or approved for harvest) from the three 6th level watersheds in the past (appendix C, table C-1). Most of these activities include commercial thinning, shelterwood preparatory cut, patch clearcut, stand clearcut, overstory removal cut, and salvage harvest. Other activities that have caused impacts include livestock grazing and recreational use, including Trujillo Meadows reservoir and campground.

Roads are causing minor localized impacts to stream health. Several closed/decommissioned roads in the upper part of the Headwaters Rio de Los Pinos watershed now have good vegetative cover and have minimal impact to stream health at road intersections. Re-opening these roads would increase the potential for sediment input at road intersections and would require careful adherence to Project Design Criteria requirements to protect water quality (i.e. NFSR 118.1A has been identified as a concern for fisheries).

Proposed activities under the Cumbres Vegetation Management Project include salvage harvests, fuel treatments, and public firewood areas. The total disturbance of these activities would be a maximum of 2,766 acres. New temporary and non-system roads would also be opened for the proposed project. Watershed impacts due to any future sales vary with management prescription and would be evaluated on a watershed scale when analyzed. Roads associated with these projects usually have the greatest potential to impact watershed health, but compliance with Forest Standards and Guidelines minimizes impacts.

Increases in CDA would occur under both action alternatives. Increases under the proposed alternative would exceed the 10 percent recommended limit for increase for the Headwaters of the Rio de Los Pinos. These increases would be a short term increase as closed roads would be reclosed and decommissioned roads would be decommissioned. In the short term this may increase sediment transport to streams. In the longer

[9] As indicated by table C.1 – appendix C, many of the past activities have occurred on the same “footprint” acres.

term (5 years), these roads would return to existing conditions and not have any higher rates of connectivity that they currently exhibit.

The accumulation of watershed disturbances from past activities is not a threat to watershed health. Cumulative effects from the action alternatives are expected to be minimal at the watershed scale because the project area comprises a very small percentage of the watersheds. The treatments proposed under the action alternatives would aid in reducing the potential of a future high severity fire event at the watershed scale in the long term. These management actions would be part of establishing a more stable and resilient ecological condition in the watershed, shifting towards multi-aged forested stands with a greater proportion of mature trees.

Cumulative watershed disturbances from timber harvest activities are not expected to cause serious impacts under any alternative. Disturbances associated with the action alternatives would not threaten watershed or stream health as long as Forest Plan standards and guidelines and PDC are followed.

Stream health in the 7th level sub-watershed of concern was found to be robust with little likelihood of change due to proposed activities. However, since disturbance levels at the 7th level sub-watershed are greater than concern levels (16 to 17 percent, depending on the alternative) and a high percentage of natural basal area loss has occurred, additional monitoring, including an established channel cross section that was evaluated in the past would also continue for the current Cumbres project.

Potential impacts to watershed resources and water quality would be minimized by implementation of Forest Plan standards and guidelines and PDC. All surface disturbances from logging operations would be adequately buffered to prevent any additional direct impacts to the water influence zone (WIZ), floodplains, wetlands, and riparian areas. Improving existing roads should reduce overall erosion and sedimentation. In general, cumulative effects from past, present, and reasonably foreseeable actions would be expected to be negligible.

3.10 Soils

Scope of Analysis

For soils, the treatment unit (i.e. boundary of harvest or burn unit) serves as the analysis area. Harvest or fuel treatment units or groups of units are therefore considered the activity area for which direct, indirect, and cumulative effects on soil productivity are analyzed. Temporary roads, skid roads, and landings within unit boundaries are included in the disturbance analysis. System roads are considered part of the Forest transportation system and are not considered for detrimental soil disturbance.

Soil productivity is a site-specific characteristic. Loss of soil productivity in a treatment unit alone does not lead to a loss in soil productivity in an adjacent stand or other areas across a watershed. The analysis areas for consideration of cumulative effects are the same as those evaluated for the existing condition and direct/indirect effects. Assessment of cumulative effects on soil productivity at scales larger than the specific treatment unit boundary (such as the watershed scale) misrepresents the effects of management activities by diluting the site-specific effects across a larger area.

Each sampled unit was defined as an individual proposed harvest unit and each unit was analyzed separately. Proposed harvest units were surveyed in the summer 2011 using the National Forest Soil Disturbance Monitoring Protocol (Page-Dumrose et al. 2009) method for measuring soil disturbance (establishing transects through units in a zig-zag manner to cover the majority of the unit). These paced transects were used to measure existing ground cover, coarse and fine woody debris, slope, soil disturbance and other related soils data (i.e. compaction) for the unit. Distance between collection points was determined by the

size of the unit. Ocular estimates, photo interpretations, and traverses (walk through) were used to estimate and correlate units with transect data to those without transects.

Existing Conditions

The soils in this analysis area are primarily of volcanic origin. Basalt, andesite, and rhyolitic rocks formed from volcanic materials and can weather to form clays. Volcanic ash also has been a source of soil parent material, forming fine silt soils. The project area contains broad, rounded mountains, with valleys, canyons and ridges typical of the San Juan Range. This soils analysis focuses on how well the project maintains long-term soil productivity and meets Forest Plan Standards.

The majority of the forested area soils fall within the Soil Resource Inventory (SRI) unit 151. SRI unit 151 has moderate risk of erosion and high mass movement potential. The SRI unit under the suitable timber lands rating it states “unsuitable due to mass movement except in the Cumbres Pass area” (USDA Forest Service, 1996). The Mancos shale underlying the volcanic parent material of the soil makes this soil unit susceptible to mass movement; however on gentle slopes this potential is reduced. In the Cumbres Pass area, the average slope is low based on field surveys. Thirteen percent of the sites recorded had slopes of greater or equal to 30 percent with the remainder of sites ranging from 0 – 25 percent. These relatively gentle slopes have allowed for past and present activities to occur in this area with minimal hazard for mass movement.

Soil Conditions - Detrimental soil disturbance (DSD) is soil disturbance that reduces soil productivity through compaction, topsoil removal, or nutrient depletions. On average the DSD was 11 percent, with a range of 0 to 23 percent. Coarse woody debris was present on average in 53 percent of sample points with a range of 34 to 68 percent. Individual unit results are shown in appendix C, table C-3. Temporary roads, skid roads, and landings within unit boundaries are included in the disturbance analysis. System roads are considered part of the Forest transportation system and are not considered for detrimental soil disturbance.

Table 3-15 shows the amount of DSD present in proposed harvest units. The 12 to 15 percent range is the level where rehabilitation is required to prevent disturbance in excess of 15 percent. Areas greater than 15 percent are above forest plan guidelines and would require post-harvest rehabilitation to reduce compaction. Units 9 and 15 have had little to no previous harvest activities. The majority of units fall within the moderate category. Based on past experience, for units currently below 12 percent DSD, additional harvest activity does not increase DSD to above 15 percent, if existing skid trails are used and/or skid trail spacing is maintained. Units 1, 2, 6, 7, 11, and 20 would require some rehabilitation following harvest activities to return DSD levels below 15 percent.

Table 3-15: Detrimental disturbance percentages for proposed harvest units.

DSD range	Category	Unit #'s	Acres
0 - 5%	Low	9, 15	188
6 - 11%	Moderate	3, 4, 5, 8, 10, 12, 13, 14, 16, 17, 18, 19, 21, 22	1537
12 - 15%	Mod to High	1, 2, 11	420
>15%	High	6, 7, 20	361

Soil compaction was the most affected indicator measured. Excessive soil compaction can alter soil functions such as soil porosity, soil nutrient cycling, and soil hydrology. Increased compaction can also lead to increased runoff and erosion which can affect streams by eroding stream banks with excess flows into and down streams as well as increased sedimentation.

Past logging activities, especially those undertaken in the 1960s and 1970s, have often left units with skid trails that are closer together than the current recommended distance. In addition, few if any, reclamation activities were completed after the sales. Past evidence of timber activities make it possible to re-use existing timber roads, skid trails, and landings which would minimize the need for additional impacts.

Direct and Indirect Effects

Alternative 1 – No Action

Under the no action alternative, no additional management activities would occur. The existing conditions of DSD, ranging from 0 to 23 percent would persist. No new disturbance would occur and over time there would be a recovery of current disturbed sites. Coarse and fine woody debris would increase over time as the beetle killed trees die and eventually fall. Public fire wood gathering and hazard tree removal would occur along open roads.

Nutrient cycling, biological and chemical processes would continue. This would continue to gradually improve current conditions and restore lost soil productivity. Previously used roads and skid trails would remain in current conditions.

Over time increased CWD (down and standing) could lead to an increased down fuel loading. This, in turn, could lead to a potential increased hazard of a severe wildfire, should a fire occur. A severe wildfire would remove soil cover, damage soil processes, and increase soil erosion, thereby increasing sedimentation to nearby streams and rivers. Depending on the amount of soil heating, wildfires can have serious short-term implications for watershed protection. Severe wildfires not only destroy vegetation, but also can detrimentally burn soils. Soils are considered detrimentally burned when most woody debris, litter, duff, and humus are consumed down to bare mineral soil. Detrimentally burned soils reduce soil productivity and may result in gully formation, shallow slumping and decreased microbial activity. Soil heating, and thus fire severity, increases over time as a result of fuel build up from dead trees falling to the ground.

Alternative 2 – Proposed Action

Direct effects are the most obvious and are directly related to timber harvest activities (i.e. compaction, soil displacement and disturbance) that occur primarily on skid trails, landings, or areas where machines turn and displace soil or organic matter. Indirect effects may include increase erosion due to loss of soil cover, reduction of nutrients or disruption of nutrient cycling, and hydrological consequences such as fine sediment from erosion entering streams. The most common indirect effects include accelerated erosion, reduced fertility and reduced vegetative growth. Limiting equipment operation to dry or frozen soil conditions, on packed snow, on lower percentage slopes, and on previously used trails and roads would help limit impact to soil resources.

The soils in the area are primarily skeletal (greater than or equal to 35 percent rock fragments) which can help limit compaction. By avoiding operating heavy equipment off-roads during wet soil conditions and re-using existing skid trails and temporary roads, additional compaction can be reduced and avoided.

As timber is removed from the stand many nutrients can also be removed. If nutrients are removed, those available for plant growth are also reduced over time, depleting the soil. Nutrient cycling depends on the return of nutrients from dead trees and plants to return to the soil to be used for plant growth. By leaving fine and CWD in the units and returning slash from limbs and tree tops back to the stand the soil, where needed, productivity can be maintained (Harvey et al. 1987; Graham et al. 1994). In addition, woody debris helps stabilize soils and prevent erosion.

There is a hazard of increased erosion created when old non-system temporary roads, decommissioned roads, and new temporary roads are reconstructed or constructed. Erosion would be mitigated by use of Best Management Practices set forth in Project Design Criteria (PDC). In addition, there is the potential for improvement through better closing and rehabilitation of roads following harvest activities.

Ground-Based Harvesting - Ground-based logging equipment could include rubber-tired log skidders, tracked feller buncher, and tracked skidders. The equipment is used in coordination to harvest and then gather trees to the landing. Usually the trees are transported to the landing where tops and limbs are removed. Project Design Criteria (chapter 2) would require a certain percentage of limbs and tops to be returned to the plot to ensure soil productivity is protected.

A high priority would be placed on reusing existing skid trails and temporary roads, with consideration to other resource needs. This would reduce the amount of additional disturbance created. Careful planning of new skid trails, re-using existing skid trails, and post-harvest sub-soiling of skid trails and landings would maintain or return cutting units to the maximum 15 percent disturbance level specified in the Forest Plan.

Ground based harvesting leads to soil compaction and soil erosion. Skid trails are compacted and can become conduits which can accelerate erosion and thus increase sedimentation to streams. This loss of soil can be extreme; however with the proper placement and use of water bars and application of slash after use, erosion can be controlled and soil fertility protected. Water bars can effectively reduce erosion by controlling runoff, which reduces erosion and soil loss. Application of slash over skid trails helps protect against erosion, filters sediments to protect streams, and provides a nutrient source to help with vegetation establishment and growth. These measures are also required by PDC.

Landings - Landings create areas with considerable compaction and soil disturbance. They also have the potential to increase soil erosion and sedimentation. To protect resources, landings would be sub-soiled where prescribed, and properly maintained to prevent erosion during and after harvest activities.

Landings are the center of the harvest activities. As such they are the most compacted and nutrient deficient location associated with harvest activities. Traditionally, landings are slow to recover. Rehabilitation measures can reduce erosion, protect water resources and reduce recovery times.

Fuels Treatments - There are 171 acres of proposed fuels treatments under both alternatives. These fuels treatments are primarily chainsaw cutting of trees and brush adjacent to private property. Burning of the small slash piles is likely, but these would not be expected to create enough soil heating to damage soils. Burn plans would be followed to maintain soil cover standards. Erosion would be minimal to none in relation to these activities.

Reforestation - Reforestation is anticipated to be completed manually, which would not cause additional ground disturbance.

Road Maintenance – Existing open roads are already highly used and require periodic maintenance and do not affect the soils resource. Road maintenance would increase and help to better protect the system from erosion and sedimentation. Reconstruction and reconstruction of temporary roads poses a hazard for soil erosion and loss. Care needs to be taken to properly construct, re-open and protect roads against erosion. Since this alternative would require more road construction, it would pose a greater risk. These requirements are covered in the PDC (chapter 2). In addition, closure and rehabilitation would need to occur to help remain within the 15 percent disturbance level set forth in the forest plan.

Existing roads would benefit from increased maintenance that would reduce erosion by effectively maintaining needed water dispersal mechanisms designed to prevent erosion from road prisms. This would

also be the case for system roads not open to the public. These roads would remain closed to the general public and benefit from the increased maintenance.

Coarse Woody Debris (CWD) - The Forest Plan specifies a minimum 10 to 15 tons per acre in a spruce-fir forest type. Mechanical equipment can damage and reduce the effectiveness of some CWD already in the unit. PDC (chapter 2), requires that the amount specified remain in the plot to protect soil and soil productivity. Initially some functionality of existing CWD may be lost due to mechanical disturbance of existing downed logs. The increased of CWD from the project over time would benefit the long-term soil productivity.

Alternative 3 – Limited Action

Effects of Alternative 3 would be similar to Alternative 2 except there would less ground disturbance under since fewer acres would be proposed for harvest, thereby requiring fewer landings, skid trails, and temporary roads.

For units not proposed for harvest under this alternative, effects would be similar to alternative 1. Units 7 and 20, with high levels of DSD, and units 1 and 11, with moderate to high levels of DSD would recover slowly over time; soil productivity would continue to improve.

Summary of effects for action alternatives - In general, both alternatives would likely meet Forest Plan standards and guidelines after rehabilitation measures are completed. PDC and best management practices (BMPs) would minimize new soil disturbance activities, such as skid trails and landing placement. Landings and skid trails are the main concern to soil disturbance. Past disturbances can have lasting effects on soil productivity, by implementing rehabilitation measures following salvage harvest, compaction resulting from past actions could be addressed, increasing the rate of improvement in overall soil quality and productivity.

Cumulative Effects

Cumulative effects are based on the number and types of management activities occurring within a unit over time. These effects are measured by how they affect soil productivity and effects are measured by determining the spatial extent of disturbance within a unit.

Past timber harvest activities have resulted in soil various degrees of detrimental soil disturbance. Other off-road activities that may affect soil productivity in the area are limited to very localized high-use areas popular with dispersed campers, some livestock trails, or firewood gathering within 300 feet of open roads. No other projects are reasonably foreseeable in the analysis area. Any cumulative effects that may occur would be over a very limited spatial extent and be relatively minor.

3.11 Air Quality

Scope of Analysis

This section describes the effects to air quality in the vicinity of the Cumbres project analysis area including nearby private land and the South San Juan Wilderness Area, a Class I Airshed. The nearest town is the Village of Chama, New Mexico, which is about 12 miles south.

Current land ownership patterns, wilderness designations, relatively low population, and lack of industrial development have minimized the sources of sustained air pollutants. Pulses of emissions that do occur are generally small, localized, and short-lived and therefore seldom overlap in time and space.

The Clean Air Act, passed in 1970 and amended in 1977 and 1990, requires the Environmental Protection Agency (EPA) to set standards for air pollutants to protect the public health and welfare. The standards,

known as National Ambient Air Quality Standards, limit the amount of these pollutants that can be present in the atmosphere. The EPA has set standards for six common pollutants known as "criteria" air pollutants—ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and carbon monoxide (CO). There are standards for two categories of particulate matter—one for suspended particles less than 10 micrometers in diameter (PM_{10}) and one for fine particles less than 2.5 micrometers in diameter ($PM_{2.5}$). Primary standards are designed to protect public health, while secondary standards are designed to protect public welfare. These standards can be found at: http://www.epa.gov/air/criteria.html

Unlike most other criteria pollutants, ozone is not emitted to the atmosphere directly; it is formed when nitrogen oxides and volatile organic compounds react in the presence of sunlight. In general, ozone concentrations in the lower atmosphere are highest during warmer months and lower in the cooler months. In some parts of the western U.S., high winter-time ozone concentrations have been monitored. The project area is not in an airshed with monitored high winter-time ozone concentrations. The chemical reactions that form ozone are complicated and nonlinear, making it difficult to predict ozone concentrations that will result from increasing nitrogen oxides and volatile organic compounds in the atmosphere; effects depend on the ratio of the two precursors already present. Ozone formation is also highly dependent on meteorological conditions, including temperature, wind speed, and solar radiation. Ozone in the lower atmosphere is harmful to human health and vegetation. Some fine particulates ($PM_{2.5}$), particularly ammonium sulfate and ammonium nitrate particles, can also be formed in the atmosphere from the interaction of either SO_2 or nitrogen oxides or ammonium. These types of $PM_{2.5}$ particles are referred to as secondary particulates, while particles emitted directly from a source are referred to as primary particulates.

Fine particulate matter ($PM_{2.5}$) is chiefly comprised of five mass types: organic mass, elemental carbon (also known as soot or black carbon), ammonium sulfates, ammonium nitrates, and crustal materials (i.e., soil). Primary fine particulate emissions result from combustion processes (including fossil fuel combustion and biomass combustion that occurs in wildfires) and include black carbon. In general, however, black carbon and crustal materials comprise a relatively small proportion of the fine particulate mass suspended in the atmosphere.

Visibility- Visibility is a measure of how clearly distant objects can be seen. Clear visibility is one of the most noticeable and highly valued attributes of any landscape for wilderness visitors. Impairment to visibility is commonly called *haze*, which results when particles in the air scatter and absorb light. As airborne pollutants increase, more absorption and scattering of light occurs, thereby reducing the clarity and color of distant objects. *Uniform haze* is well-mixed pollution from one or more sources that obscures visibility uniformly. *Layered haze* occurs when pollutants appear as a layer due to poor mixing. A *plume* is a continuous column from a single source. Air pollution likely impairs visibility to some degree on all Federal lands. The visual range in the West averages between 60 and 90 miles, or about one-half of the visual range under natural conditions.

Visibility is a measure of not only how far one can see, but how well one can see important characteristics of the landscape such as form, color, geologic features, and texture. Visibility is limited by the presence of particles and gasses in the atmosphere that scatter and absorb light. In the Clean Air Act, Congress established a national goal of remedying any existing, and preventing any future, impairment to visibility caused by manmade pollution in mandatory federal Class I areas (42 USC § 7491), including the South San Juan Wilderness Area. To aid the implementation of Clean Air Act and EPA legislation, the Interagency Monitoring of Protected Visual Environments (IMPROVE) program was implemented in 1985 to launched an extensive long term monitoring program to establish the current visibility conditions, track changes in visibility, and determine mechanisms for visibility impairment (http://vista.cira.colostate.edu/improve).

Various particulates contribute to haze and visibility impairment, as shown in table 3-16. Some types of particles such as sulfates are more efficient at scattering light, particularly during humid conditions. Fine particulates ($PM_{2.5}$) that are prevalent in smoke are more efficient at scattering and absorbing light and impairing visibility than coarse particulates (PM_{10}). Smoke can cause short-term visibility impacts by obscuring the form, contrast detail, and color of near and distant features. It poses a safety hazard when it obscures visibility on land, water, or aerial transportation routes. Smoke can also cause public nuisance and complaints about loss of visibility, odor, and soiling from ash fall-out at relatively low pollutant concentrations.

In order to meet the goal set by Congress in the Clean Air Act of remedying existing manmade visibility impairment in mandatory federal Class I areas, the EPA promulgated the Regional Haze Rule in 1999. This rule requires states to develop plans to reduce manmade pollution in Class I areas.

Table 3-16. Major contributors to visibility impairment.

Particulate	Sources and Comments
Sulfate	Particles form in the air from sulfur dioxide gas, released primarily from industrial sources such as coal-burning power plants, smelters, and oil refineries. Sulfates are the largest contributor to haze in the eastern U.S. In humid environments, sulfate particles grow rapidly to a size that is very efficient at scattering light.
Nitrate	Particles form in the air from nitrogen oxide gas, released from virtually all combustion sources (esp. cars, trucks, and motors like those in lawn mowers, and boats, power plants, oil and gas production, and other industrial sources). Like sulfates, nitrates scatter more light in humid environments.
Organic Carbon	Particles emitted into the air and also form as a reaction of various gaseous hydrocarbons. Major sources include vehicle exhaust, vehicle refueling and solvent evaporation. Hydrocarbon emissions from forests and wildland fire smoke are additional sources. Fire emissions also include primary organic particles in the form of uncombusted material.
Elemental Carbon	Particles emitted directly into the air from virtually all combustion activities and are especially prevalent in diesel exhaust and smoke from the burning of wood and wastes. Elemental carbon particles like soot are smaller than most other particles and absorb rather than scatter light. The brown clouds often seen in winter over urban areas and some mountain valley towns can be largely attributed to elemental carbon.
Crustal Material	Particles enter air from dirt roads, fields, and other open spaces as a result of wind, traffic, and other surface disturbing activities.

Existing Conditions

Current conditions of air quality in Colorado are detailed in the Colorado Air Quality Control Commission: Report to the Public 2012-2013 (http://www.colorado.gov/cs/Satellite/CDPHE-AQCC/CBON/1251592949477. The project area is located in Colorado's Central Mountains Air Quality Region which includes many of the mountains and mountain valley areas of the state. Skiing, tourism, ranching, mining, and correctional facilities are the primary industries in this region. All of the area complies with federal air quality standards (Colorado Dept. of Public Health 2011).

Air quality in the area is generally good. Areas that meet federal ambient air quality standards are classified as being in attainment, while areas not meeting standards are classified as being in nonattainment. On April 30, 2012, the EPA finalized its ozone nonattainment designations with respect to the 2008 ozone standard[10]

[10] (http://www.epa.gov/airquality/ozonepollution/designations/2008standards/final/region8f.htm).

EPA identified only one nonattainment area in the Denver-Boulder-Greeley-Fort Collins metropolitan areas located along the Front Range approximately 150 miles to the northeast of the project area. EPA has not identified any current nonattainment areas in Colorado for any of the other criteria pollutants.

Colorado maintains a network of monitors that track compliance with ambient air quality standards. Most of the monitors are located in the eastern half of the state, particularly along the more urban Front Range. Southwestern Colorado, by comparison, is relatively sparsely populated, and there are no monitors in the immediate vicinity of the project area. There are, however, monitors in some areas of western Colorado. Table 3-17 shows the maximum monitored values by county for selected counties near the Forest for the period 2009-2011. Not every county in the area has monitoring, and counties that do have monitors do not necessarily have monitoring for all criteria pollutants. No monitoring data were available for this period for SO_2 or lead concentrations for the selected counties. While these monitors cannot provide information regarding air quality in the immediate vicinity of the project area, they do give some insight into regional air quality conditions.

Table 3-17. Monitored criterion pollutants in nearby counties, 2009 to 2011.

County	Year	CO 2nd Max 1-hr (ppm)	CO 2nd Max 8-hr (ppm)	NO_2 98th Percentile 1-hr (ppb)	Ozone 2nd Max 1-hr (ppm)	Ozone 4th Max 8-hr (ppm)	$PM_{2.5}$ 98th Percentile 24-hr (μg/m^3)	$PM_{2.5}$ Weighted Mean 24-hr (μg/m^3)	PM_{10} 2nd Max 24-hr (μg/m^3)	PM_{10} Mean 24-hr (μg/m^3)
Archuleta	2009								78	23
	2010								65	21
	2011								81	21
Gunnison	2009								86	27
	2010				0.07	0.06			92	24
	2011				0.07	0.064			74	24
La Plata	2009	1.4	0.9	47	0.08	0.071	12	4.4	40	20
	2010	1.2	0.7	39	0.08	0.074	11	4.3	88	21
	2011	1.3	0.7	38	0.08	**0.077**	12	4.5	50	18
San Miguel	2009								72	18
	2010				0.06	0.059			52	15
	2011				0.08	0.069			61	16

The table demonstrates that air quality in the vicinity of the project area is in compliance with the National Ambient Air Quality Standards. Only one exceedance of a standard is noted in the table, for ozone monitored in La Plata County in 2011. The monitor that recorded the exceedance was the Shamrock Mine monitor, located near Crawford, CO. The annual 4th-highest 8-hour ozone average for that year was 0.077 ppm. Since a violation of the standard only occurs when the three-year average of the annual 4th-highest daily maximum 8-hour is over 0.075 ppm, an individual exceedance does not necessarily indicate a violation of the standard.

Visibility is tracked using data from the IMPROVE monitoring system. There are no IMPROVE monitoring sites in or near the South San Juan Wilderness area. The two IMPROVE monitoring stations in southern Colorado are located on Engineer Mountain on the San Juan National Forest (over 80 miles northwest of the project area) and in the Great Sand Dunes National Park (over 72 miles northeast of the project area). There is also an IMPROVE monitoring site located in northern New Mexico in the Wheeler Peak Wilderness area, but that site is also over 60 miles southeast of the area.

Direct and Indirect Effects

Alternative 1 – No Action

No logging operations or pile burning would occur, so no additional emissions would occur.

If a large wildfire would occur, regional air quality and visibility would be impacted during the life of the fire due to large releases of emissions associated with wood and vegetation combustion (see additional discussion under alternative 2). These large emissions would last during the life of the fire (up to several weeks) and have widespread effects.

Alternative 2 – Proposed Action

Proposed project activities in the action alternatives that could directly affect air quality would include the combustion of fuel from equipment use in cutting, transporting, and hauling logs, burning slash piles at landings following harvest completion, and, if used, burning handpiles as part of WUI fuel reduction treatments.

Some road re-construction/maintenance would occur under both of the action alternatives. In general, this would result in emissions of fine particles (dust) from the disturbance to the ground surface and processing of road building materials, if needed, such as crushed rock, sand, and gravel, as well as volatile organic compounds, soot, nitrogen oxides, sulfur dioxide, particulates, carbon dioxide, and carbon monoxide from vehicle and construction equipment engines. Once road work is complete, vehicles travelling along the roads would emit, through their exhaust systems, volatile organic compounds, nitrogen oxides, sulfur dioxide, particulates, carbon dioxide, and carbon monoxide. Travel by vehicles along unpaved roads would result in additional emissions of fine particles from the surface of these roads.

Vehicle emissions from harvest operations would occur. Impacts from emissions would be short-term and localized, but would occur on an intermittent basis for several years. Vehicles used in harvesting operations and gas and diesel powered equipment used to cut and remove trees would result in emissions typically found in gas and diesel exhaust, including sulfur dioxide, particulates, volatile organic compounds, carbon dioxide, and nitrogen oxides. Depending on the season of logging (winter vs. summer), some amount of dust could be generated by harvest activities which could be more visible than vehicle emissions. When logging during the dry periods, Project Design Criteria (PDC) would require dust abatement on NFSRs 118 and 118.1C, which are the major recreation user access roads in the project area. Dust abatement would reduce the dust from all traffic during the period of use for this road.

The two action alternatives identify winter pile burning as a likely way to dispose of slash generated by both the WUI fuel treatments and the large slash piles at landing areas. The WUI fuel treatments could result in approximately 9 acres of handpiles (maximum size 8 ft. by 8 ft.) scattered across about 171 acres along two blocks of private land. Adjacent private homes are generally occupied only in the summer months, so the minor amounts of smoke generated would be unlikely to impact these residences. It is estimated that logging activities would generate between 15 and 22 larger piles at landings, depending on the alternative. Burning of landing slash piles would likely occur at a rate of a few per season over several years, depending on the rate of harvest operations. The limited scale of winter burning operations would be unlikely to impact nearby summer residences or the Village of Chama.

Pile burning of slash piles would result in emissions typically associated with wood combustion, particularly volatile organic compounds, nitrogen oxides, soot, particulates, carbon dioxide, and carbon monoxide. Fires could also emit hazardous air pollutants, such as polynuclear aromatic hydrocarbons and aldehydes (such as formaldehyde). Since prescribed fires and slash burning are conducted under controlled conditions, are less intense than wildfires, and are much smaller in size, it can be reasonably expected that the emissions

resulting from these fires would be considerably lower than those from an uncontrolled wildfire. All pile burning operations would also require smoke permits issued by the Colorado Air Pollution Control Division (CAPCD). Prescribed burn permits include specific parameters that must be met to limit short term air quality impacts from smoke. Prescribed burns also require burn plans that consider smoke dispersal and impacts to local residences and visitors to the area to ensure that adverse effects are minimized.

Alternative 3 – Limited Action

Qualitatively, Alternative 3 would generate less vehicle emissions and dust, since fewer acres would be harvested and fewer slash piles would be burned, but neither alternative would be expected to have a measurable impact on local air quality.

Cumulative Effects

Emissions generated by implementing an action alternative would contribute somewhat to local pollution, but all affects would be short-term and limited. Due to the limited scale of potential logging operations and slash pile burning, the extent of impacts is expected to be quite small. Once project activities are completed in a particular area, any additional dust or smoke impacts would cease and have no further overlap in time or space with other pollution sources. As a result, proposed activities within the Cumbres project area are not expected to contribute to any violation of National Ambient Air Quality standards or to contribute measurably to any increase in visibility impairment at nearby Class I areas.

All alternatives, therefore, would comply with the Clean Air Act. This conclusion is additionally supported by the Forest Plan FEIS (USDA Forest Service 1996a), pages 3-151 through 3-154 that air quality on the Forest is good for all air pollutants and all Forest Plan approved activities would meet National Ambient Air Quality Standards.

3.12 Fire and Fuels

Scope of Analysis

This analysis covers an area of approximately 3,546 acres in the Neff Mountain and Trujillo Meadows area west of Cumbres Pass.

The processes used to conduct the technical analysis were the computer applications of the Forest Vegetation Simulator (FVS) with the Fire and Fuels Extension, Fuels Management Analyst Plus Ver. 3 (FMAPlus) and BehavePlus 5.0.

FVS models stand and understory attributes from stand inventories and then simulates growth over time. Disturbances and management actions can also be simulated decades into the future. In this analysis FVS was utilized to calculate snag fall and surface fuel accumulations over a 50 year time period. This simulated surface fuel loading was then compared to fuel loadings in the Photo Series Editor in FMAPlus to determine which fuel model would best represent these stands at the 1, 20, and 50 year time steps. BehavePlus was then utilized to model fire behavior and estimate rates of spread and flame lengths.

The stand conditions used in FVS were modeled every 10 years out to the year 2062. A wildfire was simulated in 2012, 2032 and 2062 in separate simulations to compare potential fire behavior as stand conditions changed.

Existing Conditions

Fire Analysis - The Cumbres project area would be generally categorized as Fire Regime V or infrequent fire occurrence (200+ years) and stand replacement in nature. The area is dominated by Engelmann spruce and subalpine fir on the higher slopes, ridges and valleys. Aspen is a minor component in the project area. Climate and weather conditions play a greater role in large fire development than fuel loading in this type of fire regime.

Fires in high elevation forests of the southern Rocky Mountains are infrequent and usually small, due to snowmelt and the frequent summer rain showers that generally keep these areas too wet to burn throughout most of the growing season. However, in rare dry years or under extended drought conditions, sufficient drying of the fuels may allow for large fires to burn across extensive portions of the landscape in severe, stand-replacement fires. These large stand replacing events lead to patches of forest types on the landscape that are uniform in their succession and stand characteristics (Romme et.al. 2009).

When these spruce/fir stands burn as stand replacing fires, fire behavior is often of very high intensity[11] with flame lengths reaching two to three times the height of the existing canopy, exhibiting rapid rates of spread, and producing extensive fire brand/ember lofting ahead of the main fire. Large, down woody debris is often completely consumed and extensive soil heating can occur, which can affect many physical and chemical soil properties. Fire severity[12] and/or soil burn severity can be extensive in a stand replacing fire and determines how soon pioneer species recover within the area. In severely burned areas, soils may lose the ability to absorb moisture and exhibit water repellency for several years following the event.

Past fire suppression activities within the analysis area have been limited to small single tree fires or fires that seldom grew beyond 10-20 acres. This area has not seen extensive, landscape scale fires since the late 1800s/early 1900s. Much of the analysis area has been logged in the past and the removal of much of the over-story has affected the subsequent stand development.

Fuels Analysis - Intense scientific interest in bark beetle-fire interactions is relatively recent and ongoing. It is clear that beetle infestations have a direct effect on wildfire potential, and that the degree of influence can be categorized by the phase of the infestation. Bark beetle mortality modifies the canopy fuels, surface fuels (grasses, forbs, shrubs, downed-woody material) and ground fuels (dead litter and humus). Localized weather conditions such as increased sun, wind, and rain or snow are also modified in proportion to the number of trees killed. These changes are directly linked to changes in the forest water balance which are known to affect fuel moisture relationships, and therefore fire behavior (USDA Forest Service 2011).

Current understanding of effects of bark beetles on fire behavior: Basic fire science principles suggest that opening the forest should lead to drier surface fuels, more sunshine, and more wind which would favor increased ignitions and early fire spread resulting in more fires requiring management. Past experience is largely anecdotal, but decades of firefighter wisdom suggest that any fires will be more intense for an indeterminate amount of time following attack.

- Following attack, forest composition and structure are fundamentally altered. Fire behavior can be expected to decline somewhat in the post attack phase and not return to pre-fire conditions. Conditions for surface fire spread are improved, whereas conditions for crown fire spread are

[11] **Fire intensity** - Energy output from the flaming front of the fire, does not take into account the smoldering combustion post fire frontal passage; closely correlated to flame length.

[12] **Fire severity**- Aboveground and belowground organic matter consumed by the fire. Soil burn severity- Amount of belowground organic matter consumed by the fire, a factor determined by soil temperature and duration of heating.

reduced. However, snags present unique fire behavior problems, principally as a source for, and recipient of, embers which start new fires ahead of the main fire.

- Snags constitute a major safety hazard for fire fighters. Safety concerns will reduce fire fighter effectiveness leading to larger fires.
- Heavy downed logs slow fireline construction. The increased resistance to control implies fires will either grow larger or require more suppression resources.
- Heavy downed logs are associated with extended burning, greater soil heating, sustained smoke production and extended fire mop-up, particularly in warmer-dryer forests.

The landscape level West Fork and Papoose fires that burned just less than 88,000 acres in similar stand conditions of spruce beetle mortality on the Divide Ranger District on the Forest during the summer of 2013 generally exhibited the type of fire behavior described above. Fire behavior reports completed during the fire indicated that the dry needle cast and dead spruce, combined with minimal relative humidity recovery, lead to quick transitions between surface and crown fires. The large numbers of snags were considered safety hazards to firefighters and contributed to the limited options for fire suppression strategies under the dry, windy weather conditions. Extreme long range spotting up to 3 miles ahead of the main fire was observed under plume-dominated fire behavior. Portions of the burn area with high surface fuel loadings experienced severe soil heating impacts, while other areas had minimal soil impacts due to the high winds. Fire behavior analysts re-emphasized that current crown fire prediction models are not valid in recently beetle killed forests.

Based on stand exam data and Forest Vegetation Simulation modeling, surface fuel loadings varied extensively across the analysis area from stands with 20 tons/acre at the low end to stands with greater than 70 tons/acre at the high end. Due to the extensive spruce beetle mortality, surface fuel loads are expected to increase over time. Snag fall-down rates for spruce beetle mortality have not been well documented, but Schmid & Hinds (1974) estimated an annual snag fall rate of 1.5 percent in spruce beetle killed Engelmann spruce. Meilke (1950) found that 84 percent of beetle killed spruce snags on the Dixie National Forest, in Utah were still standing after 25 years. A somewhat higher percentage of trees had dropped out of the smaller diameter classes than in the larger ones.

Direct and Indirect Effects

Alternative 1 – No Action

The short-term effects of the spruce beetle mortality will be an increased risk of crown fire initiation and spread while the dead trees retain the red or gray needles. This risk drops dramatically once the needles have fallen, usually within 1 to 3 years following infestation. Once the needles have fallen, there would be increased sunlight available to the forest floor which should lead to an increase in herbaceous plant growth. The increase in available fine fuel, plus the opening of the canopy, would allow for increased winds at ground level resulting in potentially higher rates of spread for surface fires. So while the risk of crown fires decreases, the rate of spread for surface fires would increase. Over time, as regeneration fills in, the potential for higher rates of spread may decrease.

Over the long term, as more of the dead trees fall, the surface fuel loading of large diameter material would increase. Due to the slow decay of the large diameter fuels in this environment, this material would continue to accumulate which would result in higher intensity fires of longer duration, if the area burns. These high intensity burns would increase soil heating to a deeper depth, detrimentally impacting soil micro-organisms and nutrient cycling.

As shown in table 3-18, the modeled projections for the no action alternative would produce the following tons per acre (T/A) of surface fuel loadings for 2013, 2033, and 2063. The modeled fire behavior under the no action alternative indicates average flame lengths of 11to 12 feet in length, rates of spread of 26-29 chains[13] per hour and heat per unit area of 2150-2550 BTUs per square foot under 90th percentile weather conditions across the majority of the project area throughout the 50 year timeframe.

Table 3-18. Modeled surface fuel loading, Alternative 1.

Year	Average > 3" Diameter Surface Fuel Loading (tons/acre)
2012	32 T/A
2032	43 T/A
2062	42 T/A

Alternative 2 – Proposed Action

Under the proposed action alternative harvest activity would remove approximate 32 tons per acre of the dead standing trees which would no longer contribute to the surface fuel loading over time. The modeled surface fuel loads for Alternative 2 in 2032 and 2062 are also shown in the second column of the table below. The difference between Alternative 2 and Alternative 1 in 2032 and 2062 are shown in table 3-19. The results of the harvest activity would be a lower surface fuel loading over time.

Table 3-19. Modeled changes in surface fuel loading for action alternatives.

Year	Average > 3" Diameter Surface Fuel Loading in Alternative 2	Difference between Alternative 2 and Alternative 1 in Average >3" Fuel
2032	30 T/A	13 T/A less
2062	26 T/A	15 T/A less

The modeled fire behavior under the proposed action alternative indicates average flame lengths of 9 feet in length, a rate of spread of 22 chains per hour and heat per unit area of 1718 BTUs per square foot under 90th percentile weather conditions across the project area following harvest in 2012. This modeled fire behavior is somewhat similar to the no action alternative. However, in 2032 the flame lengths decreased to 4 feet in length, the rate of spread decreased to 20 chains per hour (1,320 feet hour) and heat per unit area decreased dramatically to 434 BTUs per square foot. In 2062 the flame lengths were projected to be 6 feet, the rate of spread increased to 34 chains per hour due to wind speeds that were increased by opening up the stands, and the heat per unit area was projected to be 467 BTUs per square foot.

Overall, harvested units show a decrease in greater than 3 inch diameter fuels, flame lengths, and heat per unit area when compared to the no action alternative. In units that currently have an aspen component, the opening of the stand to increased sunlight and the disturbance of the logging activity could increase aspen sprouting and regeneration. Depending on the amount of aspen regeneration, fire behavior could be moderated in these areas.

The alternative 2 has the greatest effect in reducing potential flame lengths which is correlates to decreased potential fire intensity and soil heating. In some of the units the potential rate of spread increases or stays the same due to the more open nature of the stands which would allow for increased wind speeds at the surface. The removal of small diameter ladder fuels and thinning from below along the private property boundary would improve the defensibility of the private property and reduce the potential for crown fire initiation and spread in those areas. The proposed thinning on 171 acres adjacent to private property is expected to generate

[13] One chain equals 66 feet.

an average of 40 slash piles per acre, each covering approximated 64 sq. ft. (8' x'8' footprint). The area impacted by winter slash pile burning would be approximately 2560 square feet/acre or approximately 9 acres within the analysis area. Because these piles are very small and the ground is typically frozen when the slash is burned, there would be very little impact to the soil from these pile burns.

The proposed alternative would reduce large diameter surface fuel accumulation in the harvested units over time by the removal of the dead standing trees. As the residual live trees and subsequent regeneration mature, the fuel loading and potential fire behavior would continue to change. Spruce/fir stands at this elevation do not burn often due to moister weather conditions during most fire seasons. Long term drying conditions (drought) and favorable short term weather conditions (low RHs, higher temps, and increased winds) are usually required for these stands to burn. However if these conditions are present, the proposed alternative could reduce potential for high intensity burns of long duration that could detrimentally affect soil micro-organisms and nutrient cycling in areas that have been harvested

Alternative 3 – Limited Action

Under the limited action alternative the modeled large diameter fuel reductions and fire behavior would be the same as the proposed alternative with a reduction in acreage harvested and no treatment done in units 1, 2, 3, 9, 15, 16, 18, 19, and 20. Units not harvested would have fire behavior similar to Alternative 1 with higher fuel loadings, and increased flame lengths and rates of spread. The effects of thinning along the private property would remain the same.

Cumulative Effects

Since no further vegetation management activities are planned in the project area, there would be no cumulative effects to fire or fuels management within the analysis area.

Social Resources

This section includes a summary of potential effects on social resources. Complete reports are located in the project file.

3.13 Social-Economics

Scope of Analysis

The social effects analysis primarily focuses on Conejos County, Colorado and to a certain extent on Rio Arriba County, New Mexico. The surrounding communities include Antonito and La Jara, Colorado as well as Chama, New Mexico, due to its proximity to the analysis area.

Existing Conditions

Most of the early settlers in Conejos County used the surrounding lands for logging, mining, sheep, and cattle grazing. Much of the population lived in rural areas where the National Forest lands were important for gathering firewood for heating and cooking, collecting medicinal plants such as *Osha*, gathering food such as mushrooms, and for hunting, trapping, and fishing. A large portion of the population in Conejos County has historically been dominated by individuals of Hispanic origin, with many of the residents being descendants of the original Spanish settlers. The influence of the Spanish culture is evident in the local architecture and in the names of towns and geographic features of Conejos County, Colorado and Rio Arriba County, New Mexico.

The National Forest lands continue to be an important source of firewood and an important source of special forest products for the local population. Census data indicate that about 28.8 and 18.1 percent of the

households in Conejos and Rio Arriba counties, respectively, use wood as a heat source. Livestock grazing has also remained an important component of the local economy. Many of the local ranchers graze cattle and sheep on Forest Service allotments in Conejos County.

The local economy in Conejos County has changed over time as recreation has become more important. This is particularly true in areas near the project area with the Cumbres & Toltec Scenic Railroad, the Caminos de los Antiguos Scenic Byway, the Continental Divide National Scenic Trail, and the South San Juan Wilderness Area located nearby. There are many local outfitter guide services, cabins, second homes, campgrounds, and businesses catering to area visitors. The area offers excellent opportunities for site seeing, hiking, hunting, fishing, camping, horseback riding, snowmobiling, cross country skiing, snow shoeing and wildlife viewing. All of the recreational opportunities and services provided by local businesses have made recreation a very important component of the local economy. National Forest lands have also continued to be utilized for their hunting and fishing resources. These resource users contribute to local economy during the summer and fall months and support the Colorado Parks and Wildlife (CPW) through license fees.

Timber harvesting and other forest management activities have had mixed benefits to the local population; some timber sales have been purchased by local mills that generally utilize local contractors for logging operations, other sales have been purchased by mills from outside the local area, though sometimes these mills contract with local contractors. These types of activities do contribute to the diversity of employment opportunities in the area. National Forest lands continue to be an important source of sawtimber for the timber industry in Colorado.

The economic analysis focuses on the financial efficiency associated with commercial harvest treatments. It does not determine if the sales are above or below cost, compares the financial efficiency of each alternative. This financial efficiency analysis does not incorporate monetary values for all known market and non-market benefits and costs. Discussions specific to the timber industry focus primarily on the State of Colorado though nearby Chama, New Mexico also has some wood processing facilities.

Cost efficiency is a measure of how well inputs (activities) are used in a production process to produce a fixed set of outputs. It is only a partial measure because not all benefits and costs to society can be quantified. Revenues from sawtimber have been assigned dollar values based on current markets and are quantifiable. Other resources such as watershed health, riparian health, wildlife abundance and diversity, long-term habitat improvement, social benefits, and scenic resources cannot easily be assigned dollar values. This financial efficiency analysis does not consider ecosystem services or non-market goods that are not required at the project level by the NFMA. Ecosystem services and non-market goods are addressed in the Forest Plan FEIS (FEIS 3-445 through 3-469).

Direct and Indirect Effects

One financial analysis with three alternatives was run for the project. Table 3-20 summarizes the cost-benefit and Present Net Value results from Quick-Silver.

Table 3-20. Quick-Silver financial efficiency analysis by alternative.

Alternative	PV Benefits	PV- Costs	Benefit: Cost ratio	Net Present Value	Approx. Vol. (CCF) Harvested	Fuel Reduction Acres
Alternative 1	$0	$250,000	0.00	-$250,000	0	0
Alternative 2	$402,779	$956,490	0.42	-$553,712	44,747	171
Alternative 3	$235,810	$646,735	0.36	-$410,924	32,083	171

Alternative 1 – No Action

The no action alternative would have various effects on the local populations because the areas impacted by spruce beetle would not be treated. If left untreated, over time, these may become less accessible due to the number of downed trees, and could be unsafe to enter as trees began to fall.

A beneficial outcome of the no action alternative could be the abundance of firewood that could be made available to the public, though many of the acres are not adjacent to open roads, so dead trees would not be accessible without additional actions. In addition, the no action alternative would minimize any short-term social conflicts between logging operations and recreational users.

Financially, Alternative 1 would not generate revenues through the sale of commercial forest products. The cost of the environmental analysis is not offset by revenues generated through the sale of timber. The no action alternative would have a negative impact on the local timber industry. The benefit-to-cost ratio for this alternative is zero. This alternative creates a negative cash flow for the Forest Service and does not provide means for site reforestation in suitable timber lands that are infested with spruce beetles and lack advanced regeneration, nor does it assist with road maintenance or other needed road improvements.

Alternative 2 – Proposed Action

Alternatives 2 and 3 would have similar effects. Under these alternatives, approximately 30 to 44.7 CCF of forest products would be made available to the forest industry. Providing this volume would allow local mills to effectively compete for resources because of lower mobilization and operational costs. Other beneficial impacts would include the increased public safety and usability of the area after harvest is completed compared to the no action alternative. Firewood would remain available under these alternatives and fuel reduction treatments would reduce the potential for property damage caused by wildfires. Removal of hazard trees would help protect infrastructure from damage and reduce the time and costs to protect these features.

Each of the action alternatives creates potential for conflict between harvest activities and other forest users. Some forest visitors may choose to use different areas, in the short-term, which could negatively impact local businesses. In addition, the Forest Plan states that Forest visitors can expect to see managed stands of trees in a natural or near-natural forest setting. Stands would have evidence of management, including tree stumps, slash, skid trails, and soil disturbance. These action alternatives, in combination with changes that are occurring naturally on the landscape, may shift social uses that take place in the project area, bring new users into the area, or direct current users to different locations.

Alternative 2 would generate a benefit-to-cost ratio of 0.42 with the proposed harvest and artificial regeneration under this alternative, since the benefit-to-cost is less than 1.0; this alternative is financially below cost to the Forest Service. The net present value of this alternative is -$553,712. The present value benefit of the forest products being offered under this alternative is $402,779; these benefits include only sawtimber volume sold and do not include personal use or commercial firewood, as this project is not

expected to create a net increase in the amount of firewood available or sold. The present value cost associated with implementing this alternative is $956,490; these costs include timber sale preparation, road work needed to access the sale areas, timber sale administration, slash disposal, and reforestation. Under this alternative, approximately 44,747 CCF of sawtimber could be offered.

Alternative 2 has the largest benefit-to-cost ratio, but the smallest net present value of the alternatives analyzed. Though this alternative is financially below cost, the economic benefit of supplying timber to industry not only supports the timber industry, but also supports secondary businesses and local communities, and helps the Forest meet Forestwide objectives 7.1 and 8.2 and fulfill the intent of the Forest Plan ROD.

Alternative 3 – Limited Action

Alternative 3 generates a benefit-to-cost ratio of 0.36, the smallest ratio of the two action alternatives, but has the largest (though still negative) net present value of the action alternatives. The present value benefit of the forest products offered under this alternative is $235,810, and the present value cost associated with offering this product is $646,735; these costs include timber sale preparation, road work needed to access the sale areas, timber sale administration, slash disposal, and reforestation. Under this alternative, approximately 32,083 CCF of sawtimber could be offered. As with Alternative 2, this alternative is financially below cost for the Forest Service, but supports local communities by making timber available to the forest products industry. In doing so, this alternative helps the Forest meet Forestwide objectives 7.1 and 8.2 and fulfills the intent of the Forest Plan ROD in regards to timber outputs and economic diversity.

Cumulative Effects

This analysis area is adjacent to other active timber sale areas accessed by the same road system. Project Design Criteria have been developed to protect public safety and minimize other conflicts between logging and other activities, but logging activities could still affect other users, especially if roads are closed temporarily to protect public when logging is occurring adjacent to roads.

In combination with past, present, and other planned harvest activities, either of the action alternatives would help the Forest Service to continue its stable and sustainable supply of timber. This in turn would help support the local and regional wood products industry, dependent service providers, and local economies. In summary, the action alternatives have the greatest potential to benefit the local communities in the longer term and Colorado/northern New Mexico timber industries in the short-term. Forest management can increase the rate of forest recovery and improve recreational and commercial opportunities, while increasing safety to Forest users.

3.14 Recreation and Travel Management

Scope of Analysis

The recreation analysis focuses on the recreational use in the analysis area boundary and high-use areas immediately adjacent to the analysis area boundary.

Existing Conditions

Developed Recreation - The Trujillo Meadows Campground is directly adjacent to the analysis area, and essential components of the campground water system are located in the analysis area. The access route (NFSR 118) for both the Trujillo Meadows Campground and Reservoir are located in the analysis area. The Trujillo meadows Campground was closed in 2012, for hazard tree removal (covered under a separate analysis document) and is expected to be re-opened in spring of 2014.

Dispersed recreation - A diverse array of dispersed recreation opportunities occur within the analysis area. These opportunities include but are not limited to: driving for pleasure, sight-seeing, hiking, hunting, fishing, horseback riding, picnicking, firewood gathering, snow shoeing, cross-country skiing, snowmobiling, use of all-terrain-vehicles (ATV) on roads, and use of the yurt system.

Recreation Opportunity Spectrum (ROS) Setting -The ROS is modified-roaded. The area prescriptions according to the Forest Plan Management Area Prescriptions (MAP) are General Forest (5.11) and Forest products (5.13).

System Trails/Trailheads - There are no trails or trailheads within the analysis area. Trail number 736 is located northwest of the analysis area; the access road to this trailhead traverses the analysis area. Trail number 813, the Continental Divide National Scenic Trail (CDNST), is located south of the analysis area, within a few hundred yards of NFSR 118.

Recreation Special Uses -There is one commercial recreation permittee operating in the area. The permittee operates a total of four yurts, two of which are in the analysis area, and the access route to another yurt, passes through the analysis area. PDC (chapter 2) are being employed to minimize effects to these recreationists.

Travel Management - Forest travel regulations restrict motorized travel to designated roads and trails. All of the gated roads are closed to motorized uses. Open roads are the only routes open to motorized uses within the analysis area. Additionally, forest regulations allow vehicles to leave roads for a distance of 300 feet to access a suitable campsite or for gathering firewood, as long as no damage is caused to the resources. Game retrieval is allowed in this area (afternoons with ATVs less than 48 inches in width) during the big game hunting seasons.

Direct and Indirect Effects

Alternative 1 – No Action

This alternative could have some impacts to recreationists if the widespread effects of down trees impede visitor access and/or the safety aspects of many standing dead trees preclude the use of the area. Winter recreationists may not be able to access areas until the snow is deep enough to adequately cover down trees, as they fall over time.

Alternative 2 – Proposed Action

This alternative would have temporary effects on recreation users and private land owners adjacent to the proposed treatment areas, especially during the active timber sales with heavy truck traffic on open roads leading into the sale areas. There would also be fewer opportunities for public firewood gathering than alternative 1, even with the three areas (totaling 97 acres) set aside for public firewood gathering. The two yurts under a special use permit (figure 1-2) are located in proposed salvage units. Since Project Design Criteria would allow logging only up to December 15th this cutoff date would still allow for safe winter recreational use of the area, for both the yurt visitors and dispersed recreationist, plus reduce financial impacts on the yurt permittee.

Following harvest, the area would be more open which could allow for unauthorized cross-country travel by motorized vehicles, which would be difficult to restrict without natural barriers. Additional steps may be needed to block closed roads and skid trails to motorized use. The openness of the area could also change winter use patterns as well by allowing snowmobiles access to different areas, currently unusable due to dense tree cover. Cross country travel by snowmobiles could impact tree regeneration, as machines may clip the tops of the trees that are minimally covered by snow.

The CDNST is adjacent to the analysis area (figure 1-2). The analysis area is within the viewshed of the CDNST (defined as the 0.5 mile foreground viewed from either side of the trail). However, the majority of the trail is at a lower elevation than the analysis area, so hikers would likely only see the edge of the analysis area while traveling through, not large sections. PDC stipulate a minimum 200 foot buffer from the trail, where logging activities would not occur. The buffer would provide for the general safe distance of two tree lengths from any tree cutting/ harvesting activities for trail users, and for the trail itself and since logging activity would occur over a ridge, this should minimize visual effects and sounds during logging activity in the area.

The recreation/travel management PDC are feasible because they would be incorporated in the timber sale or other contracts to protect recreation infrastructure, warn visitors of hazards, and minimize impacts to forest users during periods of highest use. These PDC have been used on other timber sales on the Forest and should be an effective means of minimizing negative impacts to other forest users.

Alternative 3 – Limited Action

Effects of this alternative would be similar to alternative 2, except there would be fewer opportunities for firewood gathering with two designated areas (totaling 73 acres) being set aside. However, fewer acres would be in harvest areas which would allow more firewood gathering opportunities in the analysis areas outside of the designated areas. Unharvested areas would have similar effects to Alternative 1, as the standing dead trees started to fall.

Under this alternative, the special use permitted yurts would not be located in a harvest unit, but access routes to the yurts would be affected if winter logging was permitted. Therefore, PDC would only allow logging up until December 15th to reduce impacts to winter recreation and special use permittees. Hazard tree removal within 2 tree heights of the yurts would still occur under this alternative to protect the structures from potential damage.

Following harvest, some areas would be more open which could allow for unauthorized cross-country travel by motorized vehicles, which would be difficult to restrict without natural barriers. The openness of the area could also change winter use patterns as well by allowing snowmobiles access to areas they currently do not, due to heavy timber. Cross country travel by snowmobiles could impact regeneration trees, as machines may clip the tops of the trees that are minimally covered by snow.

Cumulative Effects

Since there are no additional plans for recreation facilities and the existing road network and authorizations would not change, there are no cumulative effects expected for the recreation or travel management resource.

3.15 Transportation

Scope of Analysis

This section addresses the travel ways that could be used to access, monitor, and haul timber from the Cumbres Vegetation Management project. The spatial analysis boundaries for the transportation system are limited to the analysis area boundary. The type of work required for each road and the costs associated with the required work are displayed for the action alternatives. The direct and indirect effects of the road system on the various resources are addressed in the individual resource sections.

The transportation network that would be required to accomplish the objectives of the action alternatives has been carefully analyzed and planned through field reconnaissance, aerial photography interpretation, and extensive map analysis. The main goals in preparing the transportation plan were to minimize construction

disturbance and to control impacts to the environment, while safely and efficiently accomplishing the goals of the proposed action.

Existing Conditions

The transportation system in the Cumbres analysis area was constructed to allow access for recreation, timber harvest, range management, private land access, and fire suppression. Construction occurred in stages beginning in the early 1950s. Trujillo Meadows Reservoir was constructed in 1955.

The analysis area is located north and west of State Highway 17, approximately 54 miles southwest of Antonito, Colorado. The analysis area is accessed from State Highway 17 by two National Forest System Roads (NFSRs) - Neff Mountain road, NFSR 116, and Trujillo Meadows road, NFSR 118. Neff Mountain road is a high-clearance vehicle road that trends west from Highway 17 to intersect, at its western termini, with NFSR 118. NFSR 118, maintained for passenger car use, trends north past Trujillo Meadows Campground and ends at Trujillo Meadows Reservoir. NFSR 118.1C is suitable for use by passenger cars and is used to gain foot and horse access into the South San Juan Wilderness Area. These roads would be used as haul routes for the action alternatives (figures 2-2 and 2-3).

Other Forest roads within the analysis area are either maintained for high-clearance vehicles or are unauthorized for motorized use. There are approximately 23.3 miles of NFSRs in the analysis area boundary, of which 5.8 miles have been decommissioned and 3.8 miles are closed by gates or barriers to vehicle use. All system roads are maintained by the Forest Service. The existing local roads within the analysis area are generally well located and adequate to serve the majority of the proposed project needs.

The initial Forest level Roads Travel Analysis Process (TAP) that evaluated each road was completed in 2004 (USDA Forest Service 2004). Through this science-based process, the Forest staff determined a minimum road system and also identified unneeded roads, in accordance with 36 CFR 212.5. Each road within the analysis area was evaluated and recommended for either keep/maintain storage, or decommissioning. These recommendations are reflected in the current Motor Vehicle Use Map (MVUM).

Direct and Indirect Effects

Alternative 1 – No Action

The No Action Alternative would require no new disturbance and would result in no change to the existing transportation network in the area. Reconstruction and maintenance opportunities will be limited by budget constraints. Currently, road maintenance is generally done on a 5 to 7 year schedule with heavily used roads suitable for passenger vehicles (i.e. NFSR 118) receiving more frequent maintenance.

Alternative 2 – Proposed Action

Under Alternative 2, minor reconstruction would be necessary to improve road drainage and the road surface on the three main haul roads (NFSRs 116, 118/118C, 119) for environmental protection. Some Maintenance Level One (closed) roads, would be temporarily used for stand treatment activities (see figure 2-2), but would be closed and reseeded upon completion of the project. Closed roads would not be opened to public travel during logging operations.

Several temporary road segments would be constructed to gain access into harvest units. Some of these temporary roads are old, non-system roads that were used in past harvest operations and some would be new construction. Type of work needed could include: surface blading, brush clearing, drainage installation, reshaping, and turnout or turn-around construction to allow for safe and efficient use by haul vehicles and trailers. All temporary roads would be closed to vehicle traffic and rehabilitated upon project completion and are treated the same for cost estimation purposes.

Table 3-21 and figure 2-2 shows the proposed transportation network and estimated cost for reconstruction or maintenance. The preliminary costs shown do not include post-harvest rehabilitation. The maintenance shown is for work required above normal pre-haul maintenance.

Table 3-21. Road system and estimated cost for road maintenance/reconstruction, Alternative 2.

Road type	Length (mi.)	Work Required	Cost Estimate
System Roads	23.4 miles	Reconstruction / maintenance	$ 84,600
Temporary Roads	8.3 miles	Construction / Reconstruction	$ 24,900

Costs for rehabilitating temporary roads, developed from past experience and the Intermountain, Southwestern, and Rocky Mountain Regions *Cost Estimating Guide for Road Construction*, are estimated to average about $ 3,000 per mile.

Alternative 3 – Limited Action

Under Alternative 3, fewer system and temporary roads would be used than in alternative 2. Road management during and following harvest activities would be the same as described under Alternative 2 in that all closed roads used during operations would be closed to vehicular and rehabilitated. Closed roads would not be open to public travel during logging operations.

Table 3-22 and figure 2-3, show the proposed transportation network needed for alternative 3. The preliminary costs shown do not include putting reopened roads to bed after treatments. The maintenance shown is for work required above normal pre-haul maintenance.

Table 3-22. Road system and estimated cost for road maintenance/reconstruction, Alternative 3

Road type	Length (mi.)	Work Required	Cost Estimate
System Roads	15.85	Reconstruction / maintenance	60,400
Temporary Roads	4.4 miles	Construction / Reconstruction	$13,200

Costs for rehabilitating temporary roads, developed from past experience and the Intermountain, Southwestern, and Rocky Mountain Regions *Cost Estimating Guide for Road Construction*, are estimated at $ 3,000 per mile.

Cumulative Effects

Since the existing road network and authorizations would not change and no future road or motorized trail construction is planned in this area, there are no cumulative effects expected for the transportation resource.

3.16 Scenic Resources

Scope of Analysis

The analysis boundary for scenic resources is located from Rio de Los Pinos Creek along Trujillo Meadows to Neff Spring, along NFDR 118 just east of the Continental Divide National Scenic Trail and to the east edge of the private land boundary.

Existing Conditions

This analysis focuses primarily on the scenery resource within the Cumbres project analysis area boundary as described in chapter 1. However, there are two other important recreation sites adjacent to the project area that will also be considered: 1) Trujillo Meadows Campground and Reservoir, which is located on the north boundary of the analysis area; and 2) The Continental Divide National Scenic Trail, located south of the analysis area boundary.

The Trailhead area for NFS Trail 736 (access point to the South San Juan Wilderness area) is accessed by driving through the analysis area on NFSRs 118 and 118.1C/118.2.

The project area is located within lands designated for multiple-use management and is part of the suitable timber base. Hazard tree removal and cleanup in the Trujillo Meadows Campground was completed in2013. This work substantially reduced the canopy cover in the campground. Although re-vegetation actions are planned following harvest, it will be many years before the trees appear mature.

Adjacent to the analysis boundary is the County Line/Wolf Beetle Timber Sale, which has very little canopy due to a previous a Forest Service and private land timber sale and large scale blowdown event that left roughly 5-10 trees per acre. The County Line/Wolf Timber Sale also harvested around the Flat Mountain Yurt. The private land that sits on the west side of the analysis area boundary was also harvested 15 years ago and left approximately 30-40 trees per acre.

The current viewshed around Trujillo Meadows Campground and Reservoir has changed dramatically in the last 5 years. These RIS sites were identified in the Existing Visual Condition mapping of Level I or II (which is defined as naturally appearing or nearly naturally appearing). This viewshed would still be considered natural appearing however, the large amount of beetle-killed trees have changed the color and texture of this landscape from heavily forested and green to gray with missing overstory canopy. There were no areas mapped as Rehabilitation in the Cumbres analysis area in the Forest Plan.

All of these events have altered the Trujillo Meadows Viewshed and Landscape Character from forested to nearly non-forested and viewers can expect to see timber harvest activities in the remaining viewshed.

Landscape Visibility and Distance Zones - Landscape visibility addresses the relative importance and sensitivity of what is seen and perceived in the landscape. Landscape visibility is affected by a number of factors including: context of viewers, duration of view, degree of discernible detail, and number of viewers. In general, the greater the number of people likely to view a landscape and the longer the duration, the more sensitive the landscape is to modification (USDA Forest Service 1995). The proximity of the viewer to the particular landscape also affects the visibility and sensitivity. Viewing distances for this analysis are: Immediate foreground (0 feet to 300 feet), Foreground (300 feet to one half mile) and Middle-ground (1/2 to 4 miles).

Concern Routes and Areas - Landscapes are viewed to varying degrees from different locations that differ in their importance. Concern Level is used to express the degree of public importance placed on landscapes viewed from travel ways and high use areas (USDA Forest Service 1995). Concern levels are placed on

routes considered to be the primary use travel ways in the analysis area. Areas of Concern include sites where visitors spend time in place and would view the surrounding landscapes. For this project these include:

- NFSR 116, 118, 118C, 118.2;
- Trujillo Meadows Campground;
- Trujillo Meadows Reservoir parking and boat launch areas;
- Neff Mountain and Trujillo Meadow ski yurts (though winter use would conceal signs of activity);
- Continental Divide National Scenic Trail

Scenic Integrity Objectives (SIOs) are set during the Forest Planning process. The following is a list of the SIOs for the Cumbres Analysis area:

- **High**: refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.
- **Moderate**: refers to landscapes where the valued landscape character "appears slightly altered". Noticeable deviations must remain visually subordinate to the landscape character being viewed.
- **Low**: refers to landscapes where the valued landscape character "appears moderately altered". Deviations begin to dominate the valued landscape character being viewed but borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.

The Rio Grande Forest Plan Forest-wide Standards and Guidelines (S&Gs) identify several categories which the SIOs can be changed to the next lower objective. In section III-30 of the Forestwide S&Gs for Scenic Resources, the standard allows for the next lowest SIO to be changed due to "...disturbance such as fire, windthrow, or insect and disease infestations". However, variations in the SIOs may dominate the valued landscape character, but must borrow from the valued attributes such as size, shape, edge effect, and pattern of natural openings and still meet the minimum requirements of the next lower objective chosen.

The proposed harvest units in the Cumbres analysis area are within both mapped SIOs "High" and "Moderate". For areas listed as "High" they would have to meet the next lowest objective of "Moderate" and for the areas identified as "Moderate" they would have to meet the next lowest objective of "Low". The Cumbres Vegetation timber harvest management activities would then have to meet the Moderate and Low landscape objective. The landscape would be expected to appear altered following harvesting activities.

As shown in figure 3-8, proposed harvest units 1, 2, 3, 16, and 20 are in mapped SIOs of "Moderate"; Proposed units 4, 6, 7, 8, and 10 are split between categories "High" and "Moderate"; and proposed units 11, 12, 13, 14, 15, 17, 18, 19, 21, and 22 are all in "High" SIOs.

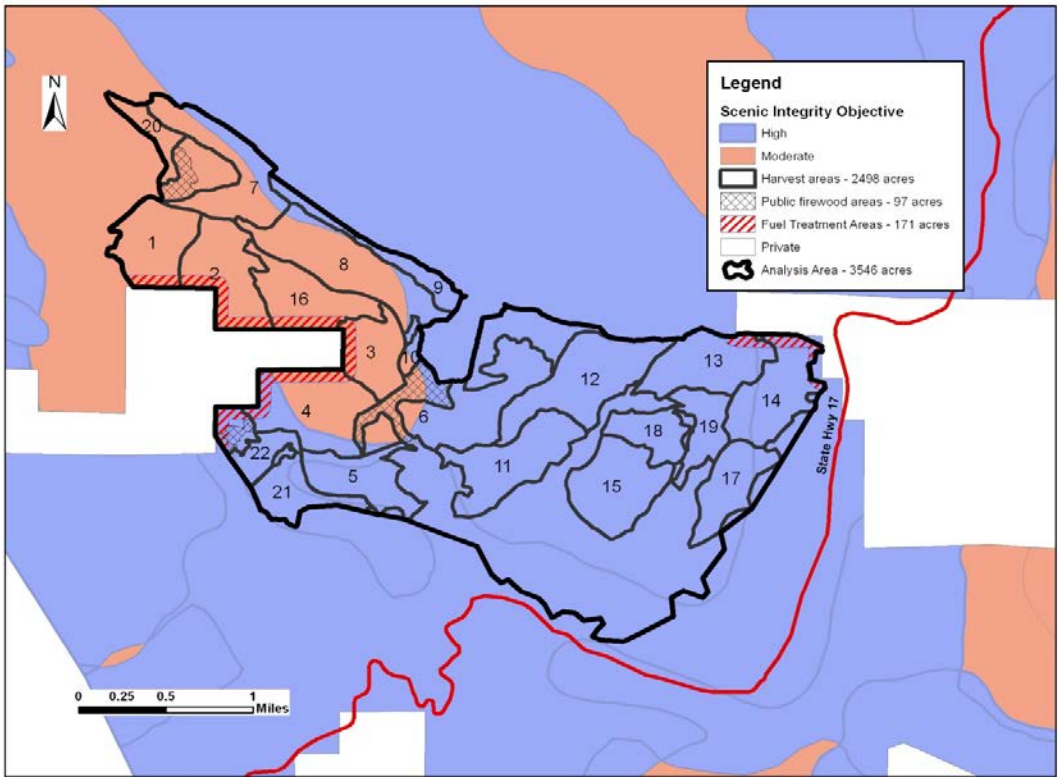

Figure 3-8. Scenic Integrity Objectives (SIOs) in relation to proposed harvest units for alternative 2.

Direct and Indirect Effects

It is important to note that landscape SIOs only apply to human activities on the ground and not natural conditions. Changes to the landscape character from forested to non-forested are considered natural and fall within the range of natural landscape variability.

Alternative 1 – No Action

Under this alternative no salvage harvest or fuel reduction activities would occur. Hazard tree removal (and firewood cutting) along NFSR 118 would likely occur on an ongoing basis. On a larger-scale, no direct effects to scenic resources would result from the No Action alternative, since insect outbreak events are considered part of the overall landscape dynamic. These events would be considered a change in cover type or landscape character. Visitors can expect to see more dead or dying trees dominating the landscape. In distant views, the landscape character would appear intact to slightly altered, depending on the number of dead trees visible. In the immediate foreground and foreground viewing distances, however, the large number of dead trees can often dominate the viewshed and landscape character, negatively affecting the scenic integrity. Firewood cutting and on-going hazard tree removal would likely have some effect on scenic resources adjacent to open roads, especially if firewood cutters leave high stumps that would not be hidden by vegetation.

Although spruce beetle epidemics are a natural landscape process, the increasing amounts of dead and dying spruce would change the quality of the landscape character. Visitor response to these dynamic and changing landscapes may be unfavorable as most visitors are attached to static (unchanging) environment, especially in long-use recreation areas. There would still be texture on the landscape with the standing dead trees; however, trees would begin to turn gray changing the overall color of the viewshed. As the tree canopy opens

up, visitors may be able to see more of the ground cover. Eventually, a portion of these trees would begin to fall, again changing the texture. Seedlings and saplings would provide color and texture on the ground, but the landscape would still look dramatically different than it did a decade ago. During the winter months even more of the ground would be visible in the background viewing distances, as the canopy recedes.

Alternative 2 – Proposed Action

Salvage Harvest Activity- Units not seen from Concern Routes or Areas would have no additional effect on the scenic integrity of the landscape settings experienced by the casual Forest visitor, as management activity would not be evident. Under alternative 2, portions of units 5, 6, 8, 9, 10, 11, and Trujillo Meadows Campground harvest are expected to be seen. Additional other units may be visible as harvesting is completed and potential blowdown takes place. Under this alternative, harvest activity over a larger viewshed would actually blend human activities, so that they look more natural on the landscape. This could help mitigate some of the overall scenic impacts over time.

Visitors could expect to see changes to the surrounding landscape character as trees are harvested, but these activities would not dominate the landscape. Design features are in place to ensure that the units repeat form and line, common to the characteristic landscape. Upon project completion, the size and intensity of the action, along with lack of characteristic color or texture would result in lower scenic integrity than its current condition.

Visitors would notice changes to the landscape, relative to the large number of beetle killed trees with little or no foliage. However, visitors may not notice harvesting activities as much as if harvesting was completed in a green stand of trees. During the winter months, the background becomes more pronounced as snow accentuates the loss of the forest canopy and trees; the snow would cover most of the evidence of harvesting activities in the immediate foreground for winter visitors.

As a result of natural and managed vegetative regeneration, harvested areas would be reforested, which would begin to return the landscape to its characteristic color and texture. Regeneration would allow seen activity effects to become obscured and blend back into the surrounding landscape setting.

It is expected that visitors to the Continental Divide National Scenic Trail (CDNST) may see some activities related to timber harvesting; however, at the closest point, the Cumbres project area is roughly 200 feet from the trail and over a ridge from any direct viewing angles, which would minimize any visual impacts the harvest may have to hikers along the trail.

To further minimize harvesting activities, PDC (chapter 2) would require visible stumps to be cut to heights less than 6 inches within 100 feet of the primary roads to reduce visual impacts.

Road System Activities - Many of the roads used to access harvest units would be unseen from Concern Routes or Areas, but portions of some roads and landings could be visible; these could result a short-term effect on scenic integrity, although vegetation re-establishment would soften and blend any lines over time.

Hazard Tree Removal- Under this alternative hazard trees located adjacent to NFSRs 118 118.1C, other open roads, and recreation infrastructure would be removed as part of salvage harvest activities or cut to protect infrastructure. PDC are in place to ensure that routes or areas of concern maintain their long-term scenic integrity following hazard tree removal.

Fuel Reduction Treatments- Fuel treatments are expected to be small in nature and limited to burn piles. These may be seen from the foreground by visitors, but would not dominate the landscape character.

Designated Firewood Cutting Areas- Under this alternative, two of these areas are adjacent to NFSRs 118/118.1C. The primary effects expected to scenic resources would be additional vehicle tracks going through the stands and the high likelihood that a portion of the cut trees would be left with high stumps, which is not permitted when areas are cut as part of administered contracts. Project Design Criteria (PDC) would include the requirement that these areas be reviewed periodically for the need for Forest crews to re-cut stumps in visible areas within 100 feet of the main roads.

Alternative 3 – Limited Action

The direct and indirect effects of this alternative would be similar to alternative 2, except fewer acres would be harvested. Though the location of some the non-treated areas may have slightly different effects on what could be seen from different viewpoints. Similar to alternative 2, visitors would see evidence of stumps and harvest activities, but these activities would not dominate the landscape character.

The main differences for alternative 3 for scenic resources is the dropping from harvest consideration units 1, 2, 3, 9, and 16, which are either adjacent to identified Concern Routes and Areas described above. Although it is expected potential hazard trees would be removed along roads 118/118.1C (either as part of salvage operations or on an ongoing basis), not harvesting these units would result in less signs of human disturbance with fewer roads and landings being needed. The retention of blocks of dead and dying trees in the immediate foreground (up to 300 feet) or foreground (300 feet up ½ mile) distance could appear more natural appearance in some ways, but could also create more contrast between harvested and unharvested stands. Since treatments implemented across a viewshed often help blend human activities, so that they look more natural on the landscape, this alternative may look less natural.

Cumulative Effects

There is the potential for these proposed harvest activities to actually help rehabilitate the existing landscape. Since some of the past harvesting occurred on private land and near the area of Neff Mountain and upslope of FSR 118, the new harvest activities would have the potential to continue to open the stand canopies and blend the old timber harvests with these new units, making the entire viewshed appear more natural to visitors.

3.17 Heritage

Scope of Analysis

The scope of this analysis focuses on the potential impacts to heritage resources that might be reasonably expected from each alternative. Forest Service policy (FSM 2361.3) requires that all areas slated for ground-disturbing activities, or land which will leave Federal agency control through sale or exchange, be surveyed for heritage resources in order to comply with 36 CFR 800, the National Historic Preservation Act (NHPA) of 1966, as amended. The legal framework also requires that the Forest Service consider heritage resources as they relate to the Archeological Resources Protection Act (ARPA) of 1979 and the American Indian Religious Freedom Act (1979) and the Native American Graves Protection and Repatriation Act (1992). A detailed analysis is documented in a Section 106 National Historic Preservation Act (NHPA) report to be sent to the Colorado State Historic Preservation Office (COSHPO) for consultation (*Draft* Krall and Frye 2012). The report and consultation correspondence will be included in the project record.

The analysis for heritage resources is drawn from a summation of archival records and a Class II (sample) heritage resource inventory conducted within the Area of Potential Effects (APE) in 2011. The APE for this project is defined by those areas identified for salvage activities with high site potential, that have not experienced previous heritage resource surveys, on slopes less than 30 degrees. Because of the large scale nature of the project, a GIS model was also employed in order to define areas of high site potential by considering the variables of slope, proximity to water and vegetation type (*Draft* Frye and Krall 2012). A

Class III inventory was employed on 25 acres within the Trujillo Meadows campground unit. Forest Service archeologists also spot checked portions of the analysis area previously surveyed for heritage resources in the late 1970s. During this effort, Rio Grand National Forest (RGNF) archeologists inventoried a total of 176 new acres for heritage resources within the APE.

Existing Conditions

Cultural Resources - A pre-field literature search indicates that there have been 2,725 acres previously inventoried for heritage resources within the proposed analysis boundary (Draft Frye and Krall 2012). These surveys indicate a very low site density within the forested areas and proposed salvage units. However, some previously recorded sites are located along meadow edges within the analysis area. The previously identified archaeological sites suggest limited prehistoric seasonal exploitation of game resources and prehistoric food processing. Documented prehistoric manifestations predominantly fall within the Late Archaic (2500 BP) and Late Prehistoric (Puebloan 500 BP) eras. Some of the analysis area was subjected logging activities that occurred between the 1920s and 1950s prior to the advent of the National Historic Preservation Act (NHPA) of 1966. As such, it is possible that heritage resources have been previously impacted within the project area, though no direct evidence of past impacts was observed. Livestock grazing has occurred in the region over the past 100 years likely contributing to the cumulative impacts on heritage resources over time.

According to the 2004 revised regulations [36 CFR 800.4(d) (1)] for Section 106 of the *National Historic Preservation Act* (16 U.S.C. 470f) the recommended determination for the proposed action is ***no adverse effect*** if design criteria are followed. Under the implementing regulations of Section 106 of the National Historic Preservation Act (36 CFR 800), sites considered not eligible to the NRHP may be directly affected once adequately recorded, evaluated, and concurrence is received from the State Historic Preservation Office regarding NRHP eligibility. **Project concurrence was received from the COSHPO Office on June 25, 2012.**

***Osha* (*Ligusticum porteri*) -** The analysis area contains a robust population of the unique medicinal plant known as Osha (*Ligusticum porteri*), a plant widely used by Native Americans, Hispanic communities, and increasingly, by the herbal industry (Figure 1). The plant's collection and use has deep cultural connections to local peoples through time, and therefore warrants analysis within the purview of heritage resources.

The plant is in the *Apiaceae* family and grows at higher altitudes, usually above 6,000 feet, often in moist aspen groves but also found in well drained and disturbed areas such as old clear-cuts and burned areas.

During the initiation of Cumbres project it was recognized that the *Osha* plant is plentiful within and surrounding the proposed project area(s). *Osha* is an ethnobotanically important plant and its odiferous roots are currently wild harvested by individuals and herbal product companies for the sale and use in treating a variety of ailments. Some believe the plant is being over-harvested and that climate change may be impacting the plant's traditional range. Initial scoping revealed the concerns from some public that timber salvage could negatively impact *osha* populations. In response to these questions and concerns, the Rio Grande National Forest, in partnership with University of Kansas, launched a multi-year field project in 2011, built on the previous work of Botanical Liaisons LLC (2002-2007), which is included in appendix C.2. The current study design has two objectives:

1) Determine population density in the wider region by creating large polygons around the perimeters of geographically distinguished populations and sampling vegetative cover within. Eight polygons were created around a cumulative area of 507,597 square meters of *osha* populations with an average of 7.8% cover (Kindscher et. al. 2012). Most of the populations appear robust and exist, in many cases,

within previously clearcut areas. Polygons that overlap proposed Cumbres cutting units will be monitored for potential impacts to the plants.

2) Analyze *osha's* density and resistance to harvest by setting up experimental plots in both a Meadow landscape (previously harvested) with high light availability and in a Forested landscape with significant canopy cover. At both sites 40 replicate 30m2 plots were established, data was collected on vegetative cover, and roots were harvested at intensities alternating sequentially between 0%, 33%, 66%, or 100% of mature plants in each plot. The Meadow site had 15% more mature plants and 58% more root mass than the Forested site. From the data it is estimated that a meadow population exhibiting a 10% cover (a dense stand of *osha*) will have on average 52.2 g dried root weight per 1 m2 area (465 lbs/acre), while a forest population exhibiting a 9% cover will have on average 13.7 g dried root weight per 1m2 area (122 lbs/acre) (Kindscher et al 2012). Baseline data were successfully gathered in 2012 and in 2013 post-harvest regrowth data was collected and a report with be generated by 2014. These data will help to determine sustainable rates of harvest and inform conservation measures needed to ensure the long-term viability of this species.

It is hoped that the Forested plots will eventually be a part of a salvage unit in order to gauge the plant's response. Currently, the study plots are signed as a 'research area' to deter public from collecting in that location.

Direct and Indirect Effects

Alternative 1 – No Action

Cultural Resources - Since this alternative includes no additional ground-disturbing activities, the potential for inadvertent discoveries of and damage and destruction to buried cultural deposits and aboriginal human remains would be negligible. This alternative would have no direct effect on significant heritage resources and no mitigation or monitoring activities would be necessary. However, the fuel loading that would occur under the No Action Alternative could result in negative indirect effects to significant historic resources (wooden buildings), if large scale wildfires sweep over the region.

Osha - This alternative would have no direct effects on *Osha*. The canopy will naturally open as a result of the spruce die-off from the beetle epidemic providing more understory habitat for osha recruitment. Under this alternative, fuel loading would increase with the dead and dying trees and fires would have a greater potential to open areas for the plant's expansion.

Alternative 2 – Proposed Action

Cultural Resources - Salvage, fuels reduction treatments (thinning), tree planting, landings and new road construction all have the potential to negatively impact heritage resources. Direct negative effects could include the potential destruction and/or alteration of unidentified heritage resources and contexts within the APE. Activities such as road maintenance and the opening of old roads would not be expected to directly impact heritage resources, if maintenance is relegated to the original road foot print. New temporary road construction has the potential to negatively affect unidentified buried cultural deposits for all the action alternatives. Indirect effects from project activities can include the erosion of buried cultural deposits precipitated by temporary road construction and the removal of trees. Potential indirect effects from vandalism to heritage resources perpetrated by individuals associated with project activities is possible under each action alternative.

While there is potential for direct negative effects to unidentified heritage resources from ground disturbing activities during salvage (2,498 acres), planting (650 acres) new temporary road construction (0.8 miles), landings (22 acres), public firewood cutting (97 acres), and fuels reduction through thinning (171 acres), the

potential for negative direct effects is very low. Much of the area has been previously inventoried for heritage resources revealing a very low site density. Therefore, the potential for negative direct, indirect and cumulative effects to unidentified heritage resources is very low. Potential indirect effects from vandalism to heritage resources perpetrated by individuals associated with project activities is possible under each action alternative is also unlikely due to the low archaeological site density and visibility.

Osha- Timber harvest activities could potentially impact individual *Osha* plants, but potential for direct negative effects to whole populations is low. Undocumented historic collection areas may be negatively impacted in the short term. Potential positive indirect effects may include the expansion of *Osha* populations into disturbed areas where the canopy has been opened.

Alternative 3 – Limited Action

Cultural Resources - The potential of direct, indirect and cumulative effects to unidentified heritage resources from ground disturbing activities during sanitation/salvage (1,549 acres), planting (170 acres) public firewood cutting (73 acres), fuels reduction through thinning (171 acres), landings (15 acres) and new road temporary construction (0.1 miles) is the lowest of the two action alternatives. Because so much of the area has been previously inventoried for heritage resources and because there is a very low site density, the potential for negative direct, indirect and cumulative effects to unidentified heritage resources is low within this limited action alternative.

Osha- Timber harvest activities could potentially impact individual *Osha* plants, but potential for direct negative effects to whole populations is low. Undocumented historic collection areas may be negatively impacted in the short term. Potential positive indirect effects may include the expansion of *Osha* populations into disturbed areas where the canopy has been opened.

Cumulative Effects

The loss of archaeological resources has happened in the past and will happen in the future. The cumulative effect is that over time fewer archaeological resources will be available to learn about past human lifeways, to study changes in human behavior through time, and to interpret the past to the public. Heritage resource inventory, recording, evaluating and archiving basic information about each site for future reference serves to partially mitigate potential cumulative effects to heritage resources. In conjunction with the proposed project, previous logging activities, recreation activities such as hunting, and livestock grazing have the potential to cause ground disturbance and lead to cumulative, long term, irreversible adverse effects to heritage resources. However, because the archaeological site potential appears very low within the analysis, the potential for negative cumulative effects is also low.

3.18 Compliance with Other Relevant Laws, Policy, Direction

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

The relationship between the short-term uses of the environment and the maintenance and enhancement of long term productivity is complex. For this analysis, it was assumed that short term uses were those that

generally occur on a yearly basis (i.e. livestock grazing as a use of the forage resource, timber harvest as a use of the available wood resource, and recreation uses).

Long term refers to longer than 10 years. Productivity refers to the capability of the land to provide market and non-market outputs and values for future generations. Soil and water are the primary factors of productivity and represent the relationship between short term uses and long term productivity.

Both Action Alternatives considered in detail, incorporate sustained yield of resource outputs in varying degrees, while maintaining resource productivity. The Best Management Practices (BMPs), specific Project Design Criteria (PDC) included in the alternatives ensures that long term productivity would not be impaired by the application of short term uses. Therefore, for every alternative, the long term productivity is assured. This conclusion is based on disclosures for each resource in chapter 3 and specific silvicultural findings report in the project file.

Unavoidable Adverse Effects

This section describes adverse effects that are unavoidable with implementation of action alternatives. For further discussion, see the resource topics in chapter 3.

Unavoidable adverse effects are similar for each action alternative evaluated, except alternative 3 proposes activities on fewer acres, so the scope of any adverse effects is less. These include some additional detrimental soil disturbance resulting from logging activities. Some damage to understory trees that are important for dense horizontal cover (DHC) for snowshoe hare, the main prey species for lynx, is also expected. Local air quality would be adversely affected on a temporary/seasonal basis as a result of burning hand or machine piles. Spruce beetles will continue at epidemic levels in the area. Soils can be compacted by the use of ground based logging equipment and soil can erode when vegetative cover is disturbed.

PDC and mitigation measures described in chapter 2 would be used to minimize adverse effects caused by activities. No Action could have adverse economic effects on local timber producers and could also create access problems for people, livestock, and big game. No action would also increase the potential to damage existing infrastructure and create long-term maintenance problems.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road. For further discussion of effects on the resources listed below, see chapter 3 under the resource topics

Irreversible resource commitment applies primarily to the use of nonrenewable resources, such as minerals or Heritage resources, or those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Two types of irreversible resource commitments would occur as a result of implementation of any of the action alternatives:

- **Energy Resources**: Fossil fuels used in processing wood products which would result from an action alternative would be an irreversible loss.
- **Other Resources**: There could be a limited irreversible loss in soil/rock resources used in road reconstruction by use of existing and potential borrow pits.

No other irreversible resource commitments were determined as a result of the implementation of an action alternative.

Irretrievable commitment of resources includes:

- **Vegetation:** Where permanent roads are constructed or reconstructed and the soil displaced, there is an irretrievable loss of the type of vegetation that occurs. For temporary roads, skid trails and landings, vegetation is re-established on the disturbed areas, but the type of vegetation may be changed from timber to grasses and forbs in these areas, at least in the short to mid-term.
- **Scenic condition:** Where trees are harvested there would be an irretrievable loss of an unaltered environment from selected routes or areas of concern in the short term (refer to Scenic section). It is estimated that recovery would begin within five years following harvest and would meet scenic integrity objectives within a maximum 20 to 25 years, depending on the number of remaining live trees and aspen response.
- **Social/Economic**: Where there is no commercial wood fiber recovered, such as No Action, there would be an irretrievable loss in income and employment in the local economy for a short period of time, or, until new sources of supply could be found. Refer to the Social/Economic section for detailed discussions by alternative. To compensate for a lack of supply of timber, firms reach outside their normal market area for sources of supply. This, in turn, drains resources available to other firms, who then must reach outside their market areas, creating a ripple effect.
- **Wildlife habitat:** loss or modification of habitat for some species of wildlife is likely under the action alternatives (see Wildlife section). As vegetation recovers, habitat would eventually return over various periods of time depending on the amount of spruce beetle mortality, stand composition, and alternative implemented.

Other Required Disclosures

Global Climate Change

The Forest Service acknowledges that global climate change is an important emerging concern worldwide. However, there is no established scientific methodology to measure the effects of small-scale projects such as this project on global climate. This analysis briefly addresses global climate change in two ways: 1) effects of climate change on a proposed project; and 2) effects of a proposed project on climate change. Each of these is briefly discussed below relative to this project.

Effects of climate change on a proposed project - The National Environmental Policy Act (NEPA) does not specifically require analysis of how environmental factors, such as global climate change, might impact a proposed action. Any differences in effects of climate change on the project between alternatives (including no action) would be negligible.

Effects of proposed project on climate change - The proposed activities are extremely small in scope and magnitude relative to a planetary scale. Although it may be possible to quantify a project's direct effects on carbon sequestration and greenhouse gas (GHG) emissions, there is no certainty about the actual intensity of individual project indirect effects on global climate change. Cumulative effects would be a consideration of GHG emissions affecting climate from multiple projects over time. But, as GHG emissions are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with any number of particular projects. Nor is it expected that such disclosure would provide a practical or meaningful effects analysis for project decisions. Any differences between alternatives (including no action) would be negligible at a global scale.

Forest Plan Consistency

As disclosed in chapter 1, this EIS is tiered to the Final Environmental Impact Statement for the Rio Grande National Forest Land and Resource Management Plan, as amended (Forest Plan); it documents the analysis in the second level of planning.

As part of the Forest Plan, land has been divided into Management Area Prescriptions (MAPs) which differ from each other in resource emphasis. The MAPs that fall within the Cumbres Project area were fully discussed in chapter 1; spatial location of these MAPs within the project area can be found in figure 1-2, chapter 1 of this EIS.

Disclosures within this EIS and project file resource reports clearly display that implementation of the Action Alternatives, including BMPS, Project Design Criteria (PDC), mitigation, and monitoring measures, are consistent with the Forest Plan standards and guidelines, Desired Conditions (goals) and objectives. Implementation of either action alternative would contribute toward meeting Forest Plan Desired Conditions and objectives for MAPs 5.11 and 5.13, which are part of the suitable timber base.

National Forest Management Act (NFMA)

The Forest Plan was prepared under the 1982 Planning Rule (36 CFR 219, 1982 version) require that NFMA findings be documented at the project level. The action alternatives are fully consistent with vegetation management requirements under the NFMA. For convenience, the discussion below is presented in terms of the 1982 rule.

Compliance with the National Forest Management Act (NFMA) is clearly displayed in resource discussions found within this EIS. A detailed discussion of NFMA requirements can be found in the project record. Because this EIS involves vegetative management treatments, NFMA compliance items covered in 36 CFR 219.27(b) "Vegetative Manipulation", 36 CFR 219.27(c) "Silvicultural Practices", and 36 CFR 219.27(d) "Even-aged Management" are summarized below. Additional

Resource Protection

219.27(a)(1): Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land - Both action alternatives conserve soil and water resources and would not result in permanent impairment of land productivity. Water resources are protected by Best Management Practices including no-harvest buffers and other PDC. Soil resources would be protected by re-using existing skid trails and landings, minimizing additional compaction and erosion, and maintaining coarse woody debris for long term soil productivity. If compaction exceeds standards following harvest, subsoiling or other prescribed mitigation would be implemented within 5 years to reduce compaction, thereby maintaining long-term productivity.

219.27(a)(2): Consistent with the relative resource values involved, minimize serious or long-lasting hazards from flood, wind, wildfire, erosion,… excepted as in wilderness- Action alternatives would be designed to minimize erosion. Hazards from windthrow to infrastructure will be reduced. The risk of wildfire will not be reduced, but the severity of a possible future wildfire could be reduced by the removal of a portion of the fuels in harvested areas prior to a wildfire occurring.

219.27(a)(3): Consistent with the relative resource values involved, prevent or reduce serious, long lasting hazards and damage from pest organisms…in the long-term be ecologically acceptable and compatible with the forest ecosystem and multiple use objectives of the plan**:** Pest-host relationships were evaluated against situation-specific prescriptions; salvage harvest was determined to be an ecologically acceptable treatment and the most compatible with the multiple use objectives for Forest Plan MAPs 5.11 and 5.13

where the Forest Plan placed an emphasis on the protection of commercial timber resources by including the areas in the suitable timber base.

219.27(a)(4): Protect streams, streambanks, shorelines, lakes, wetlands, and other bodies of water - See response under *219.27(a)(1).* All streams and wetlands will be protected from disturbance during harvest activities under both action alternatives.

219.27(a)(5):Provide for and maintain diversity of plant and animal communities to meet overall multiple use objectives.-No Threatened or Endangered plants have been reported on the Forest, nor are there any suspected occurrences. One species of Sensitive plant may be effected by an action alternative, but if the plant occurred, the determination is that individuals may be impacted, but it would not likely result in a loss of viability or cause a trend toward federal listing. Canada lynx and American wolverine are the only P, T, E wildlife species. There would be no effect to wolverine. Based on the consistency of the proposed activities with the Southern Rockies Lynx Amendment, the Forest Service determination is that project activities "may affect, likely to adversely affect" the lynx or its habitat (Biological Assessment, project file).

219.27(a)(6): Provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species…habitat for species chosen to be maintained and improved - Implementation of any alternative is not expected to affect the viability of any wildlife or fisheries population (see Wildlife and Fisheries reports).

219.27(a)(7): Assess prior to project implementation…for potential impacts and consistency with multiple uses planned for the general area - This EIS assess the potential physical, biological, social, aesthetic, cultural, engineering, and economic impacts and consistency with multiple uses planned in the project area.

219.27(a)(8): Include measures for preventing the destruction or adverse modification of critical habitat for T&E species- Project Design Criteria will protect habitat and neither action alternative would result in exceeding the exemptions and exceptions provided for under the SRLA 2008 programmatic Biological Opinion.

219.27(a)(9-11): Transportation and utility corridors; Roads designed to standard of use, re-establish vegetative cover on disturbed areas within a reasonable period. Neither action alternative would result in a change in the existing motorized transportation system currently open to public use. Rehabilitation of disturbed areas is planned for and expected following use.

219.27(a)(12): Be consistent with maintaining air quality at a level that is adequate for the protection and use of National Forest System resources and meets or exceeds applicable Federal, State, and/or local standards or regulations- Based on the discussion in chapter 3-Air Quality, neither action alternative would have measurable effects to local air quality, including visibility or haze in the San Juan Wilderness Area. All air quality standards would continue to exceed Federal standards.

Vegetative Manipulation

219.27 (b)(1): Be best suited to the multiple use goals established for the area with potential environmental, biological, cultural resource, aesthetic, engineering, and economic impacts, as stated in the regional guides and forest plans- In chapter 3, each resource is evaluated as to how each alternative addresses multiple use goals that are inherent in the Forest Plan standards and guides (S&G). As described in these effects discussions, all action alternatives comply with Forest Plan S&G. The Forest Plan S&G are a product of the Regional guides and these S&G's were developed specifically for the Rio Grande National Forest.

219.27 (b)(2): Assure that lands can be adequately restocked as provided in paragraph (c)(3) of this section, except where permanent openings are created for wildlife habitat improvement, vistas, recreation uses and similar practices- No permanent openings are being created under any alternative. In proposed harvest treatment areas, any acres requiring regeneration would be a direct result of bark beetle activity and not directly caused by salvage activity. Best Management Practices, along with past experience in the spruce-fir forest types, provide reasonable assurances they these areas would be successfully regenerated.

219.27 (b)(3): Not be chosen primarily because they will give the greatest dollar return or the greatest output of timber, although these factors will be considered **-** While economics and outputs would be considered in the decision process, other factors related to reducing the impacts of the bark beetle and protection of resources within the project area, as described in chapters 2 and 3, would be the primary focus to determine the best action to implement. The reasons for the decision will be fully described in the Record of Decision.

219.27 (b)(4): ***Be chosen after considering the effects on residual trees and adjacent stands***- Acres proposed for salvage under the action alternatives were those most affected by the bark beetles that are located in harvestable areas. Effects on other stands and residual trees are discussed in chapter 3 under Timber Management and Wildlife and under section 2.3, Design Criteria and Mitigation Common to all Action Alternatives. Actions proposed to be implemented under each action alternative are believed to best meet the project purpose and need, while addressing the issues that drove alternative formulation.

219.27 (b)(5): ***Avoid permanent impairment of site productivity and ensure conservation of soil and water resources*** **-** Best Management Practices (BMPs) incorporated as part of R2 Watershed Conservation Practices and implemented as part of PDC are designed to minimize impacts to site productivity and ensure conservation of soil and water resources. These are discussed in chapter 3 under the Soils and Watershed sections. PDC and Monitoring (sections 2.3 and 2.6) are also included to further protect these resources.

219.27 (b)(6): ***Provide the desired effects on water quantity and quality, wildlife and fish habitat and other resource yields*** **-** The analysis of the action alternatives, show that there would likely be minimal changes to water quantity in any of the affected watersheds. Since the trees being harvested are dead or dying, their removal would not increase water quantity, though the dying of the trees could have some effect on water quantity though existing understory vegetation would likely use any/most of additional available water. Affects to water quality and fish habitat would be negligible due to the implementation of the required BMPs and Project Design Criteria.

219.27 (b)(7): Be practical in terms of transportation and harvesting requirements, and total cost of preparation, logging, and administration **-** The transportation and harvest methods described are capable of being implemented, based on the silvicultural information and transportation plan. Cost effectiveness was considered by planning primarily to use the existing transportation system and focusing the harvest on lands suitable for ground-based logging equipment. Leave tree marking, designation by description, and other cost effectiveness techniques would be used to minimize sale preparation costs. The current economic situation has lowered the expected value of the timber resource, but the cost: benefit analysis does not account for other expected benefits that are not easily quantified (i.e. infrastructure protection, public safety and ease of use of the area, fire fighter safety, and the potential of high severity fire in a high use area).

Silvicultural Practices (1982)

219.27 (c)(1)-No timber harvesting shall occur on lands classified as not suited for timber production pursuant to 219.14 except for salvage sales ... These lands shall continue to be treated for reforestation purposes if necessary to achieve the multiple-use objectives of the plan- Proposed activities are salvage harvest; units proposed for salvage have been evaluated and confirmed as generally suitable. All harvest activities would be in full compliance with management requirements and consistent with the Forest Plan silvicultural systems by Forest Cover Type (Forest Plan pg. III-17).

219.27 (c)(2):The selected sale schedule provides the allowable sale quantity for the first planning period. Within the planning period, the volume of timber to be sold in any one year may exceed the annual allowable sale quantity so long as the total amount does not exceed the allowable sale quantity. Nothing in this paragraph prohibits salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow, or other catastrophe, or which are in imminent danger of insect or disease attack and where such harvests are consistent with silvicultural and environmental standards. Such timber may either substitute for timber that would otherwise be sold under the plan or, if not feasible, be sold over and above the planned volume - Since volume sold under either alternative is salvage; it is not required to be within the Forest Allowable Sale Quantity (ASQ) of 21 MMBF/year. However, this volume would be offered as part of the Forest's regular timber sale program. Sale of any volume proposed under the action alternatives would not result in exceeding the ASQ for the planning period.

219.27 (c)(3): When trees are cut to achieve timber production objectives, the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within 5 years after final harvest. Research and experience shall be the basis for determining whether the harvest and regeneration practices planned can be expected to result in adequate restocking ....- Under both action alternatives, dead and dying bark beetle infested trees would be cut to obtain economic recovery, reduce fuel loads, accelerate reforestation, and protect infrastructure. Due to the amount of advanced regeneration, only in the areas where bark beetle populations have killed substantial numbers of trees would an unstocked opening likely be created, and regeneration activities become necessary. Regeneration in these areas would not be a result of silvicultural treatments aimed at achieving timber production objectives, but are a result of bark beetle mortality.

Though in the harvest treatment sites, the NFMA 5 year requirement does not apply, the agency has made a commitment to ensure that these sites would meet minimum stocking levels within five years of harvest. Past experience and research has indicated that successful reforestation at similar sites is possible.

Monitoring would be used to assess the success of regeneration efforts following project completion. Desired results and forest plan standards would be specifically stated in the detailed silvicultural prescriptions written for each stand. See Timber-Silviculture Report for additional discussion.

219.27 (c)(4): Cultural treatments such as thinning, weeding and other partial cutting may be included in the forest plan where they are intended to increase the rate of growth of remaining trees, favor commercially valuable tree species, favor species age classes which are most valuable for wildlife, or achieve other multiple-use objectives – The only cultural treatments proposed as part of this EIS is to cut conifers less than 8 inches dbh growing into the small aspen clones in the project area. This treatment is to maintain this valuable species on the landscape to meet many resource objectives.

219.27 (c)(5): ***Harvest levels based on intensified management practices shall be decreased no later than the end of each planning period if such practices cannot be completed substantially as planned -*** This management requirement does not apply to this project. Salvage is not an intensified management practice.

219.27(c)(6). Timber harvest cuts designed to regenerate an even-aged stand of timber shall be carried out in a manner consistent with the protection of soil, watershed, fish ...resources, and the regeneration of the timber resource **-** The salvage harvest proposed is not designed to be an even-aged treatment, though the level of mortality in most stands could result in a final removal cut and stands would be in a regeneration stage. As discussed in chapter 3, BMPs and Project Design Criteria (PDC) are designed to protect soil, water, and instream resources. Examples of protection measures include: retention of adequate ground cover, including coarse woody debris; snag retention, harvest restrictions in critical soil and watershed areas; wet condition restrictions; and use of designated skid trails and landings (re-using as many of the skid trails and landings from previous harvests as possible).

219.27 (c)(7): Timber harvest and other silvicultural treatments shall be used to prevent potential damaging population increases of forest pest organisms. Silvicultural treatments shall not be applied where such treatments would make stands susceptible to pest-caused damage levels inconsistent with management objectives **-** The epidemic population levels of spruce beetle in the vicinity of the project area indicate that the majority of mature Engelmann spruce trees are likely to be attacked and die. At this stage of the epidemic, salvage of dead and dying trees will not increase the susceptibility of any residual trees to damage or insect attack (see section 3.2).

219.27 (d): Even-Aged Management (16 USC 1604 (g)(3)(f)) - The National Forest Management Act states that clearcutting is to be used on National Forest System lands only where it is determined to be the optimum method **-** Salvage is the proposed treatment in conifer areas under both action alternatives. Clearcutting is not a proposed treatment. The level of spruce beetle mortality and stand composition would determine the post-harvest condition.

Long term management objectives have not been established for the project area. Based on the SRLA, the goal will be to provide a mosaic of habitat conditions across the landscape. Spruce beetles have killed a large proportion of the overstory, creating a more even-aged condition. All stands would have an option in the future to manage as even or uneven-aged, depending on desired conditions. Managing the future stands to facilitate an uneven-aged distribution would take a longer timeframe.

219.27 (d)(1): Openings shall be located to achieve the desired combination of multiple-use objectives ... Regional Guides shall provide guidance on dispersion of openings As a minimum, openings in forest stands are no longer considered openings once a new forest is established ... Forest plans may set forth variations to this minimum based on site-specific requirements for achieving multiple-use objectives ... Regional guides shall provide guidance for determining variations to this minimum in the forest plan- Refer to the discussion under 219.27 (d)(2), below.

219.27 (d)(2): Individual cut blocks, patches, or strips shall conform to the maximum size limits for areas to be cut in one harvest operation established by the regional guide ... This limit may be less than, but will not exceed, ... 40 acres for all other forest types except as provided in paragraphs (d)(2)(i) through (iii) of this section. (i) - Cut openings larger than those specified may be permitted where larger units will produce a more desirable combination of net public benefits ... (ii) - Size limits exceeding those established in paragraphs (d)(2) and (d)(2)(i) of this section are permitted on an individual timber sale basis after 60 days' notice and review by the Regional Forester ... (iii)- The established limit shall not apply to the size of areas harvested as a result of natural uncharacteristic condition such as fire, insect and disease attack, or windstorm - There are no live tree timber harvest treatments proposed under this EIS. All commercial treatments are to salvage dead and dying spruce, so opening size limitations are not applicable.

219.27 (e)- Riparian Areas – All action alternatives include the incorporation of Forest Plan Standards and Guidelines, BMPs, and Project Design Criteria to protect riparian areas in the project area.

219.27 (f) - Soil and Water Conservation – Conservation of soil and water resources is the basis of all action alternatives. Project Design Criteria are included to minimize additional ground disturbance. Re-use of old landings, skid trails, and old non-system roads are part of the design of all action alternatives. New temporary roads would be minimized to the extent possible by requiring longer skid distances, as feasible. The Forest Plan standard to limit detrimentally disturbed soils to a maximum of 15% of any unit (Forest Plan III-10, #1) would be met under all action alternatives following harvest activities. Subsoiling or other mitigation of detrimentally disturbed areas such as landings, temporary roads, or skid trails in units that have been determined to have >12 percent detrimental disturbance would follow sale completion.

Clean Water Act

The Clean Water Act (CWA) requires each state to implement its own water quality standards. Designated uses include agriculture, domestic water source, recreation primary contact, and aquatic life cold water. Status is listed as good for all designations, except aquatic life which has not been assessed. The Beneficial Uses and good quality of water in the streams in the project area would be maintained during and following project implementation through the proper implementation of BMPs and Project Design Criteria(PDC), chapter 2.

Clean Air Act

Based on discussions in chapter 3 concerning Air Quality, it has been determined that there would be no measurable effects to air quality in class I or II airsheds relative to any of the alternatives. Dust from harvest activities and smoke from pile burning would be short-term and temporary. Dust abatement would be used on the main travel route during dry periods. Burning would also be conducted only as approved by the State of Colorado. This project would fully comply with the Clean Air Act.

Executive Order 11990

This order requires the Forest Service to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In compliance with this order, Forest Service direction requires that an analysis be completed to determine whether adverse impacts would result.

Both action alternatives would be compliance with this E.O since no ground disturbing activities would occur within 100 feet of any wetland, seep, or spring. These areas have been or would be identified prior to implementation. Impacts from adjacent or nearby areas will be prevented through implementation of PDC.

Endangered Species Act

Based on discussions in chapter 3 concerning threatened, endangered, and proposed wildlife species and analysis contained in the Biological Assessment located in the project file, it has been determined that the effects of the action alternatives would be in compliance with the 2008 Southern Rockies Lynx Amendment, but still "*may affect, likely to adversely affect*" Canada lynx due largely to the compounding factor of the loss of food for red squirrels, an important secondary lynx prey, resulting from ongoing spruce beetle activity. Habitat would remain suitable for wolverine under all alternatives.

The Biological Evaluations for plants and wildlife, located in the project record, also determined that the project alternatives would not adversely impact any Regional Sensitive species to any extent that would cause a trend toward federal listing.

Roadless Area Conservation

Both action alternatives comply with the current Forest Plan Inventoried Roadless Areas and Colorado Roadless Rule management direction, since there would be no management activities proposed in a designated roadless area.

Executive Order 12898 - Environmental Justice Act

Executive Order 12898 directs Federal agencies to focus attention on human health and environmental conditions in minority and low income communities. The purpose of the executive order is to identify and address, as appropriate, disproportionately high adverse human health or environmental effects on minority and low income populations. Table 3-23 summarizes population and household income data for Conejos and Rio Arriba counties.

Table 3-23. Population information, Conejos (CO) and Rio Arriba (NM) counties.

County	Acres by Ownership[a]		Population Information		Median Household Income (2006-2010)	% Below Poverty (2006-2010 income)
	Public[e]	**Private**				
Conejos	545,261	280,892	**Total**	**8,256**	$33,627	17.7%[b]
			%White	41.8		
			%Hispanic/ Latino	56.0		
			%American Indian	2.2		
			% Other Races	<1		
Rio Arriba	1,471,635	2,301,789[d]	**Total**	**41,190**	$41,437	19.7%[c]
			%White	12.8		
			%Hispanic/ Latino	71.3		
			%American Indian	16.0		
			% Other Races	<1		

[a] (EPS-HDT 2011b); [b](U.S. Census Bureau 2011c); [c](U.S. Census Bureau 2011d);[d] Private and Tribal lands; [e] Includes Forest Service, BLM, and State. http://quickfacts.census.gov/qfd/states/

Based on the information available, neither county would be considered low income, but both counties would have a minority population, as defined by Executive Order 12898 (CEQ 1997, Romero et al. 2001).

There is no evidence to suggest during scoping or public involvement process that the proposed action or any of the alternatives would have a disproportionate adverse effect on low-income or minority populations.

Based on information provided in this section and the Air Quality section, no adverse impacts are expected on any populations. No concerns have been identified by minority populations.

The action alternatives would provide more potential for economic benefit and diversity that could benefit local populations in a variety of ways. Though the No Action alternative may not provide direct or indirect benefits, it would be unlikely to cause measurable harm either.

Cumulatively, the addition commercial forest products and firewood that would be made available to area residents from salvaging dead and dying trees on suitable timber lands from the Cumbres project would continue to provide economic opportunities to area residents.

Plans and Policies of Other Jurisdictions

As evidenced from responses to scoping, and other public involvement solicitations, no conflicts have been identified between the objectives of other Federal, State, and local governments and Indian tribes, with the action alternatives, nor have any been identified relative to No Action.

CHAPTER 4. List of Preparers, Contributors, Notice of Availability Contacts

4.1 IDT Members

Table 4-1. Interdisciplinary Team Members

Core IDT Members	Education	Years Professional Experience	Position Title/ *IDT Role*
Diana McGinn	BS Range-Forest Management; BS Wildlife Biology, Colo. State Univ.	27	Natural Resource Planner *IDT Leader*
Michael Tooley	BS Forestry, Oklahoma State Univ.	16	Supervisory Forester *Forest Health & Timber Management*
Chris Boone	BS Wildlife Biology, Adams State College.	10	Acting Wildlife Biologist *Wildlife*
Vaughn Thacker	MS Soil Fertility & Plant Nutrition & Ag System Technology, Utah State Univ. BS Environmental Soil & Water Science, Utah State Univ.	8	Soil Scientist *Soils / Air Quality*
Sid Hall	Technical Fuels Management Applied Science-Animal Health, Adams State College	13	Prescribed Fire & Fuels Specialist *Fire & Fuels*
Negussie Tedula	BSc Agro-Engineering, Alemaya Univ. MS Soil & Water Engineering, Natl. Univ. of Ireland PhD Hydrology, Univ. of Georgia	10	Hydrologist *Hydrology, Watershed, Aquatics*
Supporting IDT Members			
Amanda Walker	BS Conservation Science, Musknigum Univ.	12	Recreation Management *Recreation & Travel Management*
Kelly Ortiz	BA Literature, Syracuse Univ. MLA Landscape Architecture, State Univ. N.Y.	19	Landscape Architect/ *Scenic Resources*
Dean Erhard	-BS Forestry, University of Mont. -MS Rangeland Resources, Oregon State Univ.	27	Ecologist (retired) *TES Plants*
Gary Frink	BS Geology, Adams State College	28	Engineer/ Transportation planner *Transportation*
Luciano Sandoval	BS Biology, Adams State College	11	Rangeland Management Technician *Rangeland & Weeds*
Angie Krall	-BA Anthropology Colorado College -MA Applied Anthropology, Northern Arizona University	21	Archeologist *Heritage*
Barry Wiley	-MS Wildlife Biology, Southwest State Texas Univ.- BS Wildlife Management, Southwest State Texas Univ.	18	Fisheries Biologist F*isheries*
Kevin Duda	MS Forestry, Colo. State Univ. BS Forestry, Colo. State Univ.	6	Forester *Social/Economics*
Milo Medina	BS Wildlife Biology, Adams State University	3	*Forester* *GIS*

4.2 Federal, State, and Local Agencies Consulted

The Forest Service consulted the following Federal, State, and local agencies and groups, Tribes, and non-Forest Service persons during the development of this document.

Table 4-2. Agencies and Tribes Consulted[1]
Colorado Parks and Wildlife
Environmental Protection Agency
US Fish and Wildlife Service
Colorado State Historic Preservation Office
Conejos County Commissioners
Ute Tribe of the Uintah & Ouray Reservation
Navajo Nation
Pueblo of Santa Ana
Taos Pueblo
Pueblo of Nambe
Ohkay Owingeh
Hopi Tribe
Santa Clara Pueblo
San Ildefonso Pueblo
Jicarilla Apache Tribe
Santa Domingo Pueblo
Pueblo de Cochiti
Southern Ute Indian Tribe
Ute Mountain Ute Tribe
[1] *Also received a DEIS notification letter*

4.3 Distribution of the Final Environmental Impact Statement

Notification of the availability of the final environmental impact statement and draft ROD has been sent to the following individuals, organizations, and Federal agencies.

Table 4-3. FEIS Notice of Availability Contacts

Contact	Format	Contact	Format
Dick Artley	letter	Office of Honorable Mark Udall	CD, letter
Joanie Berde	letter, hardcopy	Office of Honorable Michael Bennet	CD, letter
Rocky Smith	letter	Office of Honorable Scott Tipton	CD, letter
Wild Earth Guardians	letter	Office of Honorable Larry Crowder	CD, letter
Raymond Johnson	letter	Office of Honorable Edward Vigil	CD, letter
Director of Renewable Resources, Rocky Mountain Regional Office	letter		
Conejos County Commissioners	letter	Antonito Chamber of Commerce	letter
Chama City Hall	letter		
Acquisitions & Serials Branch, National Agricultural Library	CD, letter	Regional Director, Northwest Mountain Region, Federal Aviation Administration	letter
Chief of Naval Operations (N45), Energy and Environmental Readiness Division	letter	U.S. Army Corps of Engineers, Northwestern Division	letter
Deputy Director APHIS PPD/EAD	letter	U.S. Army Corps of Engineers, South Pacific Division CESPD-CMP	letter
Director OEPC	letter	U.S. Coast Guard, Environmental Impact Branch G-MEP	letter
Director, NEPA Policy & Compliance, DOE	letter	U.S. Fish & Wildlife Service, Kurt Broderdorft	letter
Director, Planning and Review, Advisory Council on Historic Preservation	letter	U.S. Environmental Protection Agency, Region 8	letter, Hardcopy, CDs
Federal Highways, Colorado HDA-CO	letter	U.S. Department of Interior, Office of Environmental Compliance	letter
Libraries - Documents Processor, Colorado State University	Hardcopy		
National Environmental Coordinator, NRCS	letter		

4.4 Distribution of the Draft Environmental Impact Statement

Notification of the availability of the draft environmental impact statement has been sent to the following individuals, Federal agencies, federally recognized tribes (see above), State and local governments, elected officials, and organizations representing a wide range of views.

Table 4-4. DEIS Notice of Availability Contacts

Contact	Format	Contact	Format
Adam Moore, Colorado State Forest Service	letter	Leonard Canto	letter
Alpine Lumber & Log Home Co.	letter	Leroy & Michelle Salazar	letter
Alfred Redwine	letter	Linette Perona	letter
Antonito Chamber of Commerce	letter	Mack Sowards	letter
Arthur Trujillo	letter	Mark Pearson, San Juan Citizens Alliance	letter
Andrew Hurd, Hurd Brothers Logging	letter	Mary Ann Deboer, Cumbres Nordic Adventure	letter
Anthony Moore, Independent Log Company	letter	Mary Romano, Sierra Club	letter
Alvin Freibert	letter	Matt Norton	letter
Arlyn & Cynthia Sowards	letter	McKown & McKown Limited Liability	letter
Bill Manning, Colorado Trail Foundation	letter	Melody Holland	letter
Blake Sowards	letter	Miguel Lujan, Conejos City Administrator	letter
Brian Ferebee, Director Renewable Resources, Rocky Mountain Regional Office	letter	Michael Rue	letter
Brent Woodward, Colorado Parks and Wildlife	letter	Mike Rupert	letter
Brett Shawcroft, SLV Cattlemen's Association	letter	Monte Vista Chamber of Commerce	letter
Brian Rue, Rue Logging, Inc	letter	Nancy Fishering, Colorado Timber Industry	letter
Bryan Bird, WildEarth Guardians[1]	letter	Nature Conservancy	letter
Cathy Bear, Chama Valley Outdoor Club	letter	Paul Sowards	letter
Carlyn Sowards	letter	Pete Deherrera	letter
Charles McDonald, US Fish & WL Service	letter	Raymond Johnson, Rincones Ranch	letter
Chama City Hall	letter	Randy Keys, Cottonwood Meadows Guide Service	letter
Conejos Water Conservation District	letter	Richard Doyon, Rocky Mountain Timber Products, Inc	letter
Conejos County Land Use Administrator	letter	Rick Basagoitia, Colorado Parks & Wildlife	letter
Conejos County Commissioners	letter	Richie McDaniel	letter
Continental Divide Trail Alliance[1]	letter		
Cumbres Nordic Adventure	letter	Rocky Smith,	letter
Conejos Ranch Outfitters	letter	Rodney King	letter
Diana Alcala	letter	Ron Pleasant, Pleasant Logging & Milling Inc.	letter
Dick Artley	letter	Kolish Lumber Inc.	letter

Table 4-4. DEIS Notice of Availability Contacts

Contact	Format	Contact	Format
Divide Timber	letter	Kurt Broderdorft, US .Fish & Wildlife Service	letter
Depps Transportation & Houselogs[1]	letter	Larry Sowards	letter
Dennis Moeller, La Manga Livestock Association	letter	Lester Bagwell	letter
Dorothy Sowards	letter	*Ryan Bidwell*[1]	letter
Doug MacLennan, Southwest Nordic Center	letter	Sam Satterwhite, DBA Satterwhite Log Homes	letter
Dwaine Rue	letter	Scenic Canyons Recreational Services	letter
Ethan Kaufman	letter	Steve Sutherland	letter
Ecological Services, US Fish & Wildlife Services	letter	Steven L. Russell	letter
Elwin & Lena Sowards[1]	letter	*Stimpson Lumber Co*[1]*.*	letter
Estate of Thomas & Deanna Cater	letter	Tanner Bagwell	letter
Fred Speechly	letter	Tehri Parker, Rocky Mountain Wild	letter
Garth Sowards	letter	Ted Krings	letter
Greg Sowards	letter	Todd Enterprises, Inc.	letter
General Manager, Cumbres Toltec Railroad	letter	Tom Troxel, Intermountain Forest Industry Association	letter
Gilbert Duran	letter	Thomas Elnora	letter
Greg Oryking	letter	Thomas Zimmerman[1]	letter
Harry Landers, Wild Horse Outfitters	letter	Tracy Miller, NRCS	letter
International Mountain Biking Association	letter	U.S. Environmental Protection Agency, EIS filing section	letter, CDs
James Wolf, Director Continental Divide Trail Society	letter	U.S. Environmental Protection Agency, Region 8	letter, CDs
Jacob Smith, Center for Native Ecosystems	letter	William Joe & Roberta Kostka	letter
Jason Miller	letter	Veronica Eagan, Great Old Broads for Wilderness	letter
Jessica & Jeffery Egnew	letter	William H. Moore	letter
Jim Braiden, Braiden Cattle Co.	letter	Steve Sutherland	letter
Joanie Berde, Carson Forest Watch	Letter, hardcopy	SLV Ecosystem Council	letter
Joan Nemyers	letter	Steve Sutherland	letter
Joanna Skinner	letter	Steven L. Russell	letter
John Baxter, Mountain Valley Lumber	letter		
John Robins	letter		
J. Wenum, Colorado Parks & Wildlife	letter		
Jon Harp, Conejos River Anglers	letter		
Josephine Trujillo	letter		
Kathleen Ivie	letter		
Kelly & David McGinnis	letter		
Kenneth Freibert	letter		

Table 4-4. DEIS Notice of Availability Contacts

Contact	Format	Contact	Format
		Office of Honorable Larry Crowder	CD, letter
Office of Honorable Mark Udall	CD, letter	Office of Honorable Edward Vigil	CD, letter
Office of Honorable Michael Bennet	CD, letter		
Office of Honorable Scott Tipton	CD, letter		
		U.S. Army Corps of Engineers, South Pacific Division CESPD-CMP	letter
Acquisitions & Serials Branch, National Agricultural Library	CD, letter	U.S. Coast Guard, Environmental Impact Branch G-MEP	letter
Chief of Naval Operations (N45), Energy and Environmental Readiness Division	letter	National Environmental Coordinator, NRCS	letter
Deputy Director APHIS PPD/EAD	letter	Regional Director, Northwest Mountain Region, Federal Aviation Administration	letter
Director OEPC	letter	U.S. Army Corps of Engineers, Northwestern Division	letter
Director, NEPA Policy & Compliance, DOE	letter	U.S. Army Corps of Engineers, South Pacific Division CESPD-CMP	letter
Director, Planning and Review, Advisory Council on Historic Preservation	letter	U.S. Army Corps of Engineers, South Pacific Division CESPD-CMP	letter
Federal Highways, Colorado HDA-CO	letter	U.S. Coast Guard, Environmental Impact Branch G-MEP	letter
Libraries - Documents Processor, Colorado State University	Hardcopy		
National Environmental Coordinator, NRCS	letter		
Regional Director, Northwest Mountain Region, Federal Aviation Administration	letter		
U.S. Army Corps of Engineers, Northwestern Division			letter
**Letter returned*			

APPENDICES

APPENDIX A

A.1- Commonly used terms and definitions

Term	Definition
Artificial Regeneration	A group or stand of young trees created by direct seeding or by planting seedlings or cuttings
Basal area (BA)	Cross-sectional area, in square feet, of a tree measured at dbh, diameter at breast height (4.5 feet above ground).
Board Foot (BF)	Measure of an amount of timber equivalent to a piece of lumber 12 inch by 12 inch by 1 inch.
Coarse Woody Debris (CWD):	Woody materials greater than 3 inches in diameter.
Commercial Forest Products	Sawlogs, small roundwood, biomass, and other forest products removed in the process of harvesting or cutting trees from NFS lands.
Cover Type	A taxonomic unit of vegetation classification referencing existing vegetation. Cover type is a broad taxon based on existing plant species that dominate, usually within the tallest layer.
Desired Conditions	A set of ideal conditions established for a Management Area Prescription within the Forest Plan. These conditions are the goals for the Management Area and the intended end results for all actions taken within it. Desired Conditions for each specific Management Area Prescription are outlined in Chapter IV of the Revised Land and Resource Management Plan of the Rio Grande National Forest.
Endangered plant:	A plant that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
Even-aged management	The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested.
Existing Scenic Integrity	Represents the status of the landscape and the degree to which it has been altered. This is a baseline measurement for Scenic Resources. The following is a list of the Scenic Integrity Levels: • **Type I** (Natural Appearing Landscapes)-areas in which on ecological change has taken place except for trails needed for access. They appear untouched by human activities. This included wilderness and primitive areas. • **Type II** (Slightly Altered Appearing Landscapes)-areas where some human activity has occurred. Usually these areas can be described as near natural appearing or slightly altered. • **Type III** (Altered Appearing)-areas where human modification has occurred and is obvious. Usually these areas are described as altered.
Fine Slash	Branches, leaves and limbs less than 3 inches diameter.
Fire Behavior	The manner in which a fire reacts to the variables of fuel, weather, and topography
Fuel Break	A wide strip or block of land on which the fuels have been modified so that fire burning into it can be more readily contained.
Fire Intensity	The rate of energy or heat release per unit time, per unit length of fire front, regardless of its depth.
Fuel Loading	The amount of fuel on site expressed in Tons per Acre.
Fuel Profile	The representation of various fuel characteristics (size class, loading, volatility, density, etc.) in terms of vertical and horizontal arrangement, amount, and continuity.
Fire Regimes	The nature of fires occurring over extended period of time. Fire Regimes reflect the fire environment, and influence the type and abundance of fuel, thereby affecting fire behavior and fire effects through time.
Fire Severity	A qualitative indicator of the effects of fire on an ecosystem, whether it affects the forest floor, canopy, or some other part of the system.
Fuels	Available vegetation, both live and dead that is capable of combustion and can contribute to fire spread.
Group Selection Harvest	An uneven-aged harvest system in which trees are removed and new age classes are established in small groups, rather than evenly-spaced individual trees. Natural regeneration is thereby established in pockets, but still under the protection of a partial forest canopy.
Heritage Resources	Are sites, features, and values having scientific, historical, educational, and/or cultural significance. They include concentrations of artifacts, structures, landscapes, or settings of for prehistoric or historic events.
Heritage Resource Inventory	A systematic on-the-ground search designed to identify the locations of heritage resources. Heritage resources identified in such inventories are recorded on State of Colorado cultural resource site forms which includes determination of the significance of individual sites.
Historical Range of Variability	A method to understand the dynamic nature of ecosystems; the processes that sustain and change ecosystems; the current state of the ecosystem in relationship to the past; and the possible ranges of

Term	Definition
	conditions that are feasible to maintain.
Indicator	A measurement of a resource quantity or quality, which is linked to a cause-and-effect relationship and responsive to a key issue. Indicators are used to compare the effects among alternatives, and are most generally quantitative, rather than qualitative, in measure.
Intermediate Shelterwood Harvest	One intermediate step of the shelterwood harvest system in which the canopy cover is opened up through the removal of mature trees to promote natural regeneration and stand vigor. This step is prior to final harvest.
Key Issue	A concern expressed over the potential effects of a proposed action on the human environment, due to the geographic extent, duration, or intensity of interest or resource conflict. Key issues are used to develop and compare alternatives, prescribe mitigation measures, and analyze the environmental effects. For an issue to be considered Key, it must be relevant to the specific project and appropriately addressed at that level
Ladder Fuels	Intermediate height fuels
Landtype Association	An ecological mapping unit based on similarities in geology, soils, and plant associations. Repeatable patterns of soil complexes and plant communities are useful in delineating map units. LTAs are an appropriate ecological unit to use in Forest- or area-wide planning and watershed analysis. On the RGNF, soil mapping units were aggregated into 13 distinct LTAs.
Long-Butt	A section cut from the bottom log of a tree and culled because of rot or other defect.
Natural Regeneration	The establishment of a plant or a plant age class from natural seeding, sprouting, suckering, or layering.
National Forest System road ~	A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county or other local public road authority.
Non-system Road	Also termed “Unclassified Roads.” Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, 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).
Noxious Weeds	A plant specified by law as being especially undesirable, troublesome, and difficult to control.
Operational maintenance level	The maintenance level currently assigned to a road considering today’s needs, road condition, budget constraints, and environmental concerns. It defines the level to which the road is currently being maintained (FSH 7709.59, 62.3). **Maintenance levels** ~ Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria. **Level 1.** Closed roads that have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. These roads are not shown on motor vehicle use maps. **Level 2.** Roads open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic is normally minor. **Level 3.** Maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations.
Prescribed fire	Planned ignitions, implemented in accordance with approved burn plans, that are designed to meet specific objectives.
Preparatory cut	An optional type of cut that enhances conditions for seed production and establishment applied under the shelterwood regeneration methods.
Reforestation	The re-establishment of forest cover, either naturally or artificially. This process usually maintains the same forest type and is done promptly after the previous stand or forest was removed.
Regeneration method	Cutting procedure by which a new age class is created. The major methods are clearcutting, seed-tree, shelterwood, selection, and coppice. Regeneration methods are grouped into: coppice, even-aged, two-aged, and uneven-aged.
Road decommissioning	Activities that result in the stabilization and restoration of unneeded roads to a more natural state." (36 CFR 212.1, FSM 7705- Transportation System) The Forest Service Manual (7712.11- Exhibit 01) identifies five levels of treatments for road decommissioning which can achieve the intent of the definition. These include the following: 1) Block entrance; 2) Revegetation and waterbarring; 3) Remove fills and culverts; 4) Establish drainageways and remove unstable road shoulders; 5) Full obliteration recontouring and restoring natural slopes.
Equivalent Road Disturbance	During Forest planning, Disturbance Area Factors (DAF) or values were established for different types of surface disturbances that may occur in watersheds (i.e. road building, livestock grazing, clearcuts, partial timber harvests, pipelines, railroads, impoundments, etc.) in order to evaluated the percent disturbance for each watershed. Each type of disturbance was given a relational DAF value that compared the disturbance to roads, generating

Term	Definition
	an “equivalent road disturbance” factor. Since roads were considered the most impacting disturbance due to the elimination of vegetation and compaction they were given a DAF of 1.0 along with other similar impact disturbances such as ditches, railroads, milling sites, impoundment, etc. Clearcuts were given a factor of 0.3 and partial timber harvests were given a factor of 0.19. When all disturbance acreage is multiplied by the appropriate DAF and added together to give a total road equivalent disturbance acreage for each watershed.
Road Maintenance	The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (FSM 7712.3).
Road Construction (New)	Activity that results in the addition of forest classified or temporary road miles (36 CFR 212.1).
Road Reconstruction	Activity that results in improvement or realignment of an existing classified road a) **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. b) **Road Realignment**. Activity that results in a new location of an existing road, or portions of an existing road, and treatment of the old roadway (36 CFR 212.1).
Road Spot Reconstruction	Road reconstruction activities on very short sections of road. Generally involve activities such as culvert replacement and surface rock replacement
Salvage	Removal of dead trees or trees being damaged or dying due to injurious agents other than competition, to recover value that would otherwise be lost.
Sanitation	Removal of trees to improve stand health by stopping or reducing actual or anticipated spread of insects and disease.
Seral	The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession.
Shelterwood Harvest	The removal of a stand in a series of usually three cuts over a period of time. Regeneration of the new stand occurs under the cover of a partial forest canopy. A final harvest cut removes the shelterwood and permits the new stand to develop in the open as an even-aged stand.
Silvicultural system	A planned series of treatments for tending, harvesting, and re-establishing a stand. The system name is based on the number of age classes (i.e. even-aged, two-aged, uneven-aged) or regeneration method (i.e. clearcutting, seed tree, shelterwood) used.
Soil Compaction	Soil that has a 15% increase in bulk density over natural undisturbed conditions.
Soil Erosion Hazard	A rating of a soils potential to erode.
Stand	A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities and so form a silvicultural or management entity.
Stand Initiation Structural Stage	Vegetation stage that develops after a stand-replacing disturbance by fire, insects, or regeneration timber harvest. A new single-story layer of shrubs, tree seedlings, and saplings develop and occupy the site.
Stocking	The degree to which trees occupy the land, measured by basal area or number of trees by size and spacing, compared with a stocking standard such as the basal area or number of trees required for full utilization of the land’s growth potential
Structure Class	A classification of forested cover types which aggregates Habitat Structural Stage into broader categories.
Succession	The process of vegetative and ecological development whereby an area becomes successively occupied by different plant communities.
System Roads	Also termed “Classified Roads.” Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service (36 CFR 212.1).
Temporary Road	A road necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or a forest trail and that is not included in a forest transportation atlas..
Threatened plant	A plant that is in danger of extinction throughout all or a significant portion of its range.
Uneven-aged stand	A stand of trees of three or more distinct age classes, either intimately mixed or in groups.
Trap Tree	A log or tree felled or treated in a manner to invite insect infestation, particularly bark beetles.
Water Influence Zone (WIZ)	The land next to water bodies where vegetation plays a major role in sustaining long-term integrity of aquatic systems. It includes the geomorphic floodplain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is 100 feet or the mean height of the mature dominant vegetation, whichever is most.
Wildfire	A fire that burns uncontrollably in a natural setting (e.g., a forest, or grassland).

A.2. Common Acronyms

AOI – Annual Operating Instructions

AMP – Allotment Management Plan

BA – Basal Area

BF- Board Foot

BMPs – Best Management Practices

CCF – Hundreds of Cubic Feet

CEQ – Council on Environmental Quality

CWD- Course woody debris

CWPP – Community Wildfire Protection Plan

DBH – Diameter at Breast Height

DSD – Detrimental Soil Disturbance

DN – Decision Notice

EA – Environmental Assessment

EIS – Environmental Impact Statement

DAU – Data Analysis Unit

DEIS – Draft Environmental Impact Statement

DHC – Dense Horizontal Cover

FAR –Functioning at Risk

FEIS – Final Environmental Impact Statement

FSH – Forest Service Handbook

FSDMP – Forest Soil Disturbance Monitoring

FSR – Forest System Road

FVS – Forest Vegetation Simulator

HRV – Historical Range of Variability

HUC – Hydrologic Unit Code

IDT – Interdisciplinary Team

IRA – Inventoried Roadless Area

LTA – Landtype Association

LAU – Lynx Analysis Unit

MAP – Management Area Prescription

MBF – Thousand Board Feet

MIS – Management Indicator Species

MMBF – Million Board Feet

NEPA – National Environmental Policy Act

NFMA – National Forest Management Act

NFSR – National Forest System Road

PDC – Project Design Criteria

PFC – Properly Functioning Condition

RGNF – Rio Grande National Forest

ROD – Record of Decision

ROS – Recreation Opportunity Spectrum

RNA – Research Natural Area

SISS –Stand Initiation Structural Stage

SRI - Soil Resource Inventory

SRLA – Southern Rockies Lynx Amendment

TES – Threatened or Endangered Species

WIZ – Water Influence Zone

WUI – Wildland Urban Interface

APPENDIX B

B.1 References Cited

Anderson, P.G. 1996. Sediment generation from forestry operations and associated effects on aquatic ecosystems. Proceeding of the Forest-Fish Conference: Land Management Practices Affecting Aquatic Ecosystems, May 1-4, 1996. Calgary, Alberta. 23 p.

Beidleman, C. 2000 (facilitator). Partners in Flight Land Bird Conservation Plan. Version 1.0. 320 pp.

Boon, S. 2008. Impact of Mountain Pine Beetle Infestation and Salvage Harvesting on Seasonal Snow Melt and Runoff Mountain Pine Beetle, Working Paper 2008-24, Natural Resources Canada, Canadian Forest Service Pacific Forestry Centre, Victoria, BC.

Bostwick, P., J. Menakis, T. Sexton. 2011. P. Keller [Tech writer]. How fuel treatments saved homes from the 2011 Wallow Fire. Apache-Sitgreaves National Forest. 14p.

Buskirk, S.W., J.L. Zahratka. 2002. Progress Report – Ecology of Snowshoe Hares in Colorado. Department of Zoology and Physiology, University of Wyoming. 15 pp.

Carlson, Joan. 2008. Potential Risks and Impacts to Soil and Water Resources from Mountain Pine Beetle Mortality, Treatments and Wildfire in Colorado and Wyoming National Forests. USDA Forest Service, Rocky Mountain Region. 40 pp.

Cederholm, C.J., L. M. Reid, E.O. Salo. 1980. Cumulative effects of logging road sediment on Salmonid populations in the Clearwater River, Jefferson County, Washington. Presented to the Conference Salmon-spawning Gravel: a renewable resource in the Pacific Northwest? Seattle, WA. Oct 6-7, 1980. 41 pgs.

Cohen, J. D. 2000. Preventing disaster, home ignitability in the wildland-urban interface. Journal of Forestry 98(3): 15-21

Colorado Air Quality Control Commission: Report to the Public 2012-2013 Available online at: http://www.cdphe.state.co.us/ap/down/RTTP10-11Web.pdf

Colorado Dept. of Public Health 2011: VIEWs website available online at: http://views.cira.colostate.edu/web/Default.aspx

Colorado Water Quality Control Division, Colorado Department of Public Health and Environment, 2012 update. Integrated water quality monitoring and assessment report, Prepared Pursuant to Section 303(d) and Section 305(b) of the Clean Water Act, The 2010 Update to the 2008 305(b) Report.

Dunstar, Julian and Katherine, 1996. Dictionary of Natural Resource Management: The comprehensive, sing-source guide to natural resource management terms. pp 144-145.

Eager, Tom. 2012**.** *Forest Health Report for the Rio Grande National Forest.* USDA Forest Service. Rocky Mountain Region. Forest Health Protection. Gunnison Service Center. 28 pgs.

Fellin, D.G. and J.E. Dewey. 1982. Western Spruce Budworm. U.S. Department ofAgriculture Forest Service. Forest Insect and Disease Leaflet 53: 1-9.

Finch, D.M. and P.W. Stangel. 1993. Introduction, Pp. 1-4 in D.M. Finch and P.W. Stangel, eds; Status and Management of Neotropical Migratory Birds; 1992 September 21-25, Estes park, CO. USDA Forest Service General Technical Report RM-229, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Furniss, M.J., Love, M., Flanagan, S.A., 1997. Diversion Potential at Road-Stream Crossings. USDA Forest Service Technical Report 9777 1814 – SDTDC.

Goodwin, K., R. Sheley, and J. Clark Excerpted and adapted 2002. Integrated Noxious Weed Management After Wildfires. Montana State University Extension Service: Bozeman, MT. Pub. EB-160.

Graham, R.T., T.B. Jain, M. Loseke. 2009. Fuel treatments, fire suppression and their interaction with wildfire and its impacts: the Warm Lake experience during the Cascade Complex of wildfires in central Idaho, 2007. Gen. Tech. Rep. RMRS-GTR-229. Fort Collins, CO: USDA For. Serv. RMRS. 36 p.

Graham, R.T., A.E. Harvey, M.F. Jurgenson, T.B. Jain, J.R. Tonn, and D.S. Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Res. Pap. INT-RP-477. USDA Forest Service, Intermountain Research Station. 13p.

Grant, G.E.; Lewis, S.L.; Swanson, F.J.; [and others]. 2008. Effects of Forest Practices on Peak Flows and Consequent Channel Response: A State-of-Science Report for Western Oregon and Washington. General Technical Report PNW-GTR-760, USDA Forest Service, Pacific Northwest Research Station.

Hadley, Keith S, Thomas T. Veblen, 1992. Stand response to western spruce budworm and Douglas-fir bark beetle outbreaks, Colorado Front Range, Can J. For. Res. Vol 23, 1993.

Intergovernmental Panel on Climate Change (IPCC). 2007. IPCC Fourth Assessment Report: Climate Change 2007. Available online at: http://www.ipcc.ch/publications_and_data/publications_and_data.htm

Jackson, M., M. Taber, C. Nosie, R. Whiteaker, K. Kelly, P. Keller. 2011. Wallow Fire fuel treatment effectiveness on the Fort Apache Indian Reservation. Fire Review. December 2011. 20 p.

Jeffers, R. M. (1995). Engelmann Spruce Super-seedling Plantations- Rio Grande National Forest. Lakewood, CO: White Paper.

Hadley, Keith S, Thomas T. Veblen, 1992. Stand response to western spruce budworm and Douglas-fir bark beetle outbreaks, Colorado Front Range, Can J. For. Res. Vol 23, 1993.

Kees, Christopher R. 2006. Foliar moisture contents of North American conifers. Fuels Management- How to measure success: Conference Proceedings RMRS-P41, Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. pg. 395-399.

Keyes, Christopher R. 2006. Foliar moisture contents of North American conifers. Fuels Management- How to measure success: Conference Proceedings RMRS-P41, Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 395-399.

Kimbell, Abigail. 2007. Statement of Abigail Kimbell, Chief Forest Service, United States Department of Agriculture before the United States House of Representatives Select Committee on Energy Independence and Global Warming November 1, 2007 concerning wildfires and climate change.

Kimbell, Abigail. 2009. Statement of Abigail Kimbell, Chief Forest Service, United States Department of Agriculture before the United States House of Representatives Committee on natural Resources Subcommittee on National Parks, Forests, and Public Lands March 3, 2009 concerning the role of federal lands in combating climate change.

Kolka, R.K. and M.F. Smidt. 2004. Effect of forest road amelioration techniques on soil bulk density, surface runoff, sediment transport, soil moisture and seedling growth. Forest Ecology and Management. 202:313-323.

Krall, Angie and Ken Frye 2012. A Class II Cultural Resource Inventory for the Cumbres Vegetation Management Project Draft. Rio Grande National Forest, Conejos Ranger District, Conejos County, Colorado. Ms. on file at the Rio Grande National Forest Supervisor's Office, Monte Vista, CO.

Kindscher, K, J. Yang, Q. Long, R. Craft, and H. Loring. 2012. Harvest Sustainability Study of Wild Populations of Osha, Ligusticum porteri. Open-File Report No. 176. Kansas Biological Survey. Lawrence, KS., 20 pp.

Litschert, S.E., MacDonald, L.H., 2009. Frequency and characteristics of sediment delivery pathways from forest harvest units to streams, Forest Ecology and Management (259) 143–150, doi:10.1016/j.foreco.2009.09.038.

Mahalovich, Mary Frances. 2014. Seed Transfer Refresher presentation. USDA Forest Service. 2014 Reforestation-TSI Workshop for Regions 1,2,3,4 National Forests.

Mask, Roy and Worrall, James. 2011. Spruce Beetle and Root Disease Observations; Trujillo Meadows Campground, RGNF. Service Trip Report, GSC-11-03. USDA Forest Service. Rocky Mountain Region. Forest Health Protection. Gunnison Service Center.

Mehl, Mel S. 1992. Old-Growth Descriptions for the Major Forest Cover Types in the Rocky Mountain Region. 16p.

Mielke, J. 1950. Rate of deterioration of beetle-killed Engelmann spruce. Journal of Forestry, 48 (12): 882-888.

Page-Dumrose, D., A. Abbot, T. Rice. 2009. National Soil Disturbance Monitoring Protocol. Volume 1 and 2: Rapid Assessment, Supplementary methods, statistics, data storage. USDA, Forest Service. 95p.

Powers, R.F. 2002. Effects of Soil Disturbance on the Fundamental, Sustainable Productivity of Managed Forests. USDA Forest Service, General Technical Report, PSW-GTR-183.

Pugh, E. and Small, E. 2011. The impact of pine beetle infestation on snow accumulation and melt in the headwaters of the Colorado River, Ecohydrology, Wiley Online Library.com, DOI: 10.1002/eco.239.

RawinskiJ, Page-Dumroese, D. S., 2008. Soil Compaction Monitoring of the Pool Timber Sale, Rio Grande National Forest, Colorado, 16 Years after Logging. USDA Forest Service, RMRS. General Technical Report RMRS-GTR–215.

Romme, W.H., J. Clement, J. Hicke, D. Kulakowski, L.H. MacDonald, T.L. Schoennagel, and T.T. Veblen. 2006. Recent Forest Insect Outbreaks and Fire Risk in Colorado Forests: A Brief Synthesis of Relevant Research. Colorado Forest Restoration Institute, Colorado State University, Colorado State Forest Service, and University of Idaho. 24 pp. Available online at: http://www.cfri.colostate.edu/reports.htm.

Ryerson, Daniel E, Thomas W. Swetnam, Ann M. Lynch, 2003. A tree-ring reconstruction of western spruce budworm outbreaks in the San Juan Mountains, Colorado, U.S.A. Can. J. For. Res. 33: 1010-1028, 2003.

Safford, H.D., D.A. Schmidt, C.H. Carlson. 2009. Effect of fuel treatments on fire severity in an area of wildland-urban interface, Angora Fire, Lake Tahoe Basin, California. Forest Ecol. Manage. (2009), doi:10.1016/j.foreeco.200905.024.

Schmid, J. and Hinds, T. 1974. Development of spruce-fir stands following spruce beetle outbreaks. USDA Forest Service, Rocky Mountain Research Station, Research Paper RM-131, 16 pp.

Schmid, J.M. and R.H. Frye. 1976. Stand Ratings for Spruce Beetles. USDA Forest Service Research Note RM-309. 4p

Schmid, J. and S. Mata. 1996. Natural variability of specific forest insect populations and their associated effects in Colorado. USDA Forest Service General Technical Report: GTR-275. Fort Collins, CO. 22 pp.

Schnorbus, M.A. 2011. A synthesis of the hydrological consequences of large-scale mountain pine beetle disturbance, Mountain Pine Beetle Working Paper 2010-01, Pacific Climate Impacts Consortium, University of Victoria, Victoria, British Columbia, Canada.

Shepperd, W. D., Jeffers, R. M., & Ronco, F. J. (1981). An Engelmann Spruce Seed Source Study in the Central Rockies. Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.

Smith, David M., Bruce C. Larson, Matthew J. Kelty, and P. Mark S. Ashton, 1997. The Practice of Silviculture, Applied Forest Ecology. 9th edition, John Wiley and Sons, New York, NY.

Stednick, J.D. 2010. Effects of Pine Beetle Infestations on Water Yield and Water Quality at the Watershed Scale in Northern Colorado. Presentation at the MPB Science Symposium: Impacts on the Hydrologic Cycle and Water Quality. April 8, 2010-NCAR Mesa Lab-Boulder, Colorado.

Terborgh, J. 1992. Perspectives on the conservation of Neotropical migratory birds. Plenary Address, Pp. 7-12 in J.M. Hagan III and D.W. Johnston, eds; Ecology and Management of Neotropical Migrant Landbirds. Papers from the Symposium on Ecology and Conservation of Neotropical Migrant Landbirds, December 6-9 1989, Woods Hole, Massachusetts.

University of Maryland 1999 Draft Proposal to List Ligusticum porteri in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Submitted by the University of Maryland Program in Sustainable Development and Conservation Biology to the U.S. Fish & Wildlife Service Office of Scientific Authority. http://www.nps.gov/plants/medicinal/pubs/cites-b.htm.

U.S. Climate Change Science Program (CCSP). 2008. Synthesis and Assessment Product 4.3 (SAP 4.3): The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States, A report by the U.S. Climate Change Science Program (CCSP). May 2008. Available online at: http://www.usda.gov/oce/global_change/sap_2007_FinalReport.htmU.S. Census Bureau.2011a. American

U.S. Census Bureau. 2011c. Quickfacts: Conejo and Rio Arriba Counties. http://quickfacts.census.gov. Last revised 10/27/2011. Website accessed March 2012.

USDA 1997. Environmental Justice 5600-2, 34 pg.

USDA Forest Service. 2011. Review of Forest Service Response: The Bark Beetle Outbreak in Northern Colorado and Southern Wyoming. Done at the request of Senator Mark Udall. Sept. 2011.

USDA Forest Service. 2008. Forest Service Strategic Framework for Responding to Climate Change ver. 1.0. Washington Office, USDA Forest Service. October 2, 2008. Available online at: http://www.fs.fed.us/psw/topics/climate_change/pdf/2Oct08StrategicFramework.pdf

USDA Forest Service 2006. Watershed Conservation Practice Handbook, FSH 2509.25, Region 2 Forest Service.

USDA Forest Service 2005. Rio Grande National Forest Avian Population Monitoring Protocol. Unpublished Internal Document.

USDA Forest Service. 2008. Southern Rockies Canada Lynx Amendment: Record of Decision and Environmental Impact Statement. USDA Forest Service, Rocky Mountain Region, Denver, CO. January 2004.

USDA Forest Service, 1995. AH701 Landscape Aesthetics – A Handbook for Scenery Management.

USDA Forest Service 2004.The Rio Grande National Forest Roads Analysis report (January 2004) 124 pg. unpublished document on file at the Rio Grande National Forest Supervisors Office, Monte Vista CO

USDA Forest Service. 2003. Species Assessments for Hermit Thrush, Brown Creeper, Elk, Mule Deer and Rio Grande Cutthroat Trout, Management Indicator Species. Supporting Analysis and Report to the Management Indicator Species: A Forest Plan Amendment to the Revised Land and Resource Management for the Rio Grande National Forest. Rio Grande National Forest. Monte Vista, CO.

USDA Forest Service. 2003a. Biological Evaluation in Support of the Management Indicator Species Amendment to the Revised Land and Resource Management for the Rio Grande National Forest. Rio Grande National Forest. Monte Vista, CO

USDA Forest Service. 1996. Soil Resource and Ecological Inventory of the Rio Grande National Forest-West part, Colorado.

USDA Forest Service. 1996. Revised Land and Resource Management Plan (as amended) Forest Plan and Final Environmental Impact Statement for the Revised Land and Resource Management Plan, Rio Grande National Forest. USDA Forest Service. Rocky Mountain Region. Rio Grande National Forest. Monte Vista, CO. December 13, 1996.

USDA Forest Service. 1992. Soil Management Handbook. Forest Service Handbook 2509.18-92-1, Region 2 Supplement

Webb, Robert H, Gregory J. McCabe, Richard Hereford, Christopher Wilkowske, 2004. Climatic Fluctuations, Drought, and Flow in the Colorado River. USCS Fact Sheet 3062-04

Williamson, J. R. and W. A. Neilson. 2000. The Influence of Forest Site on Rate and Extent of Soil Compaction and Profile Disturbance of Skid Trails During Ground-Based harvesting. Can. J. of For. Res. 30: 1196-1205.

APPENDIX C

C.1. Past Timber Management activities in the Cumbres analysis area

Table C-1. List of past timber sales in the Cumbres analysis area boundary.

Project Name	Year	Activity	Acres	Cumbres Unit #s
Los Pinos River Sale (Hanson)	1939	Shelterwood Preparatory Cut, Shelterwood Establishment Cut	1238, 235	1,3,4,6,7,11,12,13,14,17,20
Los Pinos (Hanson)	1941-57	Patch Clearcut	2651*	1,2,3,4,6,7,8,11,12,13,14,16,20
Neff Mountain	1963	Stand Clearcut	172	13,18,19
Hansen Lumber (Misc)	1967	Shelterwood Removal Cut	19	1,2
Skyline Lumber	1968	Commercial Thinning, Shelterwood Preparatory Cut	15, 15	9
Western Pine Ind (Los Pinos III)	1974	Shelterwood Preparatory Cut	343	2,3,4,16
Evergreen Lumber Co (Flat, Strawberry, Boat Ramp)	1976	Shelterwood Preparatory Cut, Overstory Removal Cut	313, 24	6,7,8,11,12,20
Rio Vista Log Co Dead	1979	Salvage, Shelterwood Establishment Cut	343, 116	2,3,4,7,16,20
Commercial Thinning (Misc)	1982	Thinning	118	3,16
Sandwich	1987	Overstory Removal	16	none
Stone Forest Ind (Pinos)	1988	Shelterwood Establishment Cut, Sanitation/Salvage	285, 170	1,2,3,16
TMC Salvage	1989	Log decks in campground	60	none
Cumbres	1991	Shelterwood Preparatory Cut, Intermediate Salvage	511	1,2,3,4,5,21,22
Trujillo Meadows Salvage	2000	Sanitation/Salvage	16	4,5
Neff Mountain Beetle Salvage	2004	Sanitation/Salvage	105	6,11,12
Neff II Salvage	2008	Sanitation/Salvage	103	6,11,12
*This number represents treated area and not patch cut size. Likely performed as part of the Los Pinos River Sale.				

Table C-2. List of other silvicultural activities in the analysis area.

Year	Treatment	Acres	Units Affected
Unknown	Precommercial Thinning	Unknown	7,20
1970	Reforestation	132	18,19
1980	Reforestation	6	none

C.2 Research Project - *Osha* (*Ligusticum porteri*) study

Figure C-1. Osha stand (bright green plants) in original study plot established in 2002 in a late 1970s clear-cut just outside the current analysis area. Photo by Vnce Spero 2002.

In 2002, the Rio Grande National Forest and the Partners for Plants/Plant Conservation Alliance Medicinal Plant Working Group (PCA-MPWG) initiated an *Osha* harvest and monitoring project designed as a long-term effort to collect data that would lead to the greater understanding of the ecological status and sustainability of the plant for which little botanical data is available. The 10-acre study plot was established on Cumbres Pass, Colorado, approximately 2 miles west of Trujillo Meadows Reservoir and the current analysis area. The plot is in a clear-cut (late-1970s) on the south facing forested slope above Wolf Creek at an elevation of 11,000 feet and slope between 5° and 10°. Vegetation in the clear-cut area consists of Osha, elderberry, strawberry, and fescue. Forested vegetation surrounding the clear-cut consists of an over story of Engelmann spruce and subalpine fir with an understory of vaccinium and heartleaf arnica.

The inventory and harvest project was led by Trish Flaster (Botanical Liaisons, LLC Executive Director and chair of the MPWG Conservation and Ethnobotany Committees) and then Forest Archaeologist, Vince Spero. Fieldwork was provided by 24 volunteers that collected baseline data for *Osha* at this test site and refined a collection protocol initially devised for use with black cohosh in the Appalachian Mountains (Figure 2). Plants were identified, measured, and permanently tagged and numbered, with a percentage of randomly selected plots harvested lightly and others harvested more intensely. Root material was sent to the University of Mississippi to be analyzed for active ingredients. In 2003, the Rio Grande National Forest hosted the second *Osha* PCA-MPWG inventory and harvest. Fieldwork was also provided by volunteers (Figure 2). This project collected more baseline data for *Osha* and drew upon a diverse collection of community volunteers, thus expanding community recognition of the value of native wild plants. A total of 14 -5x20 M plots were installed, 769 plants were identified, their X and Y coordinates were taken, plants measured, and mature plants that were harvested were permanently tagged and numbered. Monitoring and harvesting at the plot also occurred 2004 and 2005. Weather likely impacted data collection over the course of the study with major drought effects in 2002 and snow in 2003.

Figure C-2. Volunteers map Osha plant within study plot in 2003. Photo by Vince Spero.

The plant is in the Apiaceae family and grows at higher altitudes, usually above 6,000 feet, often in moist aspen groves but also found in well drained and disturbed areas such as old clear-cuts and burned areas. Timber staff has observed that the plant often responds positively to disturbance much the way aspen does. Traditional cultures are known to harvest the root after the seeds form in September. It is used as a talisman to ward off snakes, as well as for stomach and respiratory ailments. Tea, tinctures, cough syrups and chewing the root raw are the most common forms of delivery. Increasing popularity, limited populations, and difficulties associated with harvest of *Osha* make a long-term monitoring study critical at this time.

In 2010, Trish Flaster of Botanical Liaisons LLC and Kansas University ethnobotanist Dr. Kelly Kindscher revisited the 2002 study plot with students and volunteers to revive the study. During the subsequent analysis of the data, they ran tests for each year of the data with treatment (0%, 33%, and 66% harvest) as the factor and ran analysis for several different response variables that were calculated for each replicate plot (cumulative plant height, cumulative width, average height, average width, # of mature plants, # of juvenile plants, total # of plants, total # of inflorescences, and average # of inflorescences per mature plant). The result is that there were no significant differences between treatments in any year. While it initially seems to be a positive result that there was no effect of harvest in 2010, apparently illustrating that the populations had rebounded entirely regardless of harvest intensity. However, this assertion is statistically invalidated by the results from previous years, which surprisingly demonstrate that there were no differences between treatments even in the year following the original harvest when one should obviously expect to find a significant effect of harvest. The lack of significant results across all years is due to the amount of variance in the data. It is believed that this is a result of there being many differences between plots naturally, that there were problems with the data collection, plot numbers, data entry in years past, and perhaps some lack of quality control. Regardless, it appears through observation that *Osha* was quite resilient to harvest in the plots sampled. To acquire more data to support this, KU is proposing a new study plot and experimental design as well as a mapping project within the analysis during the 2012 field season. To fund this work, Botanical Liaisons LLC., KU and the RGNF are partnering on a proposal to the American Herbal Products Association's Foundation for Education and Research on Botanicals (AHPA-ERB Foundation). The Forest Service has pledged Inventory and Monitoring funding as a match and local Hispanic school groups and herbalists will be recruited to assist in the mapping project.

In 2011 RGNF archaeologists and the soils scientist made note of *Osha* populations while surveying within the analysis area. Both observed light concentrations within proposed salvage units and denser concentrations of the plant in open meadows, tree line edges and old clear-cuts. Eight locations were documented with a GPS point, a photo and a narrative description of the environment of each locale (Figure C-3). Points were chosen inside and outside of proposed salvage units. More photo points will be established within proposed salvage units during the 2012 field season and harvest units within the County Line Timber Sale (2007) will be visited to determine if *Osha* is recruiting within recently logged units.

Figure C-3. Photo Point C established in 2011. Note well established Osha plants in the lower left within old clear-cut dotted with planted trees. Photo by Ken Frye.

This project analysis provides a unique opportunity to study *Osha* on three fronts: 1) The Forest Service will monitor the impacts of timber harvest on the plant through time to gauge whether or not salvage logging substantially impacts plant populations. Healthy populations within old clear-cuts suggest that the plant responds favorably to such disturbance; 2) Information on local collection areas and practices will be sought in order to protect and preserve local collection areas for personal use; 3) Establishing a new study plot to research sustainable collection practices will be important to clarify how *Osha* responds to differing levels of harvest activity in order to prescribe sustainable harvest methods. If managed appropriately, the plant could be commercially harvested on a small scale as a Special Forest Product affording economic opportunities to depressed local Hispanic and tribal communities.

C.3 Soils Data

Table C-3. Soil data by unit for Cumbres project area.

SOIL ATTRIBUTE	HARVEST UNIT NUMBER[1]															
	1	3	5	6	7	8	9	10	11	12	13	14	17	20	21	Av.
Forest. floor depth (cm):	1.3	1.2	1.7	1.6	1.3	1.4	1.8	1.8	3.9	1.9	1.6	1.3	1.3	1.4	1.2	1.65
Forest floor Impacted?	0.35	0.27	0.42	0.40	0.52	0.33	0.00	0.13	0.43	0.32	0.32	0.41	0.25	0.39	0.31	0.32
Live Plant	1.00	0.97	0.90	0.91	1.00	0.97	0.80	0.83	0.83	0.94	0.97	1.00	0.88	1.00	0.91	0.93
Fine Woody <7 cm	0.87	0.63	0.68	0.71	0.81	0.73	0.80	0.77	0.90	0.84	0.90	0.75	0.75	0.74	0.63	0.77
Coarse Woody >7cm	0.52	0.53	0.68	0.51	0.42	0.53	0.70	0.53	0.50	0.58	0.61	0.53	0.50	0.45	0.34	0.53
Bare Soil	0.16	0.33	0.29	0.06	0.26	0.33	0.13	0.20	0.13	0.07	0.16	0.31	0.28	0.29	0.28	0.22
Rock?	0.13	0.03	0.23	0.00	0.19	0.17	0.00	0.07	0.03	0.00	0.00	0.09	0.22	0.16	0.03	0.09
Topsoil displacement?	0.10	0.17	0.26	0.11	0.19	0.17	0.07	0.03	0.20	0.06	0.06	0.06	0.09	0.19	0.13	0.13
Erosion?	0.00	0.07	0.16	0.06	0.00	0.10	0.00	0.00	0.10	0.00	0.00	0.00	0.06	0.00	0.19	0.05
Rutting? <5cm	0.03	0.03	0.13	0.11	0.06	0.10	0.03	0.07	0.10	0.03	0.10	0.03	0.00	0.00	0.06	0.06
Rutting? 5-10cm	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Rutting? >10cm	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compaction? 0-10 cm	0.35	0.37	0.45	0.46	0.45	0.27	0.00	0.23	0.30	0.26	0.26	0.31	0.31	0.29	0.44	0.32
Compaction? 10-30 cm	0.13	0.20	0.10	0.11	0.16	0.17	0.13	0.10	0.20	0.19	0.23	0.16	0.19	0.13	0.13	0.15
Compaction? >30cm	0.03	0.03	0.00	0.06	0.06	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.03	0.00	0.02
Platy/Massive/Puddled structure 0-10 cm	0.16	0.13	0.23	0.31	0.39	0.10	0.00	0.17	0.10	0.16	0.26	0.09	0.13	0.19	0.16	0.17
Platy/Massive/Puddled structure 10-30 cm	0.10	0.10	0.06	0.11	0.10	0.13	0.00	0.03	0.20	0.00	0.10	0.03	0.09	0.03	0.03	0.07
Platy/Massive/Puddled structure >30 cm	0.00	0.00	0.00	0.03	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01
Slope > 30%	0.16	0.23	0.10	0.00	0.10	0.13	0.23	0.07	0.23	0.19	0.13	0.25	0.13	0.00	0.00	0.13
Soil Disturbance Class																
0	0.65	0.77	0.68	0.57	0.61	0.83	1.00	0.87	0.73	0.84	0.84	0.72	0.78	0.74	0.81	0.76
1	0.29	0.23	0.32	0.34	0.42	0.30	0.00	0.10	0.37	0.29	0.26	0.38	0.28	0.32	0.25	0.28
2	0.06	0.00	0.00	0.06	0.06	0.00	0.00	0.03	0.07	0.00	0.03	0.00	0.00	0.03	0.03	0.02
3	0.00	0.00	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.01
Detrimental (Proportion)	0.13	0.07	0.10	0.20	0.23	0.10	0.00	0.07	0.17	0.06	0.10	0.09	0.09	0.16	0.09	

1 The same soil type is present throughout the majority of the analysis area. As a result disturbance levels in units not sampled during the analysis process were assumed to be the same disturbance level as adjacent units with similar activity/disturbance history. The following assumptions or correlations were made for this analysis: Unit 1 = 2 and 16, Unit 3 = 4, Unit 17 = 18 and 19. Unit 15 had no previous logging activity, so it was assumed to have a detrimental disturbance percent similar to Unit 9.

APPENDIX D

D.1. Responses to Comments Received on the DEIS

Project: Cumbres Vegetation Management Project (34685)
Formal Notice & Comment Period on DEIS (12/20/2013-2/3/2014)

Comment: 1-1	As a property owner in the immediate area, we are totally in favor of any harvest efforts in the area to remove the pine beatle infestation of the Englemann Spruce forest. Thank you allowing input to the Forest Service plan. (Individual)
Response:	Thank you for your comment; the Forest Service appreciates the support.

Comment: 2-1	While we share the concern regarding the tree mortality in this area (and throughout the West and Southwest) we believe that climate change and associated drought mean this is the "new normal" for our high elevation spruce-fir forests. Because of this we believe the changes in our forest structure and composition makes large Salvage Sale treatments questionable and likely to have increased adverse impacts than in the past. The DEIS failed to acknowledge this loss of resilience and makes assumptions based upon past, cooler & wetter climate conditions. (Environmental Conservation/ Preservation)
Response:	The Forest Service does acknowledge that climate change concerns are important considerations in land management decisions, as noted in the DEIS on page 114. We feel, however, that climate change effects on the project would be overall negligible in difference between the alternatives. In comparative analysis, the proposed actions would only influence resiliency in the following areas: 1) the success of forest regeneration within the limited scope of activity-related site disturbance, 2) forest age-class distribution within the broader landscape, and 3) species distribution and presence within the limited scope of activity-related site disturbance (i.e. stand composition). All other factors would remain neutral between the alternatives. Concerning regeneration, current trends in planting success still give us reasonable assurance that these sites can be successfully regenerated. See the section 3.3 for additional information. Concerning age class and species distribution, the proposed actions are intended to promote these attributes, making the landscape more adaptable to whatever future changes transpire.

Comment: 2-2	We recommend additional analysis that factors in such climate & eco system changes especially here in the spruce-fir forest. The preferred alternative 2 bases affects determinations upon current & past climate – yet most western ecologists agree that in the near future, many of these areas will just not be able to support such spruce-fir forests due to climate change. (Environmental Conservation/ Preservation)
Response:	The project intentionally limits effects to those factors that can be responsibly influenced and which are listed in response to Comment 2-1. Efforts to predict outcomes and proactively influence other ecosystem dynamics, such as through assisted species migration and extensive importation of seed from other seed zones are being researched, but few results are available to date. For example, contrary to prior belief, more recent information is indicating that seedlings moved from more northerly latitudes and/or higher elevations may adapt more readily than those from more southerly/lower sites, due to their adaptation to extreme environmental conditions (Mahalovich, 2014). Our goal is to maintain healthy and naturally-occurring plant communities of genetic diversity on the landscape in the present, so as to allow them to adapt and/or shift according to the interaction of disturbance agents in the future; prior to planning any reforestation activities, any new research would be considered

Comment: 2-3	The alternative 2 of the DEIS fails to account for the above changes-and will have negative effects on wildlife & watersheds here-already under stress from changing ecological patterns. (Environmental Conservation/ Preservation)
Response:	The DEIS and FEIS fully analyzed the impacts of stress upon multiple resources resulting from the on-going disturbance events.

Comment: 2-4	We are especially concerned regarding the impacts of this project upon Canada Lynx. Because of recent large fires in its' range (from Creede to Wolf Creek, etc.) and the large numerous Salvage Sales (County Line, Black Mesa & others near Creede & Wolf Creek)-The cumulative effects of further treatment in this area of National Forest will cause unacceptable disturbance for Canada Lynx at this time. We disagree that this project complies with lynx conservation & standards in the lynx amendment to the Forest Plan. (Environmental Conservation/ Preservation)
Response:	Although this project is expected to cause some additional effects to lynx that would be in addition to the current beetle epidemic and salvage activities within the area; the project is still consistent and does comply with the direction set forth by the Standards and Guidelines of the Southern Rockies Lynx Amendment (SRLA) 2008. Cumulative effects for lynx are analyzed at the Lynx Analysis Unit (LAU) scale, which is the Rito Archuleta LAU for this project. This species home range within this LAU does not include the areas of Black Mesa, Creede or Wolf Creek, so we did not consider these areas specifically in the project analysis. However, all projects Forest-wide or disturbances such as the recent fire are accounted

	for and tracked annually in the Forest baselines, as required in the SRLA.

Comment: 2-5	We recommend a re-evaluation of Lynx affects in the DEIS that does a better analysis of cumulative effects-and includes this past summer's wildfires. (Environmental Conservation/ Preservation)
Response:	See response to Comment 2-4.

Comment: 2-6	We share these same concerns regarding Watershed impacts-and again there needs to be greater cumulative analysis of recent wild land fires and climate change especially earlier run-off in spring and reduced snowpack in this area. (Environmental Conservation/ Preservation)
Response:	Fire cumulative effects as related to this project are discussed section 3.12-Fire and Fuels section of the FEIS. There have been no recent wildfires in the Cumbres Project's analysis area. Cumulative analysis of recent wildfires Forest-wide or in the western U.S is outside the scope of this project. Climate change was addressed in section 3.18 of the FEIS. Actual climate change effects are still being studied and the situation is evolving. Generally, in the southwest U.S it is expected that snow pack will be less and run off will occur sooner. However it is a complex system and exact ecosystem responses are still largely unknown.

Comment: 2-7	It appears that Standard VEG S2 in the lynx amendment is violated in the DEIS alt. 2. (See p. 45 DEIS) It is clear the alternative will change the areas treated to unsuitable-and when combined with recent fires & nearby Salvage Sales-this violates the standards to protect lynx recovery. (Environmental Conservation/ Preservation)
Response:	Standard VEG S2 of the SRLA would not be violated if alternative 2 was implemented. This alternative would convert approximately 1,291 acres (52%) of the project area to the Stand Initiation Structural Stage (SISS) which is considered unsuitable for lynx. However, it is within the 15% conversion to SISS over a 10 year period allowed for in the SRLA VEG S2. The recent wildfires, elsewhere on the Forest, are located outside the Rito Archuleta LAU and thus are not accounted for in this project analysis. However, all projects Forest-wide or disturbances such as the recent fire are accounted for and tracked annually in the Forest baselines, as required by the SRLA.

Comment: 2-8	Any action alternative needs to not adversely affect Canada lynx. There are just too many nearby impacts (with the fires, Salvage Sales, and climate change reduced snow packs and tree mortality,) etc.-and this project only further threatens lynx viability in the Southern Rockies. This area is vital to persistence & recovery of lynx & many other species dependent upon spruce-fir forest. We are also concerned about Boreal Owl, Boreal Toad, Plka, and other species in this habitat type. (Environmental Conservation/ Preservation)
Response:	Table 3-4 summarizes the expected effects of the alternatives on lynx habitat. Adverse effects to lynx are expected considering the existing conditions such as the spruce beetle infestation and the additive effects from this project. This project is still consistent with the Southern Rockies Lynx Amendment (SRLA 2008) which does allow for adverse effects and take of the species to the extent analyzed in the USFWS Biological Opinion issued as part of that document. However, this project is not expected to threaten the viability of lynx within the Southern Rockies, as concurred within the USFWS Biological Opinion for the project. Although this project will have impacts to other spruce/fir associated species, they are expected to be minimal at the Forest level. Effects on the boreal toad and other R2 sensitive species are summarized in table 3-5 and potential effects are discussed in section 3.4 of the EIS.

Comment: 2-9	Future re-generation & replanting cannot be relied upon to provide adequate wildlife habitat for many years, if at all. (p.49) again-with a warmer climate & reduced snowpack-any reliance upon regeneration needs to be modified and more conservative. (Environmental Conservation/ Preservation)
Response:	Current trends in planting success still give us reasonable assurance that these sites can be successfully regenerated and growth rate of existing, established trees and shrubs will also increase due to increased light and water availability. As a result, wildlife habitat can reasonably be expected to re-establish within the estimated timelines. Even 1-2 years post salvage, regeneration can provide suitable foraging habitat for species such as deer, elk, and small mammals. Longer-term regeneration (30-40 years) is expected to provide high quality winter snowshoe hare foraging habitat for lynx. See sections 3.3 and 3.4 for additional information.

Comment: 2-10	Since 79% of lynx habitat would be impacted in the Project area (p.49)-there needs to be more effort to develop an alternative that does more to protect lynx viability in this area. Because so much of the Rito Archuleta & other LAUs have been affected by fires, salvage sales, tree mortality, etc.-any further actions that adversely affect lynx are not acceptable at this time. (Environmental Conservation/ Preservation)
Response:	Table 3-4 summarizes the expected effects of the alternatives considered in detail for this project on lynx habitat. As summarized in the table, although there may be short-term local impacts to lynx habitat resulting from harvest activities, the effects on the LAU, which represents the size of a female lynx home range, is relatively small. Also see the response to Comment 2-8.

Comment: 2-11	While alternative 3 is an improvement in having lesser adverse impacts to lynx-again-it is overly optimistic regarding regeneration success, and also fails to adequately address cumulative, additive effects from recent fires, salvage sales, tree mortality, recreation, etc. We appreciate the discussion on p.51 of the DEIS regarding lynx affects from this project. (Environmental Conservation/ Preservation)
Response:	With respect to lynx habitat, new regeneration may take some time (30-50 years) to reach the size to be considered dense horizontal cover, depending on site conditions and the climate. However, within that time period, high quality winter snowshoe hare foraging habitat for lynx is expected to be available as provided by existing seedlings, saplings, and shrubs. Thank you for your appreciation of the page 51 discussion.

Comment: 2-12	However the Decision to choose Alt.2 basically fails to follow the science and conservation of lynx and other species documented in the Biological Evaluation-There is no Rationale (except timber harvest for choosing Alt.2 and it Threatens lynx viability and violates the Forest Plan & NEPA. Please do more to address lynx protection in the FEIS. (Environmental Conservation/ Preservation)
Response:	The Responsible Official has not reached a decision for this project. The balance or weighing of the effects on lynx habitat and other resources will be done in the Record of Decision. Based on the analysis and other considerations, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives. As stated in section 3.4, the Standards and Guidelines of the Southern Rockies Lynx Amendment (SRLA) 2008 would still be met with the implementation of either action alternative.

Comment: 3-1	**Comment #1:** The DEIS at page 45 says: "The purpose and need for the amendment was 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." Incredibly, Jones with this knowledge you describe the following adverse effects caused by implementing the Proposed Action to the Canadian Lynx (listed as threatened under ESA) in Chapter 3. Are you proud? (Individual)
Response:	The expected effects of the alternatives on lynx/snowshoe hare habitat are disclosed in section 3.4 in the EIS, which is a summary of the Biological Assessment completed for this project. As stated, harvest activities do have the potential to temporarily reduce dense horizontal cover in the project area, though multiple project design criteria are included to minimize damage. Though the project area is a small portion of the Rito Archuleta LAU, changes in the habitat would be considered measurable. All alternatives would be consistent with the Biological Opinion signed as part of the Southern Rockies Lynx Amendment (SRLA) in 2008. Exemptions and exceptions included as part the SRLA allowed for levels of management within these baselines that may temporarily affect habitat. Table 3-4 shows the comparison of the alternatives with regard to the expected effects on lynx habitat. The balance or weighing of effects on lynx habitat and other resources will be done in the Record of Decision. Based on the analysis and other considerations the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives. The Record of Decision, in tandem with the protections of the Project Design Criteria, meets the SRLA purpose and need of reducing potential adverse effects from land management activities.

Comment: 3-2	**Comment #2:** Table 1-1 at page 3 of the DEIS indicates one of the Forest-wide Desired Conditions for the Rio Grande National Forest is to "**Conserve and promote Canada lynx recovery (SRLA 2008).**" The Cumbres timber sale violates NFMA by not complying with the forest plan. The DEIS indicates: 1) lynx will be displaced from the timber sale area (pg. 46), 2) lynx habitat suitability will be reduced in logging units." (pg. 47), 3) lynx prey (snowshoe hare) will be reduced by logging, 4) the reduction in prey abundance will result in very low to no lynx reproduction (pg. 47), and 5) Road construction/maintenance will disturb and displace lynx (pg. 48). (Individual)
Response:	All the expected direct and indirect effects have been thoroughly analyzed and noted in the Biological Assessment…, As stated in section 3.4, this project is consistent with the Southern Rockies Lynx Amendment (SRLA) to the Forest Plan. The SRLA does allow for exemptions and exceptions to Vegetation Standards VEG S1, VEG S2, VEG S5, and VEG S6 as long as the effects are within those analyzed in the 2008 Programmatic Biological Opinion issued with the SRLA and the acres of all projects or disturbances are accounted for and tracked annually in the Forest baselines, See also response to comment 2-8.

Comment: 3-3	The DEIS at page 52 states "Federal actions are not addressed under Endangered Species Act (ESA) requirements." The DEIS conveniently fails to disclose to the lay public that the USFS must comply (emphasis added) with the ESA. (Individual)
Response:	This statement does not mean to imply that Forest Service or other Federal Agencies are not required to comply with the ESA. Under the ESA, cumulative effects are considered to be reasonably foreseeable non-federal activities. Any future Federal activities or projects are addressed separately through individual section 7 consultations. This statement was revised in the FEIS to clarify.

Comment: 3-4	There is no acceptable level of Lynx habitat and prey base damage! Logging less acres (Alternative 3) will also cause the damage described above. "No Action" is the only alternative that doesn't drive the Canadian Lynx closer to extinction.(Individual)
Response:	See responses to Comments 2-8 and 3-1.

Comment: 3-5	You and I both know you made the decision to advertise this timber sale before you sent out your first public scoping package. After making this decision you said to yourself "now I have to do NEPA on this" as if NEPA were some inconvenient, costly, pesky, needless obligation you must deal with.(Individual)
Response:	This comment has no basis in fact. No additional response or analysis is needed related to this comment.

Comment: 3-6	Any competent public servant charged with protecting and conserving the public resources who had read the damage discussed above would drop this tragic timber sale and not spend another penny of taxpayers money developing a project that trashes what the public wants to pass to future generations. (Individual)
Response:	This comment has no basis in fact. No additional response or analysis is needed related to this comment.

Comment: 3-7	When Congress passed NEPA in 1969 they inserted into the law a mandate that the Responsible Official must analyze a "No Action" alternative. They did this for a reason. They had the expectation that the Responsible Official would take the Proposed Action through the process, read the EA or EIS, and then decide whether or not to proceed with the Proposed Action or select another alternative for action. They wanted the "No Action" alternative chosen if the impacts described by the IDT in Chapter 3 would do more harm than the benefits gained by implementing any action alternative. Jones you have failed to implement NEPA the way Congress intended. It's inconceivable that any caring person who cares more about the public than their NFTM budget would inflict such damage the IDT describes above to sell a timber sale. I know IDT member know they must describe the damage and then follow the description of the damage with a "but", "although" or "however" statements claiming it will "only be short-term, "minor", "unmeasurable", "temporary" etc.etc. in order make it appear to the public the damage is no big deal. Why do you put together an ID team and ignore them? You know I'm right. Now, please remove yourself from your denial mode and serve the public that supplies the money for your salary. Assure the ROD says you have selected the "No Action" alternative. (Individual)
Response:	Proposed activities are consistent with all applicable laws, regulations, and policy (EIS section 3.18). After review and consideration of the effects described in chapter 3, the specialist's reports, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 3-8	**The Cumbres timber sale is inconsistent with best science. The USFS is mandated by law to base their projects on best science.** I have included **attachments** to these comments. Hopefully, the other resource specialists IDT members will read each attachment closely. Frankly, I'm surprised these specialists didn't already know about the scientific information contained in the attachments. Jones, had they known, they would have recommended that you abandon your tragic proposal. If you still chose to pursue the timber sale, competent IDT members who really cared about the resources that are their responsibility to protect would not have allowed their name to appear as an IDT member. **Request for final NEPA document modifications:** Please review this project in light of the best science attached to the objector's comments and acknowledge the science conclusions of 421 independent, unbiased scientists regarding the impacts of timber sale activities. The scientists quoted in each **attachment** describe how natural resources are harmed by logging. Please assure that literature written by USDA employees does not dominate the References Cited section of the final NEPA document. Add at least as many source documents for the quotes in the **attachments** as there is literature written by USDA employees. Please see **Attachment #15**. (Individual)
Response:	As shown in the EIS, the Forest Service fully supports the use of best available science as part of project planning, developing Project Design Criteria, and monitoring. IDT consideration of and responses to "opposing views" attachments are located in Appendix D.5.

Comment: 3-9	**Please assure that the Responsible Official's responses to public comments are posted online as well as hardcopy in the Project File** **Request for final NEPA document modifications:** If the Responsible Official's responses to public comments are not posted online, then consider this a FOIA (per 36 CFR 200.6) for these responses to be mailed to me (hard copy of email) prior to the time the objection period begins (Individual)
Response:	Response to comments on the DEIS and "EA for Comment" are included in Appendix D.1 and D.2, respectively; Comment letters received during these comment periods are also included in Appendix D.3 and D.4.

Comment: 3-10	**The DEIS does not analyze an alternative in detail that does not construct any new roads (temp or system)**… The no new roads alternative stands out among the infinite number of alternatives because it reduces the adverse environmental effects of the proposed action while still meeting the purpose and need for the project. New road construction is an activity that causes damage to some important natural resources in the sale area. This activity is particularly detrimental to aquatic and wildlife resources. Chief Dombeck's statement below supports this fact. *"Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road." (Individual).* *Dr. Mike Dombeck, Chief, US Forest Service* *Remarks to Forest Service employees* *and retirees at the University of Montana* *February 1998* **Link to statement:** https://www.uwsp.edu/cnr/gem/Dombeck/MDSpeeches/CD COPY/Chief Mike Dombeck%27s Remarks to Forest Service Employees and .htm
Response:	Following initial project scoping, alternative 3 was developed in part to respond to concerns about the miles of temporary roads that would be needed to implement alternative 2. After review and consideration of the effects described throughout chapter 3, the specialists' reports, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives. As a result, the decision could include some level of action without any new temporary road construction.

Comment: 3-11	**Comment #3:** Since best science and Chief Dombeck agree that ""There are few more irreparable marks we can leave on the land than to build a road," this is a valid reason to analyze a no new temporary or system road alternative in detail. The acres harvested would be reduced slightly, but the alternative would still be responsive to the Purpose & Need and most importantly the road-related natural resource damage will be eliminated.(Individual)
Response:	There are no new system roads being proposed as part of any alternative for the Cumbres project. The effects of additional temporary roads, as mitigated by Project Design Criteria, were disclosed in chapter 3 of the EIS. Also see responses to attachment #4 in appendix D.5 and response to Comment 3-10.

Comment: 3-12	**Comment #4:** Please respond to the statements by these scientists quoted below: Dr. Bunnell concludes from his research on logging roads that: "Sediment input to freshwater is due to either the slower, large-scale process of soil erosion, or to rapid, localized "mass movements," such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991)." "Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981)." "More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads." Source: http://warehouse.pfc.forestry.ca/pfc/25154.pdf (Individual)
Response:	In general terms soil erosion is a concern whenever timber production activities occur, which include harvest activities and road construction, maintenance, or reopening. The entire analysis area primarily has one soil type, which has moderate concern for erosion and a high concern for mass movement. However as stated in section 3.10 of the EIS the concern for mass movement is reduced due to the relatively gentle slopes throughout the analysis area. Project Design Criteria/Best Management Practices (BMPs) do not allow harvesting in the Water Influence Zone (WIZs) that buffer drainages, so stream bank collapse following riparian harvesting will not occur. Roads do have the potential for erosion and BMPs are used to mitigate this issue. Furniss, et. al. 1997 and Anderson 1996 both indicated that a compromise can be reached that will minimize erosion and protect streams with careful planning and implementation Cederholm et. al. 1981 referenced sediment harm associated with salmon in the Washington state, and it is well established that excessive sedimentation introduced to streams will hinder salmonide reproduction. After review of the cited article, no reference to the 3 percent of basin roaded area will increase sedimentation was found. Road placement and proper implementation of BMPs will mitigate the effects of erosion from roads and PCD/BMPs have been proven effective. Effects of proposed temporary roads in the Cumbres project were considered and disclosed in section 3.4. Also see responses to Opposing Views in Appendix D.5. . While the indication that 'more than half of the species present in the study area will likely be negatively impacted' may be true for the study area described in the referenced article it was from a working paper from Canada. The results may not be directly transferable to this situation.

Comment: 3-13	**Comment #5:** In the final EIS please tell the public why you believe road-related natural resource damage will not occur on the Cumbres timber sale, or if it will occur, explain why the resource damage is an acceptable tradeoff for P&N goals. (Individual).
Response:	The effects of additional temporary roads, as mitigated by project design criteria (PDC), were disclosed in chapter 3 of the EIS. Also see responses to attachment #4, appendix D.5. After review and consideration of the effects described in chapter 3, the specialists' reports, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 3-14	**Request for final NEPA document modifications:** Please analyze an alternative in detail that does not construct any new roads (temp or system). The no new roads alternative stands out among the infinite number of alternatives because it reduces the adverse environmental effects of the proposed action while still meeting the purpose and need for the project even though slightly less output would be generated. **Please see Attachment #4**. (Individual).
Response:	See responses to Comments 3-10, 3-12 and 3-13. Based on the analysis, no changes are needed to the EIS relative to this comment.

Comment: 3-15	Most American recreationists will avoid areas that have been logged. Jones, you are proposing to take action that will reduce the revenue for businesses in local communities that rely on recreation dollars: motels, sporting goods stores, restaurants, gas stations, grocery stores etc. You cannot have both. (Individual).
Response:	An economic analysis, appropriate to the scope of the project and suitable for providing a comparison between alternatives, has been conducted. A more in-depth economic analysis was completed for the FEIS for the Forest Plan, discussing trade-offs between projected revenues by Forest Plan alternative (Forest Plan FEIS, pg. 3-462). This project-level analysis seeks only to implement Forest Plan direction. Additionally, it is critical that the Forest Service appropriately address potentially unsafe and hazardous issues that could pose substantial risk to human health and safety.

Comment: 3-16	**Comment #6:** Jones, at page 39 of the DEIS you say: "*The public would most likely obtain an equivalent amount of wood products from other sources, including private land or other countries."* Since the volume doesn't have to come off the why do you inflict the massive damage to the natural resources described in Chapter 3 in the sale area when you know you don't have to? There is much more value to dead trees if left in the woods than there is logging them to assure all of your NFTM dollars are spent this FY. U.S. Undersecretary of Agriculture Jim Lyons states that recreation revenues from national forests significantly exceed timber revenues. See. http://www.americantrails.org/resources/economics/EconForestRec.html There are more businesses in communities near the Rio Grande National Forest that depend on recreation revenues than there are businesses that depend on timber revenues. How will these business owners react when they read in the paper the USFS is taking action that will reduce their revenues? (Individual).
Response:	The referenced statement acknowledges that, while the National Forests are not the sole source of wood products in this region, they are a substantial source. As described in the EIS (Section 3.13 –Social-Economics), both recreation and other activities, such as forest product cutting and removal and livestock grazing contribute to the diversity of the local, rural economy. Based on scoping responses for this project, concerns identified by the local businesses would be minimized by PDC such as cutting hazard trees to protect ski yurts and fences, limiting hauling during the July 4th weekend, and prohibiting winter hauling to reduce conflicts with winter recreation. See table 2-1 for other project design criteria. See also response to Comment 3-15.

Comment: 3-17	**Request for final NEPA document modifications that appeared in the objector's comments**: Please omit the Purpose & Need statement that tells the public this project is needed to "*Provide forest and wood products"* and "*utilized for wood products or contribute to sustained yield of forest products*". Please see **Attachment #1.**(Individual).
Response:	The Forest Service feels that the purpose and need for the project, as well as the proposed action, are consistent with the Forest Plan and appropriate for the Management Area Prescriptions and circumstances for which they are written and no changes are needed to the analysis based on this comment. Responses to attachment 1 are located in appendix D.5.

Comment: 3-18	Herbicides Containing Glyphosate must Never be used on Public Land for Any Reason At page 3-43 the DEIS states: *"Canada thistle is very treatable and easy to control if caught early;"* The DEIS does not indicate which herbicides will be applied. All herbicides are not the same Herbicides containing glyphosate are potentially lethal. Other herbicides are toxic but not lethal. As a retired USFS employee I understand the potential damage to natural vegetation that will occur if non-native invasive plants are not eradicated. I also know there are effective (although a little more costly) alternatives to killing these plants other than applying the lethal herbicides that contain glyphosate (Individual).
Response:	Currently the Forest uses *Milestone,* which preferred because of its non-volatile formulation and low use rates; it provides effective control with reduced exposure for workers and for the environment. The evaluation of herbicide use, including Glyphosate, on all public lands is outside the scope of this analysis. Herbicides containing Glyphosate are allowable to use within the analysis area and are registered by the Environmental Protection Agency (EPA) for use in vegetation treatments. Glyphosate is a non-selective broad spectrum herbicidal effective against a wide range of annual and perennial weeds. Therefore, due to Glyphosate's non-selective properties, it is ***not*** a preferred herbicide to use in the project area to treat Canada thistle, since thistle usually grows in association with other desirable plants.

Comment: 3-19	**Comment #7:** Literature authored by independent scientists not connected with Monsanto or the USFS indicates mammals that eat contaminated foliage and humans that might brush against contaminated foliage or eat contaminated berries have been known to suffer from the following as a result of glyphosate contact: birth defects, non-Hodgkin's lymphoma, mitochondrial damage, cell asphyxia, miscarriages, attention deficit disorder endocrine disruption, DNA damage, skin tumors, thyroid damage, hairy cell leukemia, Parkinson disease, premature births, decrease in the sperm count, harm to the immune system in fish death of liver cells, severe reproductive system disruptions and chromosomal damage. Glyphosate is persistent and remains active for several days after being applied. The following web sites are just a few that describe the terrible effects to the health of organisms that are unfortunate enough to make contact with glyphosate-containing herbicides and the USDA involvement: http://www.organicconsumers.org/articles/article_15573.cfm http://www.counterpunch.org/2008/12/18/another-shill-for-monsanto/ http://www.veganreader.com/2008/12/18/obama-blows-it-with-monsantos-vilsack-lbam-spray-victims-beware/ http://www.dirtdoctor.com/Glyphosate-Danger-to-Livestock-Plantsbr_vq3915.htm … Glyphosate kills aquatic life even if the concentrations of the chemical in water are very low. The fish deaths will occur in the streams in the project area and a few miles downstream. Herbicide mist should never be allowed to contact water … even so-called aquatic-safe herbicides.(Individual).
Response:	See response to Comment 3-18. To meet agency requirements for controlling invasive species, the environmental effects of herbicides or other control methods on the Rio Grande National Forest were evaluated in a separate EA (*Management and Control of Noxious Plants on the San Juan and Rio Grande National Forests*, 2012). The EA requires the adherence with label instructions plus prescribes other requirements to protect wildlife, sensitive plants, water quality, and visitors.

That document and decision guides the safe use and application of herbicides and since glyphosate-containing products are not generally used to control Canada thistle, it will not be discussed further in this analysis.

Comment: 3-20	NEPA requires you to analyze environmental effects that may or might (emphasis added) occur when the Proposed Action is implemented. The 2 attachments to these comments related to glyphosate **(Attachments 9a and 18)** contain detailed explanations by hundreds of unbiased scientists about the horrid health effects of glyphosate exposure listed above. Just because you have a single outdated USFS-sanctioned document showing glyphosate is safe does not relieve you from analyzing the possible dangers to mammals (including humans) and fish based on hundreds of science documents presented in the attachments that describe how glyphosate is potentially lethal. (Individual).
Response:	See response to comments 3-18 and 3-19.

Comment: 3-21	**Comment #8:** Jones, would you apply a chemical to your yard where children play in the grass that was banned in Denmark 10 years ago because of its lethal effects? See: http://www.twnside.org.sg/title/service76.htm (Individual).
Response:	This question is outside the scope of this analysis.

Comment: 3-22	***Comment #9***: Jones, would you apply a chemical to your yard where children play in the grass that the Institute of Science in Society based in London England calls for banning in England? See:http://www.i-sis.org.uk/about.php and http://www.i-sis.org.uk/Ban_Glyphosate_Herbicides_Now.php. … Glyphosate-containing herbicides are also connected to bee Colony Collapse Disorder (CCD) that's currently driving bees towards ESA listing. The websites below describing the possible link between glyphosate and CCD are too numerous to ignore. (Individual).
Response:	This question is outside the scope of this analysis.

Comment: 3-23	**Request for final NEPA document modifications**: Please tell the public there are alternatives to herbicides that effectively eradicate noxious weeds non-native plant species. Make sure you don't tell the public you will not use these alternatives because they are too expensive. I'm sure the vast majority of the general public will think using the more expensive alternatives to herbicides is a wise use of their tax dollar. Please tell the public that no glyphosate-containing herbicides will be used to treat non-native plants noxious weeds in the ROD. Jones, if you insist on applying glyphosate-containing herbicides, then include Attachments #9a and #18 in an electronically available appendix to the final EIS. (Individual).
Response:	See responses to comment 3-18 and 3-19; no changes are needed to the analysis based on this comment.

Comment: 3-24	**The DEIS for the Cumbres timber sale does not "identify methods and procedures required by to "Identify methods and procedures to insure that presently unquantified environmental amenities and values may be given appropriate consideration."** **Comment #10:** Simply stating that amenity resource values have been considered in the NEPA document is not enough. The Responsible Official must "identify the methods and procedures used to assure appropriate consideration." **Request for final NEPA document modifications:** Please identify and discuss the methods and procedures used by the Responsible Official to insure that presently unquantified environmental amenities and values are given appropriate consideration. (Individual).
Response:	The expected effects of three alternatives were analyzed in detail and disclosed in chapter 3 of the EIS. These effects analyses include 21 distinct values, some quantifiable and others not, along with the methods used for evaluation. These alternatives give the Responsible Official a range of effects and trade-offs to consider. The balancing or weighing of resource values will be done in the Record of Decision. Based on the analysis and other considerations the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives. Based on the analysis, no changes are needed to the Cumbres EIS based on this comment.

Comment: 3-25	**Jones, if you are really concerned about aquatic species' health the final EIS MUST indicate that all newly constructed temporary roads will be obliterated after use and you must do it.** The DEIS indicates temporary road construction is a connected action to this timber sale. Please obliterate all temporary roads after use and tell the public this will be done in the final EIS. An obliterated road contains no running surface, because the natural sideslope that existed before the road was constructed is reestablished. Not obliterating a road because the line-officer will use it again to haul logs from the area means the road is not temporary! Road that will be used again in the future should be constructed to system road standards, or not at all. **Comment #11:** Since temporary roads are outsloped with no ditch, sediment that is generated during precipitation events, find its way to streams and harms the aquatic resources for decades until the next timber sale reconstructs the so-called "temporary" road. Then the riparian resource cycle of destruction begins again. The final EIS should clearly state these roads will be obliterated after use such that the sideslopes are as they were before construction. The CMPs will be removed and a running surface does not exist. **Request for final NEPA document modifications:** Please obliterate temporary roads to reduce sediment generation rather than decommissioning them. Please see **Attachment #4**. (Individual).
Response:	Road decommissioning/rehabilitation would occur on any temporary roads used for this project.. Road decommissioning is defined as: "Activities that result in the stabilization and restoration of unneeded roads to a more natural state." (36 CFR 212.1, FSM 7705 - Transportation System). Forest Service Manual 7712.11-Exhibit 01, identifies five levels of treatments for road decommissioning which can achieve the intent of the definition. These include: 1) Block entrance; 2) Revegetation and waterbarring; 3) Remove fills and culverts; 4) Establish drainage-ways and remove unstable road shoulders; 5) Full obliteration recontouring and restoring natural slopes. These five treatment levels provide the ID team and Responsible Official a wide range of options to stabilize and restore unneeded roads. The determination of what treatment level or combination of treatments is used is based on the watershed and roads analysis. In some cases restoration may be achieved by blocking the entrance. In other situations, objectives to restore hillslope hydrology may require full obliteration re-contouring. Full road obliteration is not proposed in this project, since the IDT determined that resource protection would be adequate by implementing levels 1 through 4 for all temporary roads. In addition to being very costly, total obliteration often results in more acres of disturbance and initially more erosion from the site.

Comment: 3-26	**The Opposing Views Attached to these Comments Describe the Resource Degradation and Destruction of Conditions Necessary for Proper Natural Resource Functioning that will Occur when the Timber Sale is Implemented** The attachments to these comments present the "responsible" opposing views of hundreds of independent, unbiased Ph.D. biological scientists who describe the resource damage caused by the majority of commercial timber and road construction sale activities taken at any location, on any topography, at any elevation, at any time. **Comment #12:** Jones, your responses to each of these opposing views is governed by 40 C.F.R. § 1502.9(a) and 1502.9(b) which mandate a response to each opposing view. Please note that these laws do not allow the Responsible Official to **NOT** provide the public with meaningful responses to opposing views: 1) because they are opinions. Indeed, viewpoints and opinion are synonyms, 2) because of their source (e.g. newspapers, professional journals, scientific literature etc.), 3) because their source has not been peer reviewed, 4) because the opposing views are not site-specific to this timber sale (Individual).
Response:	The expected effects to resources due to the implementation of any of the three alternatives considered in detail are disclosed in the EIS, chapter 3. Effects of implementing either of the action alternatives would be mitigated by project design criteria (table 2-1). IDT consideration of and responses to the "opposing views attachments" are located in appendix D.5.

Comment: 3-27	**Request for final NEPA document modifications:** Please review this project in light of the best science attached to the objector's comments and acknowledge, summarize and describe the science conclusions of hundreds of independent, unbiased scientists regarding the adverse impacts of timber sale activities at any location. This would include the science viewpoints quoted in **attachments #1, #4, #9a, #15 and #18**. When acknowledging these science viewpoints please organize them by issue. (Individual).
Response:	As shown in the EIS, the Forest Service fully supports the use of best available science as part of project planning, developing project design criteria, and monitoring. IDT consideration of and responses to "opposing views" attachments are located in appendix D. Review and consideration of the comments in the attachments resulted in no changes to the EIS. Changes between DEIS and FEIS are described in section 1.9, FEIS.

Comment: 3-28	**The Cumbres timber sale proposal is the antithesis of what the American public wants to occur in their national forests** The following quote comes from a forest service publication that describes what the public wants from their national forests: *"The public sees the restriction of mineral development and of timber harvest and grazing as being more important than the provision of natural resources to dependent communities (although this is still seen as somewhat important)*." (Pg. 28) Source: "Survey results of the American public's values, objectives, beliefs, and attitudes regarding forests and grasslands: A technical document supporting the 2000 USDA Forest Service RPA Assessment". Gen. Tech. Rep. RMRS-GTR-95. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 111 p. Link to Complete Report: http://www.fs.fed.us/rm/pubs/rmrs_gtr095.pdf (Individual).
Response:	This publication reports telephone survey results based on 7,069 respondents nationwide and was completed in support of the USDA Forest Service Strategic Plan submitted to Congress in 2000. The survey consisted of responses to 170 statements on a scale of unimportant/favorable to very important related to the national goals and objectives of the agency in 2000. The results were very general and are not necessarily representative of local values, as related to the Cumbres project. Project Design Criteria (PDC) are incorporated to address concerns expressed by local recreational permittees and other users of the area during scoping. Timber harvest activity is also restricted by the Forest Plan through Management Area Prescriptions, Standards & Guidelines, and Allowable Sale Quantity.

Comment: 3-29	**Comment #13:** Jones, there is no "timber famine" as the USFS has been so fond of predicting for many decades. There is no shortage of raw materials for paper and wood products in the United States otherwise the owners of private timberland would not be exporting their lumber. Any national or regional poll or survey indicates the vast majority of the public doesn't want their public land harvested for any reason. In the final EIS please tell the public why this sale is an exception. (Individual).
Response:	The EIS made no claim that there is a timber famine, nor based any decisions upon that concept. Instead, part of the purpose and need is to meet Forest Plan direction for multiple-use objectives by providing wood products from management areas that are part of the suitable timber base as a result of a bark beetle epidemic (EIS, section 1.4, Forest Plan and Related Direction).

Comment: 3-30	**Request for final NEPA document modifications that appeared in the objector's comments:** Please include a discussion and supporting data in the final EIS showing either: 1) the majority of the general public approves of logging their national forests, or 2) majority of the general public does not approve of logging their national forests. Please designate the resource damage describe in **Attachment #1** that the public appreciates and hopes for. (Individual).
Response:	The Cumbres Vegetation Management Project is a site-specific, local project. Based on the few comments received from the general public during scoping and other opportunities to provide feedback on this project, the general public is either in support of the project or currently has no concerns about the project. Responses to the attachment #1 are located in appendix D.5. Based on the analysis, no changes are needed to the Cumbres EIS based on this comment.

Comment: 3-31	**The EIS does not specifically state "whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted."** Some lay members of the public will not be able to determine if all practicable means to avoid or minimize environmental harm to the natural resources in the forest unless the Responsible makes this statement. However, don't include this statement unless it's true and the "practicable means to avoid or minimize environmental harm" are listed and discussed. **Request for final NEPA document modifications:** Please assure that the selected alternative avoids or minimizes environmental harm and state in the EIS that "all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted." (Individual).
Response:	The expected effects of the three alternatives that were analyzed in detail are disclosed in the EIS. The effects of alternatives 2 and 3 were described based on the inclusion of the project design criteria listed in table 2-1. The determination if "*all practicable means to avoid or minimize environmental harm*" has occurred will be made by the Responsible Official in the Record of Decision, which will be based on the analysis and other considerations as determined by the Responsible Official after a course of action is selected. Based on the analysis, no changes are needed to the Cumbres EIS based on this comment.

Comment: 3-32	**The Purpose & Need is written so narrowly that it excludes all reasonable alternatives to the Proposed Action. Such a narrow Purpose & Need allows you to reject all (emphasis added) alternatives submitted by the public in good faith in the "Alternatives considered but eliminated from detailed study" category. This behavior is not acceptable.** **Comment #14:** Jones, you follow the USFS script perfectly. You have approved a Purpose & Need statement written by the IDT so narrowly it gives you justification to reject all alternatives suggested by the people you supposedly serve by placing them in the "Alternatives considered but eliminated from detailed study" category. This assures your Proposed Action that you selected for implementation before you scoped the project would have no competition. **Request for final NEPA document modifications:** Please write a new (expanded) Purpose & Need that allows reasonable alternatives to the Proposed Action to be analyzed in detail. This Purpose & Need must deal with project goals that are not mutually exclusive. That is, achieving one goal must not degrade the resources indicated by another goal that need improvement. Then reinitiate the NEPA comment and analysis process to analyze the new reasonable alternatives, especially those suggested by the public during the comment period. (Individual).
Response:	The purpose and need for this project was developed to address the effects resulting from epidemic population levels of spruce beetles that have created thousands of acres of dead and dying trees in both the Cumbres project area and across the Forest. As described in section 1.4 of the EIS, active management to address the effects of insect activity is appropriate in this project area, which is located in a multiple-use Management Area Prescription. The purpose and need was developed to address the existing conditions; the short and long-term effects of implementing the proposed treatments are disclosed in the EIS. No change to the purpose and need is warranted and no changes are needed to the Cumbres EIS based on this comment.

Comment: 4-1	I. THE PROJECT IS UNNECESSARY AND NOT LIKELY COMMERCIALLY VIABLE. Part of the purpose of the project is to: Regenerate treated portions of the forested acres killed by bark beetles in order to accelerate the rate of forest and ecological recovery over the long term. DEIS at 1. However, there is already abundant regeneration in the area. Of the 22 treatment units in the project area, one has 1850 trees per acre, three others have over 1000 per acre, and only two units have less than 565 trees per acre. Id at 38. This is more than ample regeneration for a new forest! Logging the overstory, however, would kill some of the understory regeneration, as trees would be broken or uprooted during felling and skidding operations. If the species mix has less than the desired component of Engelmann spruce, fill-in planting of this species could be done (Environmental Conservation/ Preservation)
Response:	The Forest Service agrees that some regeneration mortality or damage would occur through harvest operations. Our primary interest concerning regeneration, however, is to promote establishment in areas that are non-stocked or under-stocked. We expect many of these areas to be created when severe mortality removes the seed source in locations that currently have few seedlings and saplings. A secondary interest concerning regeneration is the species composition of stands, as noted in the comment. Although some areas may gain adequate numbers of trees over time, research indicates that long-term species composition can be altered by a spruce beetle outbreak for 125-175 years (Schmid and Mata 1996). Successional pathways will retain species within the stand over time to varying degrees, but Forest Plan direction intends for some areas to be maintained with commercially valuable species at ages, densities, and sizes that allow growth rates and stand health conducive to providing a sustained yield of forest products (USDA Forest Service 1996, pp. IV-27). Part of the purpose and need for this project (EIS, section 1.3) is the desire to accelerate the rate of ecological recovery in alignment with the Management Area Prescription. Though there are many variables, the commercial sale of forest product can help offset the cost of tree planting.

Comment: 4-2	Another part of the purpose of the project is to "[s]alvage dead or dying trees while the value remains high…". DEIS at 1. However, it seems doubtful that this could occur. In the first place, there is a question about whether sales of material from the project area would sell. Presumably, it would be offered in large chunks to economize on the agency's preparation and offering costs. But there is no entity likely to buy this much wood. The one large mill in Colorado, in Montrose, is over 200 miles away. (Environmental Conservation/ Preservation)
Response:	The distinction between this analysis and the amount of timber offered within a specific timber sale should be made. The estimated volume within this analysis would not be offered in one timber sale, but likely through a series of sales over several years (EIS, section 1.5). Currently the RGNF offers and sells more than 10 MMBF per year. At that rate, the volume within this project could realistically be sold within a 2-3 year span. Because these sales would be combined with sales from other projects across the Forest, we anticipate sales over a 5 year span. All previous salvage sales offered within the Cumbres Pass area have sold to various purchasers, including Montrose Forest Products. Many of the sales have been dead for over 5 years.

Comment: 4-3	Also, how commercially viable will the wood be by the time it is cut? Beetles have already killed most of the standing spruce, as mortality of spruce trees eight inches and larger in diameter was said to be 95 percent in each stand in 2013. DEIS at 38. By the time this wood is harvested, most of it will have developed splits and weather checks, and may have insect activity (e. g., round-headed borers) that would make it useless for dimension lumber. The Forest Service should state why it believes that proposed sales from the area will be commercially viable. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-2.

Comment: 4-4	A much smaller and more implementable project that would meet most of the stated purpose and need should be considered and analyzed as an alternative in the EIS. Project purposes in addition to the ones discussed above, such as removal of hazard trees and fuel reduction in the area adjacent to private land, could be met with such an alternative. Firewood could continue to be provided, fulfilling the project purpose of providing "forest and wood products" to the people of the San Luis Valley. Small sawtimber sales could be offered (assuming the wood is still viable for such use, which is unlikely, as argued above) from hazard trees, the treatments near private land, and minor fuel reduction elsewhere. An alternative not requiring any new road construction would better "[u]tilize the existing transportation network as much as possible to minimize both resource impacts and road construction costs". Id. at 2. (Environmental Conservation/ Preservation)
Response:	After review and consideration of the effects described in chapter 3, the specialist reports that are part of the project record, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 4-5	II. FAILURE TO CONSIDER AN ADEQUATE RANGE OF ALTERNATIVES VIOLATES NEPA. Under the Council on Environmental Quality Regulations implementing the National Environmental Policy Act, "agencies shall…rigorously explore and objectively evaluate all reasonable alternatives". 40 CFR 1502.4(a). Reasonable alternatives are those that are viable, feasible, meet the stated goals of the project, or are reasonably related to the purposes of the project. Idaho Conservation League v. Mumma, 956 F.2d 1508, 1519 (9th Cir. 1992); City of Carmel-By-The-Sea v. U.S. Dept. of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997); Trout Unlimited v. Morton, 509 F.2d 1276, 1286 (9th Cir. 1974). An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action, sufficient to permit a reasoned choice. (Environmental Conservation/ Preservation)
Response:	The range of alternatives evaluated was determined adequate to meet the purpose and need for this project (EIS, section 1.3) and address the issues identified (EIS, section 1.8). The Issues specifically addressed regeneration, the effects of roads on watersheds, and the effects on lynx habitat. The range of alternatives considered is described in sections 2.2 - Alternatives Considered in Detail and 2.4-Alternative Considered, but Eliminated from Detailed Study. Collectively, these represent a reasonable range of management options for this project and therefore comply with NEPA direction. The Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 4-6	An EIS is inadequate if a viable alternative is not examined. See 833 F.2d 810 (9th Cir. 1987; rev'd on other grounds - 490 U.S. 332 (1989)). The "existence of a viable but unexamined alternative renders an [EIS] inadequate." Mumma, 956 F.2d at 1519; Resources, Ltd. 8 F.3d at 1401-02. For Cumbres, it is especially important to consider one or more alternatives that would minimize adverse impacts, including those to a threatened species. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-5.

Comment: 4-7	The EIS must have at least one additional alternative – one that meets most of the purpose and need without massive logging and the adverse impacts to lynx and watershed, which are discussed in detail below. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-5.

Comment: 4-8	III. LYNX HABITAT WOULD BE NEEDLESSLY DESTROYED AND DEGRADED. There would be major adverse impact to lynx habitat in the project area from implementation of either DEIS action alternative. Any spruce trees infested with beetles or already dead that are eight inches and greater in diameter could be cut. DEIS at 10. Since overstory composition is at least 58 percent (and as high as 100 percent) spruce in each proposed treatment unit (DEIS at 38), and 95 percent of the overstory spruce trees are said to be dead (ibid.), most of the overstory in most units is likely to be removed. This would eliminate most overhead cover and destroy lynx habitat. Dense horizontal cover (DHC), i. e., existing regeneration, would also be destroyed, and not return for 30 years or so. Id. at 47. This is "*expected to result in very low to no lynx reproduction that could cause lynx to abandon their home range and look for prey resources elsewhere*". Ibid. (Environmental Conservation/ Preservation)
Response:	The effects to Canada Lynx have been thoroughly analyzed within the Biological Assessment for Threatened and Endangered Species. These effects are summarized in section 3.4 of the FEIS. The analysis assumes that where DHC occurs, an estimated 30% could be damaged. The actual level of damage will be monitored in any harvested acres (section 2.6, FEIS). As stated in section 3.4, impacts to vegetation would be temporary and would occur on a small portion of the LAU.

Comment: 4-9	Overall, about 79 percent of the lynx habitat within the project area would be affected by implementation of preferred alternative 2. Id. at 49. 1291 acres would be converted to the stand initiation structural stage (SISS) (FEIS at 19, 50), which is unsuitable for lynx. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-8.

Comment: 4-10	Since dense horizontal cover would be destroyed or degraded as a result of logging operations, the preferred alternative would violate Standard VEG S6 in the Southern Rockies Lynx Amendment (SRLA), which prohibits reduction of snowshoe hare habitat in multi-storied mature or late successional conifer forests. SRLA Record of Decision (SRLA ROD) at Attachment 1-5. There are four exceptions to this prohibition, one of which could apply to the Cumbres Project: "[f]or incidental removal during salvage harvest (e.g., removal due to location of skid trails)". Ibid. But this would only cover a small portion of the project area and would not eliminate the violation of the standard. We find no discussion in the DEIS of compliance (or not) with Standard VEG S6. (Environmental Conservation/ Preservation)
Response:	As written currently within the SRLA 2008, the incidental removal of dense horizontal cover (DHC) that is applicable to VEG Standard S6 is allowable under salvage harvest, but it is limited by a Forest-wide baseline cap (please refer to section 3, pg. 9. SRLA, 2008). However, DHC must meet the specific criteria defined in the SRLA to be applicable to VEG S6. As defined in the implementation guide: DHC must reside within a multi-storied or late successional forest that contains at least 40% canopy cover to be applicable to VEG S6 (section 3, pg. 23. # 34.SRLA 2008). There is no limit to the amount of incidental removal of DHC that does not meet these criteria, even if it's high quality winter snowshoe hare habitat; this is addressed through Project Design Criteria. Most importantly, it is also addressed in calculating the total acres of impact on lynx habitat. Detailed information regarding this can be found within the Biological Assessment for this project. The action alternatives are compliant with Standard VEG S6, due to exception 3, as displayed in table 3-4. The EIS further states in the Effects Summary for Canada Lynx that "The Standards and Guideline of the Southern Rockies Lynx Amendment would still be met with the implementation of this project."

Comment: 4-11	Construction of new roads and use of existing ones for operations would make access easier for recreation, especially snowmobiles. Id. at 48. Snowmobiles compact snow, possibly increasing competition for lynx prey, as species like coyote and fox would be able to access prey in lynx habitat, where deep (uncompacted) snow would normally prevent such access. Snowmobile use could also damage seedlings and saplings by crushing them or compacting snow over them, delaying the annual snow melt. The latter would increase the risk of snow molds and reduce the already short growing season. (Environmental Conservation/ Preservation)
Response:	Deep, uncompacted snow does not prevent access from other predators such as the coyote. Competition from these species still does occur in those conditions. However, as noted in the Wildlife Report, repeated snowmobile traffic does result in compaction and *may improve* the ability of these competitive predators such as the coyote to access lynx habitat. All effects have been thoroughly analyzed and disclosed in the Biological Assessment for this project.

Comment: 4-12	It is unlikely that riparian buffers would be sufficient to maintain connectivity, as required by the SRLA ROD, Standard All S1. The project area outside of these buffers would be too open to allow connectivity through the project area. Lynx might not be able to find the buffers, and would avoid the area altogether. (Environmental Conservation/ Preservation)
Response:	In addition to the Water Influence Zones, all live spruce trees (trees not dying from beetle infestation); all subalpine fir and aspen would not be harvested except where safety and operational conditions warrant. These could provide sufficient cover and security for movement across the area. In addition, remaining dense horizontal cover greater than 35 percent and lower quality summer foraging habitat should not only provide snowshoe hare habitat, but could also provide some level of cover and habitat connectivity

Comment: 4-13	Lynx habitat is being adversely affected by the spruce bark beetle-caused mortality; however, stands with dead standing spruce remain suitable lynx habitat. DEIS at 46. By contrast, areas that are cut as proposed would bring the stands into SISS (id. at 47), which is unsuitable for lynx, and also destroy DHC, which is snowshoe hare winter habitat. (Environmental Conservation/ Preservation)
Response:	All effects have been thoroughly analyzed in the Biological Assessment for this project which is summarized in section 3.4 of the FEIS.

Comment: 4-14	Cumulative impacts to lynx are grossly understated. Logging similar to that proposed in the Cumbres Project area has been approved and is occurring in the County Line Project area, which is just to the west of Cumbres. Both are in the Rito Archuleta LAU. See County Line (CL) FEIS at A-7. Under selected alternative B (see CL ROD at 2), 715 acres were to be thinned and 841 acres treated with sanitation/salvage. CL FEIS at 2-5. With the heavy and pervasive beetle mortality, many of the proposed thinned areas likely were dead by the time of harvest and were salvaged or will be. In other words, cuts in CL have been (and any remaining ones will likely be) removal of overstory, converting lynx habitat to unsuitable. This means that a block of over 4000 acres of land will be mostly unsuitable for lynx. This will make it even more difficult for lynx to find habitat in the area, a situation acknowledged to already be a problem (DEIS at 47). (Environmental Conservation/ Preservation)
Response:	Consultation with the USFWS was completed for the County line project, with a concurrence on April 7, 2004 with a determination of "*May Effect, Not likely to Adversely Affect*" Canada Lynx. However, spruce beetle activity has increased dramatically in the County Line area until 2010, and has spread into and across into the Cumbres analysis area from the west at epidemic rates. The mature tree component within the County line analysis area is now expected to be predominantly dead or dying. These types of existing conditions have been accounted for and addressed within the species effects analysis of the Cumbres EIS. See also response to Comment 3-3.

Comment: 4-15	[…]But strangely, we find no discussion of this in the DEIS. In fact, *"Federal actions are not addressed under Endangered Species Act (ESA) requirements. The US Fish and Wildlife Service addresses federal actions separately through their own Section 7 Consultation.*Id. at 52. However, NEPA still requires the disclosure of all cumulative impacts. See 40 CFR 1508.25(a)(2). Therefore, the Cumbres EIS must disclose the impacts of other past, present, and reasonably foreseeable future projects, regardless of which land ownership on which they could occur. As discussed above, cuts in the adjacent CL Project will reduce lynx habitat. Thus failure to disclose cumulative impacts occurring on federal land gives a very distorted picture of the overall impacts of the Cumbres Project as proposed. The EIS must discuss the recent and expected implementation of the CL project and how this would contribute to cumulative impacts to lynx. Any other projects in the vicinity, whether in the Rito Archuleta LAU or not, must also be considered in the cumulative impacts analysis. (Environmental Conservation/ Preservation)
Response:	See response to Comments 3-3 and 3-14. Habitat losses from other federal projects within the same LAU, whether completed or not, are included in the analysis as part of the baseline condition. This measurement of past action, in addition to proposed and foreseeable actions (including all state, private, and tribal activity) is utilized in Section 7 consultation to measure cumulative effects. This consultation process has resulted in a determination of "*May Affect, Likely to Adversely Affect the Canada Lynx*," as concurred with by the USFWS in the project-level Biological Opinion.

Comment: 4-16	Because the determination for lynx under the preferred alternative is "likely to adversely affect", if the Forest Service intends to proceed with this project, formal consultation with the U.S. Fish and Wildlife Service (FWS) is required under the Endangered Species Act. 16 U.S.C. 1536(a)(4). The FWS' Biological Opinion (BO) must be released to the public prior to approval of any project in the analysis area for which a likely-to-adversely-affect determination is made. The BO will recommend "reasonable and prudent" alternatives, conservation measures, and terms and conditions, and contain an incidental take statement, all of which would affect how the project could be implemented. Thus the public must be allowed to comment on the proposed measures recommended by the FWS prior to the project being noticed for objection. (Environmental Conservation/ Preservation)
Response:	Formal consultation with FWS occurs when the Responsible Official determines a course of action and a Decision is made regarding the selected alternative. The exemptions and exceptions allowed for in the SRLA considered lynx habitat needs at a multi-forest landscape scale; Table 3-4 clearly displays how each alternative meets these exemptions and exceptions and discusses and discloses the current habitat baseline at the smaller habitat scales of the Forest and Lynx Analysis Unit (LAU). Section 3.4- Direct and Indirect Effects on Canada Lynx summarize the key points of the effects analysis for the range of alternatives considered on lynx and their habitat. When the Selected Alternative is determined, the Wildlife Report and Biological Assessment will be finalized and made part of the Project Record. Any Conservation Recommendations included in the project level BO will be reviewed and included in the project design criteria or elsewhere in the FEIS, as appropriate. The BO will also be made available during the administrative review process.

Comment: 4-17	Because of the damage and destruction of lynx habitat that would occur under the preferred alternative, <u>we strongly recommend no action or a much lighter alternative, one that would not seriously and adversely affect lynx habitat</u>. (See sections I and II above for a description.) Note that the no action alternative is the best for lynx: Overall, under a non-wildfire scenario, this alternative would allow natural disturbances such as spruce beetles to slowly re-shape the forest; providing the best opportunity for a continued and naturally created mosaic pattern across the landscape that would continue to provide suitable habitat for lynx as natural processes continue. DEIS at 46. (Environmental Conservation/ Preservation)
Response:	After review and consideration of the effects described in chapter 3 for all alternatives, the specialist's reports, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives. Based on the analysis, no changes are needed to the Cumbres EIS based on this comment. .

Comment: 4-18	A fire is always possible of course, but is not especially likely given the high elevation and high precipitation of the project area. See DEIS at 79, 94, 95, 97. Trees will lose their needles after bark beetle mortality and likely remain standing for decades, during which time the risk of a crown fire is low because there are not many crowns, and fire cannot easily jump from one snag to another. Much of the area has already been cut, reducing the potential for a crown fire before the needles fall off the beetle-killed trees. (Environmental Conservation/ Preservation)
Response:	The proposed action is not designed to reduce the occurrence or influence the spread of crown fires, but to reduce surface fire flame lengths, fire intensity, and associated soil heating impacts. Engelmann spruce that have been affected by spruce beetle mortality on the Forest have been retaining fine branch wood for several years after the needles fall off. This fine branch wood was a significant factor in crown fire initiation and spread as well as spotting on the West Fork Complex fire in 2013 that occurred on the Forest. Under the proposed action there may also be some reduction in crown fire initiation and spread in the next 5-10 years as a result of removing standing dead trees with their associated fine branch wood, and by increasing the canopy spacing.

Comment: 4-19	To substantially reduce the threat of fire, if that could even be done, widespread logging would have to be done, which would destroy much lynx habitat. But intensive logging could fail to decrease, or even increase, the spread of any fire because the cut stands would more open, allowing increased wind speeds and fire spread. DEIS at 96. (Environmental Conservation/ Preservation)
Response:	The proposed action is not designed to reduce the threat of fire, but to reduce surface fire flame lengths, fire intensity, and associated soil heating impacts. Increased sunlight to the forest floor resulting from the trees dying will likely increase herbaceous cover and fine fuel loads regardless if the area is logged or not. The same holds true for increased wind speed. These two factors (increased fine fuels and increased wind speed) will likely increase the surface fire rate of spread, but may not have a significant effect on fire intensity. Fire intensity is more dependent on the amount of larger fuels that have accumulated on the forest floor.

Comment: 4-20	Any benefits derived from implementation of alternative 2 would be far exceeded by the adverse impacts. (Environmental Conservation/ Preservation)
Response:	The expected beneficial or adverse effects of three alternatives were analyzed in detail and disclosed in the EIS, chapter 3. These alternatives give the Responsible Official a range of effects and trade-offs to consider. The balancing or weighing of resource values and trade-offs will be done in the Record of Decision, when a course of action is determined. Based on the analysis and other considerations the Responsible may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 4-21	IV. OTHER WILDLIFE SPECIES WOULD BE HARMED BY THE PROPOSED PROJECT. Species other than lynx would be harmed by the proposed removal of much of the overstory in the project area. These species include, but are not limited to: marten, boreal owl, northern goshawk, golden-crowned kinglet, red crossbill, olive-sided flycatcher, boreal toad, and elk. These species use the area for nesting, cover, and/or foraging. Removal of the overstory, even a mostly dead one, would degrade or eliminate this habitat. (Environmental Conservation/ Preservation)
Response:	Section 3.4 contains a summary of the potential short and long-term effects of the project upon various wildlife species including Threatened, Endangered and Region 2 designated Sensitive species, Management Indicator Species, Migratory Birds and General Wildlife found on the Forest. A more thorough analysis of potential effects is included in the project Wildlife Report.

Comment: 4-22	V. PROTECT SOILS AND WATERSHEDS. There have been many previous logging projects in the area (see DEIS Appendix C), but watershed improvement projects and natural recovery "contribute to the current healthy watershed condition". DEIS at 78. Several closed and decommissioned roads in the headwaters Rio de los Pinos watershed have good vegetative cover and are causing minimal impact. Id. at 83. However, a considerable amount of road work would be required to implement preferred alternative 2: 0.8 miles of new temporary road, maintenance and reconstruction of 7.5 miles of old non-system roads and 5.8 miles of decommissioned road, and maintenance and use of 5.0 miles of roads currently closed to public us and 12.5 miles currently open. DEIS at 11. Of particular concern is the reopening of Road 118.1A, which could adversely affect fisheries: reopening the decommissioned road that parallels Rio de los Pinos (FSR 118.1A), poses serious concern with potential impacts to the stream. This road crosses several small tributaries and numerous seeps/springs that flow directly into Rio de los Pinos; it was previously closed and decommissioned due to impacts to the stream. The old roadbed has re-vegetated and the impacts to Rio de los Pinos have been minimal since the closure. The proposed re-opening of this road <u>is a major concern to the health of Rio de los Pinos</u> and would require careful design and monitoring to ensure impacts to stream habitat are minimized. DEIS at 67; emphasis added. All of the road work needed to implement the proposed project would increase detrimental disturbance and connected disturbed area. This would delay continued recovery of the affected watersheds and reverse some recovery that has already occurred. In the 7th level watershed of concern, the road equivalent disturbance is already 16%; the project would increase it one additional percent. Id. at 80. Even the existing condition exceeds the 15 percent limit on detrimental soil compaction. See Watershed Conservation Practices Handbook (WCPH), FSH 2509.25, section 14.1, and Soils Management Handbook, FSH 2509.18, R-2 Supplement No. 2509.18-92-1, section 2.2 (3). (Environmental Conservation/ Preservation)
Response:	Potential concerns about re-opening decommissioned NFS road 118.1A are disclosed and documented in the EIS. Alternative 3 was developed in part to address this concern. Disturbance levels in the 7th level watersheds of concern are not the same thing as the 15% detrimental soil disturbance level. As stated in section 3.9, watersheds of concern require a closer look during analysis so they are analyzed as the 7th level rather than the 6th level. The forest plan does not set a limit on disturbance, only that the disturbance be analyzed at a closer level and viewed in that context within the larger watershed. Detrimental soil disturbance levels are analyzed on a cutting unit by cutting unit basis and many of the units that exceeded the 15% limit were addressed by Alternative 3. In addition the Watershed Conservation Handbook 2509.25 section 13.4c in part reads 'as opportunities arise to re-establish subsurface pathways'; the Forest Service would seek those opportunities through this project. The expected beneficial or adverse effects on a variety of resources of three alternatives were analyzed in detail and disclosed in the EIS, chapter 3. These alternatives give the Responsible Official a range of effects and trade-offs to consider. The balancing or weighing of resource values and trade-offs will be done in the Record of Decision, when a course of action is determined. Based on the analysis and other considerations the Responsible may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 4-23	Three proposed treatment units already exceed 15 percent limit on detrimental soil disturbance, and 3 others have such disturbance between 12 to 15 percent. DEIS at 85. A project design criterion requires subsoiling/ripping of the compacted soil areas in six units. DEIS at 16. This is a good measure; however, it would make the areas subject to erosion. Better to not detrimentally compact the soil or increase existing compaction in the first place. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-22.

Comment: 4-24	Also, connected disturbed area (CDA) would increase by 13 percent in the Headwaters Rio de los Pinos watershed (DEIS at 80), exceeding the 10 percent CDA increase allowed under the WCPH, section 11.1, design criterion 1a. (Environmental Conservation/ Preservation)
Response:	See in part response to Comment 4-22. The EIS goes on to say *'the increase in CDA would occur on currently closed or decommissioned roads; these roads would be closed or decommissioned at the completion of the project which would return the CDAs to existing conditions.*' So the increase in CDA would only be temporary under alternative 2. Alternative 3 addresses CDA and if selected would reduce the amount of CDA to a maximum of an 8% increase in the Toltec Creek-Rio de los Pinos watershed. In addition, most CDA would be reduced when roads are decommissioned again or rehabilitated. As culverts are pulled and vegetation reestablished over time, the connected disturbance will be reduced, and then eliminated as the ground cover returns.

Comment: 4-25	In short, the watersheds in the project area appear to be recovering fairly well from past disturbances. The proposed project would, at least temporarily, reverse this recovery. An indication of the magnitude of this is reflected in the followed statistics: 8061 acres have been previously cut or approved for such treatment in the three watersheds in the project area. DEIS at 83. The proposed project would treat 2766 additional acres. Ibid. (Environmental Conservation/ Preservation)
Response:	The watersheds within the project area are recovering and some areas would be set back in their recovery process if this project is approved. However, area recovery has also been set back from the mass die-off caused by insects, which this project seeks to address. Furthermore the analysis goes on to say on page 84 of the DEIS: 'Cumulative watershed disturbances from timber harvest activities are not expected to cause serious impacts under any alternative. Disturbances associated with the action alternatives would not threaten watershed or stream health as long as Forest Plan standards and guidelines and PDC are followed.' Also, Alternative 3 addresses areas that may be excluded to protect recovering areas more effectively. To clarify, the majority of past activities have occurred on the same "footprint" acres, as indicated by table C.1 in appendix C, which shows the past activities as related to the units proposed for treatment under this project.

Comment: 4-26	The watershed disturbances that would accompany implementation of the preferred alternative are yet another argument for a much smaller project. If a project in the Cumbres area is still pursued, it should be redesigned to greatly reduce the amount of roadwork needed to access treatment areas. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-22.

Comment: 4-27	CONCLUSION. The project as proposed is unacceptable. It is not needed to meet the stated purpose and need, and it would cause unacceptable adverse impacts to lynx. If an action alternative is still desired, the Forest Service must formulate and analyze one or more new alternatives, similar to what is described in sections I and II of these comments, which would have much less effect on lynx and watershed. The analysis must be published in a draft supplemental EIS and distributed for public comment. (Environmental Conservation/ Preservation)
Response:	Based on the analysis, no changes are needed to the EIS as a result of this comment. See response to Comment 4-20.

Comment: 4-28	We commend the Forest Service for choosing to prepare an EIS for the Cumbres Project. We believe that impacts to lynx, a threatened species, may be significant because about 2500 acres would be treated under the proposed action (project environmental assessment (EA) at 7). In the project area, a large amount of dead and dying trees would be removed, leaving the area to resemble several very large clearcuts. Impacts to watershed may also be significant. (Environmental Conservation/ Preservation)
Response:	Thank you for the commendation. Responses to specific resource effect concerns are addressed through all other responses to comments.

Comment: 4-29	It is also very important to analyze the possible cumulative impacts on lynx, soils, watershed, and scenery because there have been other large projects nearby, like County Line. The cumulative effects on lynx were not included in the Cumbres EA, as detailed at p. 4 of our previous comments. The draft EIS must thoroughly examine the possible cumulative impacts to lynx from all past, present, and reasonably foreseeable future projects. See 40 CFR 1508.7. The DEIS must also disclose the results of any consultation with the U. S. Fish and Wildlife Service. (Environmental Conservation/ Preservation)
Response:	Cumulative effects are considered and disclosed for all resources throughout the EIS. Please see response to Comment 4-14 and 4-15.

Comment: 4-30	It is our understanding that there have been problems in the County Line project with blowdown of residual trees and with soil impacts. These impacts and how they might be minimized in the Cumbres Project must be discussed in the EIS. (Environmental Conservation/ Preservation)
Response:	Some blowdown did occur within the Wolf Beetle Salvage Sale of the County Line project, primarily adjacent private landowner salvage operations. Blowdown was anticipated in the County Line EIS and has also been anticipated and analyzed for in the Cumbres project (see Section 3.2). Blowdown is a common disturbance event in spruce/fir forests and provides microsites for new regeneration establishment and wildlife habitat. No soil impairment, erosion, or stream sedimentation has been attributed to blowdown within the Wolf Beetle Sale due to adequate project design criteria, which is similar to what would be implemented in the Cumbres project. Soil impacts due to harvest activity were also analyzed in the County Line project and have stayed within the 15% disturbance thresholds. Sub-soiling is an option if any areas are determined to be out of compliance through sale and post-sale monitoring. Similar Project Design Criteria are being utilized in the Cumbres project and include the ability to exclude areas from harvest that are found to be wet, as utilized in the Wolf Beetle sale.

Comment: 4-31	As we detailed in our 2012 comments on the EA, a much smaller project would likely considerably reduce impacts to lynx and watershed. One of the purposes of the National Environmental Policy Act (NEPA) is to “promote efforts which will prevent or eliminate damage to the environment and biosphere”. 42 U.S.C. 4321. Under the Council on Environmental Quality regulations implementing NEPA Federal agencies shall to the fullest extent possible … (f) Use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment. 40 CFR 1500.2. Therefore, the EIS must examine at least one new alternative in addition to the ones analyzed in the environmental assessment. An alternative that must be considered would primarily remove hazard trees from areas adjacent to roads and other infrastructure, and near private land, while minimizing treatments elsewhere in order to protect lynx habitat and watersheds. See our previous comments, especially at 3-4. (Environmental Conservation/ Preservation)
Response:	See response to Comment 4-5.

Comment: 5-1	The EPA understands the need to address the tree mortality, forest health, fuels and fire risk, and timber salvage issues in the project area. We consider protection of aquatic resources to be among the most critical issues to be addressed in any NEPA analysis for vegetation management activities. The Draft EIS states that reopening of the decommissioned road that parallels the Rio de los Pinos is likely to negatively impact the stream. It further notes that the road was previously closed due to the impact it had on the stream. We support the USFS plans to carefully design the road reopening and monitoring to ensure the impact to the stream habitat is minimized. We suggest the Final EIS provide further information on how the road and monitoring will be designed to accomplish this objective. (Federal Agency/ Elected Official)
Response:	If re-opening decommissioned NFSR 118.1A is part of the selected alternative, an additional site-specific mitigation plan would be completed with input from the Hydrologist, Fisheries biologist, and the road engineer as part of the road package needed for the particular timber sale using that road. Based on the analysis, no changes are needed to the Cumbres EIS based on this comment.

Comment: 5-2	We recommend the stream/road area is highlighted in Figure 2-2, or additional detail on the location of this road and stream is provided in the text. Further, we recommend that the USFS consider whether another alternative that excludes this area from the proposed project would effectively meet the project purpose and need. (Federal Agency/ Elected Official)
Response:	The map has been modified to make road numbers more clear in order to make the location of the roads and referenced areas more apparent. Alternative 3 was develop in part to address concerns about NFSR 118.1A. The balancing or weighing of resource values and trade-offs will be done in the Record of Decision, when a course of action is determined. Based on the analysis and other considerations the Responsible may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: 5-3	The burning of slash piles in winter is part of the project and described in Section 3.11. As noted on page 93, this burning will occur under a Colorado Air Pollution Control Division permit. The same page references "prescribed bums." Since prescribed bums can be an independent vegetation treatment, we suggest that the text clarify that the term prescribed burns for this project references the burning of the slash piles. (Federal Agency/ Elected Official)
Response:	The text in the FEIS has been changed to “prescribed burning of slash piles” to provide additional clarity and a definition of prescribed burning was added into appendix A.

D.2. Responses to Comments Received on the EA for Comment

Project: Cumbres Vegetation Management Project (34685)
Formal Notice & Comment Period on EA for Comment: 6/29/2012 – 7/28/2012

Comment:EA1-1	As an owner of a small parcel of private property in the area, we would request the Forest Service actively move forward in mitigating the pine beetle infestation in the area by harvesting the infested timber. (Individual)
Response:	Thank you for your comment; the Forest Service appreciates the support.

Comment: EA2-1	I am worried about forest fires in the area. I believe the trees should be removed however necessary to mitigate potential wildfires in the area. (Individual)
Response:	Thank you for your support and taking the time to comment on this project.

Comment: EA3-1	I am providing links to the literature containing opposing view statements of hundreds of Ph.D. biological scientists who describe over a dozen logging and road construction related activities that inflict ecological damage to the forest's natural resources. (Individual)
Response:	Responses to Opposing Views Attachments #1 and 4 that were submitted are provided in Appendix D.5.

Comment: EA3-2	Temporary Roads? [...]How long was this "7.5 miles of old, non-system roads from previous harvests" pumping sediment? When were the sales sold that were associated with these 7.5 miles of "non-system" roads?[...] **Comment #1:** Clearly the line-officers on the Rio Grande National Forest trick the public into believing their temporary roads are really temporary. If the "7.5 miles of old, non-system roads from previous harvests" were really temporary they would not be useable after "maintenance." (Individual)
Response:	The old, non-system roads that are being re-opened are re-vegetated road templates which were created in the late 1960s into early 1970s, the majority of which have not been used by any vehicle traffic since that time. Because of their stable condition, these features have not been a sediment source for over 40 years. The benefit of re-opening and re-using old-road templates is two-fold: 1) disturbance would maintain the same footprint as past disturbance and 2) opportunity to rehabilitate these areas after treatment would be realized, as any future entry would not likely occur for another 100 years. There was no intent to be deceptive; these roads were called what they are and road reconstruction is associated with them (EIS, section 3.15). As a result of this comment, alternative descriptions have been corrected in section 2.2, Alternatives Considered in Detail, to change the term "maintenance" to "reconstruction" which is more consistent with the terms used in section 3.15, Transportation.

Comment: EA3-3	I will expect the final EA to indicate that the 0.6 miles of temporary road will be obliterated after use such that the running surface and CMPs no longer exist. Obliteration also means that the fills are put back in place such that the original sideslope is again in place. (Individual)
Response:	Road decommissioning/rehabilitation would occur on any temporary roads used for this project. Forest Service Manual allows for 5 levels of road decommissioning. Road decommissioning is defined as: "Activities that result in the stabilization and restoration of unneeded roads to a more natural state." (36 CFR 212.1, FSM 7705 - Transportation System). Forest Service Manual 7712.11-Exhibit 01, identifies five levels of treatments for road decommissioning which can achieve the intent of the definition. These include: 1) Block entrance; 2) Revegetation and waterbarring; 3) Remove fills and culverts; 4) Establish drainage-ways and remove unstable road shoulders; 5) Full obliteration recontouring and restoring natural slopes. These five treatment levels provide the ID team and Responsible Official a wide range of options to stabilize and restore unneeded roads. The determination of what treatment level or combination of treatments is used is based on the watershed and roads analysis. In some cases restoration may be achieved by blocking the entrance. In other situations, objectives to restore hillslope hydrology may require full obliteration re-contouring. Full road obliteration is not proposed in this project, since the IDT determined that resource protection would be adequate by implementing levels 1 through 4 for all temporary roads. In addition to being very costly, total obliteration often results in more acres of disturbance.

Comment: EA3-4	**The specialists on the IDT point out adverse natural resource impact that are more than enough to sink the timber sale**. The American owners of the Rio Grande National Forest depend on the natural resource specialists to stick-up for and defend the resources for which they are responsible for. It's not enough for the specialists to provide sanitized statements describing how this timber sale might "potentially" or "may" destroy their natural resources in and downstream from the sale area. It's not enough for the specialists to sidestep the fact that it's highly likely that their resource will be unable to function naturally for many years as a result of this timber sale. (Individual)
Response:	The EIS fully discloses the expected effects of the alternatives on all resources, as mitigated by Project Design Criteria or mitigation measures described in table 2-1.

Comment: EA3-5	You all know there is no "timber famine" that the USFS has been predicting for decades [...]You all know that Ranger Jones is proposing this timber sale to guarantee that she receives at least as much timber funding next year as she received this year. (Individual)
Response:	See response to DEIS Comment 3-29.

Comment: EA3-6	You all know that past Chiefs have told the public that trees will not be removed unless the logging provides beneficial effects to the resources in the area […] with no adverse resource effects. (Individual)
Response:	Proposed activities are consistent with all applicable laws, regulations, and policy (EIS, section 3.18).

Comment: EA3-7	You know that if you would all speak-up and demand that the "potential" adverse effects to your resource be significantly reduced by 1) applying additional mitigation, 2) modifying the sale to eliminate all chances of damage, or 3) demanding that Ranger Jones strike withdraw the sale proposal. This is your obligation to the American citizens that pay your salary. (Individual)
Response:	As stated in the EIS, chapter 3, along with relevant Forest Plan Standards and Guidelines, the ID Team recommended all additional reasonable Project Design Criteria (PDC) and/or mitigation measures determined necessary to minimize adverse effects in the Cumbres project area. Based on the monitoring of recent salvage timber sales, these measures have been effective (See Forest Plan monitoring reports at: http://www.fs.usda.gov/projects/riogrande/landmanagement/project). Monitoring (EIS, section 2.6) will also be used to continue to evaluate the effectiveness of PDC and make changes as necessary. The Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: EA3-8	As opposing views attachments #1 and #4 demonstrate, a commercial timber sale is the last thing a person would prescribe to maintain forest health. Indeed, "forest health" as used in your title must include the health of countless natural resources […] not just conifer trees. I challenge you to find the word "timber" in the dictionary definition of "management." It's sad that the USFS uses "management" as a synonym for timber harvest. (Individual)
Response:	Specific responses to Opposing Views attachments are located in The Forest Service acknowledges that there are opposing views concerning the benefits and detriments of timber harvest and its associated activities. We also agree that these views are not always right or wrong. Chapter 3 of the EIS further addresses the pros and cons of the proposed action and alternatives upon multiple natural resources other than conifer trees. The Responsible Official does not ignore opposing views, but takes them in consideration when balancing between the costs and benefits of meeting management objectives.

Comment: EA3-9	Ranger Jones, any caring competent land manager would drop the Cumbres timber sale in the blink of an eye after reading Chapter 3. (Individual)
Response:	After review and consideration of the effects described in chapter 3, the specialist reports that are part of the project record, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: EA3-10, EA3-13	Dr. Jack Cohen's fire damage risk reduction methods The pre-decisional EA at page 4 states: "To improve defensible space, fuel reduction treatments would be implemented in Wildland-Urban Interface (WUI) areas up to 400 feet from adjacent private land on approximately 171 acres."[…]The American public expects USFS line officers to place their safety and assets above all else when determining treatment methods […]using the most effective treatment and best science [...]Dr. Jack Cohen's fire damage risk reduction methods.[...]I will also expect a Dr. Cohen fire risk reduction methods alternative to be analyzed in detail. This alternative would: educate the public about Dr. Cohen's findings; hold public meetings to answer questions and distribute information; Offer USFS labor to help elderly and disabled people living in the WUI to (with their written permission) to remove fine fuels near their home..(Individual)
Response:	Dr. Jack Cohen's research into the home ignition zones and the techniques and practices that private property owners can follow to reduce structure ignition is very applicable to private property and individual home owners. However, what individual property owners can do on their own property to reduce structure ignition is outside the scope of this analysis. The proposed fuel treatments in the Cumbres project are located on federal lands and designed to slow the progression of fire so that firefighting resources can have a better chance of stopping a wildfire before it reaches private property. These types of treatments have been shown to be effective in recent wildfires (Jackson et al. 2011, Bostwick et al. 2011, Graham et. Al. 2009, Stafford et.al. 2009). The Forest does continue to coordinate and cooperate with the Colorado State Forest Service to facilitate fuels reduction projects on private lands.

Comment: EA3-11 EA3-12	This week the University of Wyoming released the results of a study showing that logging to reduce fuels is an ineffective way to prevent the intensity and rate of spread of wildfires.[...]. See below. **Study challenges views about Western forest fires** By Scott Sonner AP Published in the Daily World, July 23, 2012 Link: http://www.thedailyworld.com/sections/newswire/northwest/study-challenges-views-about-western-forest-fires.html[...]. I will expect all references to fuels to be taken out of the final EA.
Response:	We agree that the understanding of past fires and fire behavior is evolving and incomplete. However, as discussed in the EIS in section 3.12, the current understanding of fire behavior in high elevation spruce-fir dominated forests is they are very much influenced by climate and weather patterns. Fires generally remain small due to rainfall in conjunction with lightning. However, under extended drought conditions, they can become very large and burn with high intensity and high severity as demonstrated with the 2013 large wildfires on the forest. Based on the Forest-wide desired conditions and objectives for this project (table 1-1, EIS), and the Management Area Prescriptions for the analysis area (5.11 and 5.13), high intensity and high severity wildfires in this area are not desirable and considering the fuel profiles and potential fire behavior is appropriate.

Comment: EA3-14	**Recreation Revenues:** Any poll that calculates whether the public approves of timber sales will show that Americans who do not derive profit from tree extraction abhor commercial timber sales in the public land they own [...] **Comment #2**: I will expect to see an economic analysis of the revenues lost to local community businesses (motels, restaurants etc.) compared to the revenue gained by the local community because of this specific timber sale. This will include the current volume under contract held by the local mill(s). (Individual)
Response:	An economic analysis, appropriate to the scope of the project and suitable for providing a comparison between alternatives, has been conducted. More in-depth economic analysis was performed in the FEIS for the Forest Plan, discussing trade-offs between projected revenues by Forest Plan alternative (Forest Plan FEIS, pg. 3-462). This project-level analysis seeks only to implement Forest Plan direction.

Comment: EA4-1	Wild Earth Guardians submitted comments on the proposed action on April 22, 2011 and requested and EIS because of the scope and scale of the possible impacts on soils and watershed conditions. We still believe strongly that an EIS is necessary and that this project is misdirected. The planning area supports important fisheries, threatened species habitat connectivity (Canada lynx) and is a highly valued recreation area for residents of New Mexico, Colorado and even our neighbors to the east: Oklahoma and Texas. (Environmental Conservation/ Preservation)
Response:	The agency agrees that this is a highly used area that receives many visitors (chapter 3, section 3.14) and also has habitat for Canada lynx (chapter 3, section 3.4). As described in section 3.5 of the EIS, there are no native fish populations and minimal potential in streams for non-native trout, though the Trujillo Meadows Reservoir, adjacent to the analysis area, is stocked with fish and is heavily used for recreational fishing. As required by NEPA, chapter 3 analyzed and described the expected direct, indirect, and cumulative effects of the alternatives on a variety of biological, physical, and social resources. The Responsible Official determined that an EIS was appropriate and the Notice of Intent was published in the Federal Register on July 29, 2013.

Comment: EA4-2	With the National Environmental Policy Act ("NEPA"), Congress intended that requiring agencies to prepare EIS's would help "'prevent or eliminate damage to the environment and biosphere' by focusing government and public attention on the environmental effects of proposed agency action."[...]NEPA represents a firm Congressional mandate that environmental factors be considered on an equal basis with other, more traditional, concerns."[...]To this end, NEPA requires agencies to take a "hard look" at all potential project impacts when preparing EISs. (Environmental Conservation/ Preservation)
Response:	As required by NEPA, chapter 3 of the EIS demonstrated the requisite "hard look" by analyzing and describing the expected direct, indirect, and cumulative effects of the alternatives on a variety of biological, physical, and social resources.

Comment: EA4-3	NEPA statutory standards […] recognize that intelligent decision- making can only derive from high quality information […]Of primary import to this project […] agencies shall insure the professional integrity, including scientific integrity, of the discussions in the analysis. Information included in NEPA documents "must be of high quality." Accurate scientific analysis […] is essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Where an agency has outdated, insufficient, or no information on potential impacts, it must develop information as part of the NEPA process. (Environmental Conservation/ Preservation)
Response:	The IDT and Responsible Official feel that sufficient data and information was evaluated from published scientific sources (appendix B) or field collected on-site by experienced professionals for this project to allow for a reasonable assessment of project effects for each alternative evaluated. Recent experience and monitoring of other similar Forest projects was also used to evaluate potential effects.

Comment: EA4-4	We also believe the draft EA may violate the National Forest management Act's requirements for adequate regeneration. NFMA §(6)(g)(3)(E)(i). (Environmental Conservation/ Preservation)
Response:	The EIS is fully consistent with NFMA requirement concerning regeneration. A draft detailed NFMA Consistency and Silvicultural Findings Report is located in the project record (EIS, section 3.18) and will be finalized following determination of the Selected Alternative.

Comment: EA4-5	**Purpose and Need.** The Forest Service cannot support the suggestion that salvaging beetle affected trees will decrease the risk of fire ("reduction of heavy fuels") in the project area. (Environmental Conservation/ Preservation)
Response:	The salvage of beetle killed trees ("reduction of heavy fuels") is not designed to reduce the risk of fires, but would contribute to reducing the severity of a fire and its associated soil heating, if a wildfire should occur (EIS, sections 3.10, 3.12). Also see response to Comment 4-7.

Comment: EA4-6	Nor can the agency demonstrate that providing wood products outweighs other contributions to the local economy from the project area ("opportunity costs" outweigh any trivial economic benefit from salvage logging the area). (Environmental Conservation/ Preservation)
Response:	The agency does not seek to weigh opportunity costs in determining the value of the purpose and need for the project. Such value is derived from Forest Plan direction, as described in section 1.4 of the EIS. The economic analysis instead focuses on financial efficiency for comparison between alternatives in obtaining the purpose and need (EIS, section 3.13). See also response to comment EA3-14.

Comment: EA4-7,	We disagree with the need statement, especially that heavy fuels require reduction in the project area. Spruce beetles are natural components of spruce-fir forests, and those forests have evolved with periodic beetle infestations and further, there is simply no evidence that 1) dead trees increase the risk of fire or 2) large-scale, stand-replacing fire is unnatural in Colorado's spruce-fir forests. If the RGNF believes otherwise, then the forest should provide scientific information justifying its purpose and need statement. -As experience with the 1940s beetle mortality on the Flattops on the White River National Forest has shown, fire risk is actually lowered after beetle infestations.[...]the Colorado State Forest Service and Department of Forestry at Colorado State University conclude: -"*Although it is widely believed that insect outbreaks set the stage for severe forest fires, the few scientific studies that support this idea report a very small effect, and other studies have found no relationship between insect outbreaks and subsequent fire activity.*" (Environmental Conservation/ Preservation)
Response:	As described in section 3.12 of the EIS, our analysis does not state that the salvage treatment would reduce the risk of fire or that large-scale stand replacing fires in spruce/fir are unnatural. What our analysis and modeling shows is that heavy accumulations of large diameter surface fuels burn for longer durations and increase soil heating with associated detrimental soil impacts. The natural fire regime in green, live spruce/fir is infrequent stand replacing crown fires that occur at 150-300 year intervals. That fire regime is significantly altered in a spruce beetle infestation of the scale that is currently affecting the Cumbres analysis area. In the short-term, as the surface area receives more sunlight and there is less competition for available moisture, herbaceous vegetation will increase which will result in faster moving surface fires. Over the longer term, the dead standing spruce will start to fall and increase the large diameter fuel accumulation. If a fire

burns in those areas, it would have a longer residence time and increased soil heating impacts.

Comment: EA4-8	Finally, the reforestation of forest stands lost to beetle infestations is an inappropriate purpose because it is likely to occur without timber harvest, and is more likely to be complicated by than assisted by the proposed action. The use of heavy equipment will compact soil, making any sprouting of seeds more difficult, at least in the short term [...] Given that spruce requires shade to regenerate, and the project proposes to remove most of the standing overstory of trees, the RGNF must provide scientific information to substantiate claims that spruce (not other species) reforestation efforts on the Forest have in fact resulted in more rapid reforestation of beetle killed stands than what would occur naturally. (Environmental Conservation/ Preservation)
Response:	Although the Forest Service agrees that regeneration would likely occur over time without harvest, our primary interest concerning regeneration is to promote establishment in areas that are non-stocked or under-stocked. We expect these areas to be created when severe mortality removes the seed source in locations that currently have few seedlings and saplings. A secondary interest concerning regeneration is the species composition of stands. Although some areas may gain adequate numbers of trees over time, research indicates that long-term species composition can be altered by a spruce beetle outbreak for 125-175 years (Schmid and Mata 1996). Successional pathways will retain species within the stand over time to varying degrees, but Forest Plan direction intends for some areas to be maintained with commercially valuable species at ages, densities, and sizes that allow growth rates and stand health conducive to providing a sustained yield of forest products (USDA Forest Service 1996, pp. IV-27). Part of the purpose and need for this project (EIS, section 1.3) is the desire to accelerate the rate of ecological recovery in alignment with the Management Area Prescription.

Comment: EA4-9	If artificial reforestation (planting) is proposed […] the RGNF must show from its experience in spruce-fir forests, how the high cost of such action is sufficiently justified, rather than allowing the area to reforest naturally. (Environmental Conservation/ Preservation)
Response:	Recent surveys in the Grouse Creek (Conejos Peak Ranger District) and Twister (Divide Ranger District) timber sale areas have shown success in establishing species mix and stocking rates at desirable levels within 5 years of planting. Research also supports the concept that artificial regeneration of spruce/ fir is effective in the Central Rockies when applied correctly (Shepperd, Jeffers, and Ronco 1981). Research even includes a study conducted within the project analysis area (Jeffers 1995). As a result, planting continues to be considered an effective and justifiable means of managing for resource objectives.

Comment: EA4-10, EA4-11	**II. The Rio Grande NF Must Prepare and EIS for the Large of a Project.** Given that the proposed project contemplates 2,488 acres of salvage logging and road maintenance and reconstruction of 30.2 miles of roads and reopening 7.3 miles of closed roads, we expect that the RGNF will prepare an EIS for this project.[...]NEPA requires that federal agencies complete a detailed Environmental Impact Statement (EIS) when planning a major federal action which may significantly affect the quality of the human environment.[...]Moreover, we think NEPA's policy goals require agencies to err in favor of preparation of an EIS when the proposed action is likely to have a significant environmental impact. (Environmental Conservation/ Preservation)
Response:	The Responsible Official determined that an EIS was appropriate and the Notice of Intent was published in the Federal Register on July 29, 2013.

Comment: EA4-12	EIS's must analyze the "environmental impacts" of proposed actions with not only direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions regardless of what agency […] or person undertakes such actions" […] Given that the Cumbres Salvage project proposes to log up to 2,488 acres of spruce---fir with: potential for windthrow and subsequently exacerbated spruce-beetle infestations; likely negative impacts to lynx habitat and connectivity; no scientifically supportable need for forest health treatments, fuels reduction, or insect and disease prevention within the spruce-fir ecotype (which is within the historic range of variability for fire, insects, and disease); logging proposed within watersheds of concern or sensitive watersheds; the presence of sensitive species such as Rio Grande Cutthroat trout; and, possible impacts to the Continental Divide Trail, Cumbres (10,570 acres) and Chama Basin (21,645 acres) Inventoried Roadless Areas as well as the South San Juan Wilderness. The RGNF clearly must prepare an EIS for this large project. (Environmental Conservation/ Preservation)
Response:	Chapter 3 of the EIS and project specialist reports describe the expected direct, indirect, and cumulative effects expected for an appropriate range of biological, physical, and social resources as determined by the IDT and Responsible Official for this project. Effects were considered for No Action as well as two action alternatives. At this stage of the epidemic, the potential for the blowdown of residual spruce trees exacerbating the level of spruce beetle infestation is not as great of concern as when there is a substantial number of mature live spruce remaining. Table 3-1, in section 3.3, Forest Management, shows the level of spruce mortality by harvest unit in 2011 and 2013; mortality has continued to increase with levels over estimated at 95 percent across the analysis area. Also see response to Comment EA4-31. The expected effects to lynx habitat and connectivity were described in the EIS in section 3.4. See response to Comment

EA4-36

Though epidemic levels of spruce beetles do occur periodically, resulting in landscape level changes, the purpose and need for this project (EIS, section 1.3) is to recover some economic value from the dead spruce and focus on regenerating the next forest in management areas 5.11 and 5.13, which were designated for active management under the Forest Plan and already have system roads in place.

The expected effects of project activities on watersheds were described in the EIS in section 3.9. Stream health was carefully assessed by on the ground surveys for the HUC 7 sub-watershed of concern and the streams were found to be stable with good vegetative cover. Project Design Criteria and Monitoring were included that would ensure stream health would be maintained.

As stated in the EIS in section 3.5, there are no native fish populations in the analysis area. Trujillo Meadows Reservoir is stocked with non-native trout and there are small non-native trout populations in a couple of the perennial streams.

Effects on the Continental Divide National Scenic Trail are described in the EIS in sections 3.14 and 3.16. Project Design Criteria were included to both maintain a safe distance from trail users and project activities and to minimize visual changes and sounds of any harvest activities.

See response to Comment EA4-15. The analysis area for this project does not include any Inventoried Roadless Areas, so it was not addressed in this analysis. The access trailhead for the South San Juan Wilderness (trail 736) is about 3 miles northwest of the analysis area boundary, though FSR 118/118C is used to access the trailhead (EIS, section 3.14). FSR 118/118C was considered a Concern Route (Section 3.16) and Project Design Criteria were included to minimize long term impacts to scenery from any management activities. Areas within 300 feet of this road are currently open to personal use firewood cutting, so high stumps and other signs of use are common and increasing as the trees continue to die.

The Responsible Official determined that an EIS was appropriate and the Notice of Intent was published in the Federal Register on July 29, 2013..

Comment: EA4-13	**III. Alternatives.** The RGNF should consider a full range of alternatives with the proposal, including but not limited to: A genuine forest health proposal that would close roads and promote natural regeneration; and, An alternative that requires no road reopening or road reconstruction. (Environmental Conservation/ Preservation)
Response:	See response to DEIS comment 4-5, appendix D.1.

Comment: EA4-14	[…] In particular, such analyses should consider the likely implications of each alternative on the spread of spruce beetles, the rate and likelihood of regeneration, and effects on other resources such as water quality and wildlife habitat. (Environmental Conservation/ Preservation)
Response:	The direct, indirect, and cumulative effects of the alternatives considered in detail on spruce beetle spread, regeneration, and other resources including water quality and wildlife habitat, are described in chapter 3 of the EIS.

Comment: EA4-15	It appears from the map included with the scoping notice that portions of the project overlap or are directly adjacent to the Cumbres (10,570 acres) and Chama Basin (21,645 acres) Inventoried Roadless Areas […].and any impacts on these IRA from logging nearby should be considered in an EIS (Environmental Conservation/ Preservation)
Response:	The analysis area for this project does not include any Inventoried Roadless Areas, so it was not addressed in this analysis. The access trailhead for the South San Juan Wilderness (trail 736) is about 3 miles northwest of the analysis area boundary, though FSR 118/118C is used to access the trailhead (EIS, section 3.14). FSR 118/118C was considered a Concern Route (Section 3.16) and Project Design Criteria were included to minimize long term impacts to scenery from any management activities. Areas within 300 feet of this road are currently open to personal use firewood cutting, so high stumps and other signs of use are common and increasing as the trees continue to die.

Comment: EA4-16	**V. The Action Alternatives Would Treat Areas Already Having a High Degree of Soil and Watershed Disturbance.**[…] The proposed action alternative would authorize detrimental activity in areas already exceeding standards.[...] Detrimental soil disturbance already exceeds 15 percent in three units […]. If alternative 2 was implemented, disturbance in 7th-level watersheds of concern would increase. Three other units are just below the 15 percent threshold. Note that the detrimental soil disturbance estimates assume that BMPs would be implemented and that soil recovery would occur over time (Environmental Conservation/ Preservation)
Response:	As stated in the Forest Plan Forest-wide Desired Conditions (Forest Plan pg. I-3): "Soils may be periodically disturbed by management activities, but are restored and reclaimed to original potentials after activities have been completed". Past timber harvest project design criteria did not necessarily follow the same guidelines as they do now. Some areas were impacted and exceed the 15 percent activity unit limit that is now used. The requirement that units be brought under the 15 percent limit after harvest completion (EIS, table 2-1) does provide an opportunity to accomplish multiple forest objectives, timber harvest as well as soil protection and improvement/ rehabilitation.

Comment: EA4-17	Implementing the project would increase the area of detrimental disturbance, violating the Soil Quality Handbook and the Forest Plan. The EA states that the project would comply with soil standards because project design criteria would be followed. But there is no analysis of the effectiveness of these criteria, only conclusive statements that they will be effective. (Environmental Conservation/ Preservation)
Response:	Project Design Criteria (PDC) are used to both protect and to minimize adverse effects to specific resources and from project activities. Monitoring of these criteria is done on a regular basis to ensure that they are effective. Sub-soiling using a winged subsoiler was found to be up to 75 to 80 percent effective in breaking up compacted layers (EIS, section 3.10). Based on recent annual Forest Monitoring Reports (http://www.fs.usda.gov/projects/riogrande/landmanagement/project), these PDC have been shown to be effective. Also see response to Comment EA4-16.

Comment: EA4-18	The areas and watersheds with a high level of disturbance should be avoided. This would reduce the potential for additional detrimental disturbance and reduce the cost of restoration of disturbed areas. (Environmental Conservation/ Preservation)
Response:	The No Action alternative addresses to some degree the environmental impacts of not entering a unit or the sale as a whole (EIS, Sections 2.2 and section 3.9). In addition each resource area also addresses No Action from their resource point of view. Project design criteria work to minimize impacts to resources and therefore limit costs of rehabilitation.

Comment: EA4-19	Connected disturbed area must be calculated, displayed, and minimized.[...]we do not find a discussion of connected disturbed area (CDA) in the EA. It is not listed as one of the indicators for watershed condition and effects of action, but should be. The WCPH, section 11.1, states that "[c]onnected disturbed areas are the main source of damage in all regions". The need for disconnecting drainage from roads includes closed roads with some recovery that would be bladed and used for the project. The final EA must show current CDA, and what it would be after implementation of each action alternative. The latter must not be more than the 10 percent limit imposed by the WCPH. (Environmental Conservation/ Preservation)
Response:	Connected disturbed areas (CDAs) are discussed in Section 3.9, Hydrology, Watershed, and Aquatics. It is also listed as an indicator for Issue 2 (EIS, section 1.8) and table 2-2 shows a comparison of expected change in CDA by alternative. The Watershed Conservation Protection Handbook (WCPH) requires that connected disturbed areas be assessed. There is no official measure of CDA in the handbook. Project Design Criteria are designed to limit connected disturbed areas by buffering streams and wet areas and by road and skid trail design (see table 2-1). Also see response to DEIS comment 4-24, appendix D.1.

Comment: EA4-20, EA4-21, EA4-22, EA4-23	The Draft EA Fails to Assess Whether Regeneration Standards Can Be Met Given That Advanced Regeneration may Already be Dead or Dying Due to Spruce Budworm. Salvage logging or in USFS terms, regeneration harvest, because most trees over 8 inches dbh would be removed, does invoke the Forest Plan's 5-year regeneration requirement Thus, the proposed actions describe the need for regeneration surveys to determine whether regeneration will be sufficient to meet Forest Plan Standards. Although there has been significant advanced regeneration in many of the previously harvested stands in question since earlier harvest activities, a recent and ongoing spruce- budworm infestation has resulted in extensive mortality in young spruce and other species that have regenerated.[…] Although it may have been the original intention of the project to take advantage of existing advanced regeneration to improve regeneration success, the recent mortality of understory trees throughout many of the harvest units complicates this proposition. The EA contains no assessment of the degree to which budworm impacts have resulted in mortality of advanced regeneration. (Environmental Conservation/ Preservation)
Response:	The EIS analyzes for and acknowledges a minor presence of western spruce budworm (WSBW) in some of the eastern-most units, but not to the extent which would even affect tree vigor or form (EIS, section 3.2). There has been no known mortality of regeneration from WSBW in this project area. As stated in the EIS in section 3.2, "Overall, budworm is not considered a concern to forest health in this project". The "recent and ongoing spruce-budworm infestation" mentioned appears to be in an area other than the Cumbres project area. Such an outbreak resulting in "extensive mortality in young spruce and other species" has not been observed within the analysis area. Likewise the "decades and repeated planting efforts" in clearcuts has not been found in management records.

Comment: EA4-24	The proposed timber management activities may constitute an irreversible and irretrievable commitment of resources, in contrast to the EAs conclusion at 24. The EA's failure to consider the likelihood of successful regeneration-and therefore Forest Plan and NFMA compliance - in the wake of current and expected budworm mortality is a significant oversight, and fails to meet NEPA's hard look standard. The project could also violate NFMA, requiring that the Forest Service insure that timber will be harvested from National Forest System lands only where soil, slope or other watershed conditions will not be irreversibly damaged [and where] there is assurance that such lands can be adequately restocked within five years after harvest. (Environmental Conservation/ Preservation)
Response:	It is not expected or anticipated that western spruce budworm (WSBW) would affect regeneration efforts in the project area (EIS, section 3.2). NFMA compliance has been specifically analyzed for the project as well as WSBW impacts on management objectives. Detailed information on these analyses is found in the NFMA Consistency and Silvicultural Findings Report (project record) as well as the Forest Health and Forest Management sections (EIS, section 3.2 and 3.3). The proposed actions do not constitute an irreversible or irretrievable commitment of resources (section 3.18).

Comment: EA4-25	**VII. Landslide Risk.** The analysis must disclose soil types in the project area, and provide an assessment of landslide risks throughout the project area […] determining […] pre- and post-proposed harvest canopy cover, increase in ground water saturation, slope, and soil type [road construction and reconstruction should not be permitted in areas of landslide-prone soils. (Environmental Conservation/ Preservation)
Response:	Section 3.10, of the EIS describes the soil resource inventory unit (SRI), as well as the erosion hazard and mass movement potential for the area as determined at the time of the forest soil survey (1996). As stated in the EIS, the relatively gentle slopes in the Cumbres project area have minimized any risk for mass movement of these soils; there has been no evidence of landslides or unstable slopes in the analysis area. Since the majority of the stands in the project area tend to be multistoried, plus have variable proportions of subalpine fir (along with an expected increase in grasses and shrubs), a large increase in available water is not expected (section 3.9). More in depth soils information can be found in the specialist report and appendix C, table C.3 and section 3.15 of the EIS describes the road system needed to implement each analyzed alternative. No new system roads would be constructed under any alternative.

Comment: EA4-26	**VIII. Grazing.** The analysis should include a discussion of allotments in each unit and the analysis area; historic grazing levels permitted by the RGNF and on adjacent public or private lands, and an analysis of the quality of rangelands in the area. Possible impacts of grazing on forest regeneration should be considered (Environmental Conservation/ Preservation)
Response:	A discussion appropriate to the scope of the project has been provided concerning livestock grazing. This discussion includes allotment names, stocking levels, quality ranking, and effects analysis (EIS, section 3.6). Impacts on forest regeneration has also been considered through the project design criteria (EIS, table 2-1), monitoring measures (EIS, section 2.6), and cumulative effects analysis (EIS, section 3.6).

Comment: EA4-27	**IX. Travel System.** The RGNF should disclose the extent of the travel system, both system and non-system roads and trails, and determine whether this meets Forest Plan standards and/or guidelines. Further, the RGNF should disclose how and when an inventory of the travel system was performed, and whether it may overlook any non-system roads. (Environmental Conservation/ Preservation)
Response:	The NFS roads in the analysis area shown on figure 2-2 and described in section 3.15, Transportation. As shown on figure 2-2, some of these roads are currently open to motorized travel and others are not. There are no NFS trails or trailheads in the analysis area (EIS, section 3.14). The main non-system roads are also identified in figure 2-2. These temporary roads are not part of the transportation system and would be closed and rehabilitated/decommissioned following use. The data used for the transportation report was from the Forest transportation atlas from 2009 along with on the ground reconnaissance and aerial photo interpretation (EIS, section 3.15).

Comment: EA4-29	The impact of this travel system on watershed condition, water quality, and aquatic species must similarly be fully assessed and disclosed. (Environmental Conservation/ Preservation)
Response:	Expected direct, indirect, and cumulative effects that would result from implementation of analyzed alternatives to watersheds, water quality, and aquatic species are described in the EIS, chapter 3, sections 3.3 and 3.5.

Comment: EA4-29	Any changes in the travel system necessary to implement the project and the possible effects therefore must be thoroughly analyzed and disclosed. (Environmental Conservation/ Preservation)
Response:	There are no changes planned to the existing transportation system as a result of this project. All routes currently open to motorized travel would remain open and routes closed to motorized travel would remain closed, both during and following completion of project activities. The effects of the use and decommissioning of temporary roads was considered by resource, as appropriate, in chapter 3.

Comment: EA4-30	**X. Old Growth**. The RGNF should disclose the method used to determine old growth (stage 5) and mature successional stages (4A, 4B, and 4C). Any approved action should include concrete provisions to protect remnant large trees in the area. Any stands that escaped past logging should be left as a control or baseline. This should include restrictions on logging of any living trees over a specified diameter breast height limit, such as 12" or 14". (Environmental Conservation/ Preservation)
Response:	Once late successional stands are identified within a project area, an inventory protocol is utilized to identify old-growth stands (Erhard, Hartvigsen, & Metzger 1998) measuring for old growth attributes utilizing Mehl's (1992) guidelines. These guiding documents are provided in the project record. Due to the extensive nature of the beetle mortality occurring with the project area (EIS, table 3-1), it was determined that live tree attributes for old growth stands cannot be met. These stands do not meet the minimum age, size, and live tree density requirements due to beetle mortality affecting the overstory (EIS, section 3.3). This disturbance process is moving stands toward early and mid-successional stages. A baseline for no-action would be provided by unmanaged stands in the adjacent Roadless areas. All live uninfested trees would be retained, except those thinned to maintain aspen clones or removed as hazard trees near infrastructure (EIS, table 2-1).

Comment: EA4-31	**XI. Noxious Weeds, Insects and Disease.** 36 CFR 219.12(k)(5)(iv) requires the RGNF to "Ensure that destructive insects and disease organisms do not increase to potentially damaging levels following management activities." Logging in high elevation spruce-fir ecotypes can often exacerbate windthrow potential. As windthrow increases the potential for spruce bark beetle outbreaks, the proposed logging may accomplish the exact opposite. The RGNF must disclose and assess windthrow potential both pre-and post-proposed alternatives, and subsequently spruce bark beetle risk, with a complete description of the prevailing wind patterns, topography, and thus the likelihood for increased windthrow. Further, slash from live trees can host various insects. This potential to increase insects should also be disclosed. (Environmental Conservation/ Preservation)
Response:	The potential for spruce beetle outbreak cannot be increased above the present condition. Stands within the Cumbres analysis area had up to a 95 percent mortality rate in spruce at last survey in the summer of 2013 (table 3-1). The current spruce beetle epidemic is affecting the entire high elevation portions of the Forest, and beetle pressure is high across the entire landscape (Eager 2012). As stated in the EIS (section 3.2) and the Timber and Silvicultural specialist report, windthrow potential will be increased post-treatment; however, windthrow cannot exacerbate the event which is occurring due to the existing beetle population dynamics. Likewise, slash would not cause an increased risk of bark beetle outbreak. Potential effects of windthrow on other resource objectives has been considered and addressed through alternative development and Project Design Criteria.

Comment: EA4-32	The analysis should include discussion of increased spread of root disease due to creation of more stumps and tree wounds. This includes, but is not limited to Armillaria root disease for instance.[...]The scale of the proposed logging here would leave plenty of stumps and wounds for Armillaria to spread. It provides yet another reason to not log the few areas that have not been logged yet, if they exist, as they most likely have the lowest prevalence of Armillaria. The RGNF should disclose whether the proposed logging might hasten the spread of Armillaria.[...]as discussed in the recently approved and nearby County Line Vegetation Management Project, the presence of Armillaria may increase the susceptibility of spruce to beetles. Accordingly, any actions that increase the spread of Armillaria may undermine efforts in the County Line area to reduce spruce susceptibility to beetles. (Environmental Conservation/ Preservation)
Response:	Root disease observations and management implications were discussed in the EIS (section 3.2) and addressed in detail in section 3.2. Additionally, a service trip report was prepared by the Gunnison Service Center for the adjacent Trujillo Meadows Campground (Mask and Worrall 2011). The service report indicates that stump contact with airborne spores is not a common means of infection for *Armillaria* root disease; infection is primarily by vegetative root contact with infested tree roots or soil rhizomorphs. *Armillaria* root disease is also not considered to be a significant factor in young spruce and fir trees (ibid), which would be the predominant live tree size classes in the residual stands. Finally, presence or spread of *Armillaria* cannot increase potential for spruce beetle outbreak. Also see Response EA4-31 concerning spruce beetle potential.

Comment: EA4-33	Musk thistle, Canada thistle, and whitetop, and other noxious weeds can be considered disease organisms. As such, the RGNF must ensure that logging, grazing, or other activities proposed do not increase noxious weeds to potentially damaging levels. (Environmental Conservation/ Preservation)
Response:	Noxious weeds are considered in the EIS in section 3.7. Additional soil disturbance can increase the potential for additional weed populations. Project Design Criteria in conjunction with monitoring have been effective in quickly re-establishing vegetation cover quickly, minimizing risk of spread (EIS, section 3.7).

Comment: EA4-34	In order to adhere to NEPAs high quality information and hard look tests, the Forest Service must carefully assess the scenery impacts from concretely identified vantage points or "viewing angles", acknowledge the major impacts on scenery from past and proposed logging on both public and private lands, and permit the public an opportunity to comment on the impacts. (Environmental Conservation/ Preservation)
Response:	Section 3.16 in the EIS described the expected direct, indirect, and cumulative effects for scenic resources and identified areas and routes of concern. As described in the EIS, much of the landscape would be visible from Concern routes and areas from a range of distances. Viewing platforms were identified from the Trujillo Meadows Reservoir parking lot, Trujillo Meadows Campground loops, and along FSRs 118/118C and 116 to evaluate impacts to Scenic Resources. No specific GIS points were established. The Trujillo Meadows Campground view point was chosen to help better design timber sale activities to blend with the recent campground harvest needed to remove hazard trees. Some areas around the Campground were excluded from harvest due to extreme slopes or wet areas, so in these locations there were not opportunities to blend the recent tree removal with new timber sale activities. The Trujillo Meadows Campground views only allow Immediate Foreground and Foreground views. The same view is available from FSR 116; however, this viewing platform is slightly elevated from the Reservoir parking lot with a slightly longer viewing distance. Project Design Criteria (table 2-1) were included to minimize effects on the Continental Divide National Scenic Trail (CDNST) and ski yurts and to maintain scenic integrity over the long-term. .

Comment: EA4-35	The RGNF LRMP requires that the next lowest Scenery Integrity Objective below "High or Moderate" must be met following project implementation. Is the SIO for the area High, or is it Moderate? Thus, is the next lowest SIO moderate or low? Based on the impacts from past logging in the area, and the major extent of the logging proposed, the analysis must honestly assess and disclose whether the next lowest SIO will even be met. (Environmental Conservation/ Preservation)
Response:	Proposed harvest areas are located within both "High and Moderate" areas. Based on this comment a map was included in section 3.16 illustrate SIOs for units proposed for harvest under Alternative 2 and some additional discussion was included to clarify the section. As stated in section 3.16, it is always important during timber sale activities that Scenic Resources are considered on a viewshed basis. For instance, if the entire viewshed is harvested using similar methods, it would appear less modified. However, the greater number of harvesting techniques that are used within one viewshed, the more modified it appears to visitors. As described in the EIS, for scenic quality alternative 2 would have fewer effects over the long-term, since it proposes to harvest more of the viewshed in a consistent manner across all units, as viewed from these areas and routes of concern, to maintain a more natural appearing landscape. Additionally, to reduce the amount of disturbance in the Immediate Foreground and Foreground, stump heights would be required to be cut low within 100 feet of FSR 118 and slash piles eliminated and rehabilitated quickly. In the long-term, harvested areas would meet SIOs as vegetation recovers and harvest activities become less visually evident.

Comment: EA4-36	**XII. Lynx.** […] The RGNF will be required to undergo formal Section 7 Endangered Species Act consultation, and obtain a Biological Opinion (BO), from the Fish and Wildlife Service. The Biological Assessment performed by the RGNF, as well as the BO, must consider the Lynx Conservation and Assessment Strategy (LCAS) conservation measures. (Environmental Conservation/ Preservation)
Response:	The expected effects to lynx habitat and connectivity were described in the EIS in section 3.4 and draft project Biological Assessment (project file). Though implementation of an action alternative would have some effects on lynx habitat as summarized in section 3.4, based on informal discussions with the Fish and Wildlife Service (FWS), the expected changes are within those allowed under the Southern Rocky Mountain Lynx Amendment (SRLA) Biological Opinion (2008). Project Design Criteria would be in place to limit disturbance to lynx and their habitat, live trees, understories and dense horizontal cover in a manner consistent with the SRLA. Informal consultation with the FWS will occur once the Responsible Official determines a course of action.

Comment: EA4-37	Meanwhile, the NFMA requires that habitat "must be well distributed so that reproductive individuals can interact with others in the planning area" 36 C.F.R. 219.19. The courts have found that the Forest Service must analyze the impacts of timber sales on wildlife corridors[…](Environmental Conservation/ Preservation)
Response:	As described in EIS, section 3.4, under cumulative effects for species considered, regardless of the Selected Alternative, remaining habitat is expected to be well distributed within both the project area and Rito-Archuleta LAU. Project Design Criteria, SRLA objectives and standards would be in place to limit disturbance to lynx and their habitat, live trees, understories and dense horizontal cover in a manner consistent with the Southern Rockies Lynx Amendment (2008).

Comment: EA4-38	The RGNF should pay particular attention to the impacts of this project in combination with the nearby and recently approved County Line Vegetation Management Project on habitat connectivity and fragmentation. The Colorado Division of Wildlife has identified this particular area of Colorado, including the planning area, as high density occupied habitat by lynx and likely a movement corridor to and from New Mexico for this animal.6 Because of the Lynx's status under the ESA and the critical role the planning area plays in this animal's recovery, the USFWS will have to provide formal consultation on the project.(Environmental Conservation/ Preservation)
Response:	See response to DEIS Comment 4-14 in appendix D.1.

Comment: EA4-39	**XIII. Other Wildlife.** The EIS prepared for this project must consider in a Biological Evaluation the revised Region 2 sensitive species list. These include but are not limited to boreal toad, boreal owl, pine marten, snag dependent species, and Rio Grande Cut-throat trout. Other sensitive, endangered, threatened, and species proposed for listing under the ESA must also be considered.(Environmental Conservation/ Preservation)
Response:	The Biological Assessment and Evaluation for the Cumbres Vegetation Management project does consider all applicable R2 Sensitive, Threatened and Endangered species. The BA/BE analysis is summarized in section 3.4 of the EIS.

Comment: EA4-40	The analysis should also assess and disclose the adequacy of the RGNF's Forest Plan mitigation measures for goshawk, their scientific justification, and adequacy. (Environmental Conservation/ Preservation)
Response:	Goshawk surveys have been conducted to ensure their protection and PDC have been included, if a nest were found during implementation. However, assessment of the adequacy and scientific basis of the goshawk guidelines are outside the scope of this project.

Comment: EA4-41	National Forests must gather MIS population and trend data before taking action that may affect habitat. Despite the RGNF's 2003 MIS Amendment, the regulations governing implementation of the National Forest Management Act (NFMA) create a general obligation that the Forest Service gather and keep data to ensure species diversity in the planning area. (Environmental Conservation/ Preservation)
Response:	Project level species occurrence data provide information on the occupancy and distribution of the species in the project area, rather than population trend. Population trends are monitored at the Forest level, consistent with NFMA requirements (36 CFR 219.19). The project analysis evaluates the effects of the project on species and their habitats, and relates those effects to the Forest-level population and habitat trends.

Comment: EA4-42	**XIV. Osha**. The analysis area contains a population of the medicinal plant Osha (Ligusticum porteri), a plant used historically and today by Native Americans, Hispanic communities, and by the herbal industry. The plant's cultural and traditional uses raise the analysis of this resource in the heritage section. However, this section in the draft EA appears weak and perhaps not in compliance with the requirements of NEPA and NFMA. (Environmental Conservation/ Preservation)
Response:	A concern regarding timber harvest activities and the potential effects on *Ligusticum porteri* (*Osha*) was brought up during scoping. Since the plant is of cultural interest and is relatively common in the project analysis area, the IDT determined that it was appropriate to highlight in the EIS that there is ongoing local research concerning this plant, along with agency commitment to monitor effects of any management activities by providing support to increasing the research data available for the species. See response to Comment EA4-43.

Comment: EA4-43	The draft EA notes the plant may be declining nationwide and may warrant listing according to research. EA at 79. More information is needed on the impacts to this plant species. The draft EA makes speculative conclusions about both potential negative and positive affects of the proposed alternatives on the local population of Osha. Without better scientific information, it is prudent for the project to mitigate any impacts through [...] avoidance. Where local populations are identified in the planning area, the project should prescribe a buffer zone. (Environmental Conservation/ Preservation)
Response:	Following this comment, additional investigation was made into the status of the species. The statement that was in the EA was misleading and removed in the EIS. There is no solid evidence that the plant is declining nationwide, though it is indeed being over-wild crafted in certain areas, most notably in New Mexico. There is no evidence of over-harvest on Cumbres Pass where populations are locally very robust and the plant is commonly found. The listing that was referred to in the EA was proposed by the *Problem Solving Class of the Program in Sustainable Development and Conservation Biology* at the University of Maryland for inclusion into Appendix II of the Convention on International Trade in Endangered Species (CITES)(University of Maryland 1999). They concluded that *L. porteri* warranted CITES Appendix II listing because of regional and state protection measures, impacts of harvesting for an increasing medicinal demand, and lack of success in cultivating the plant. The plant was never listed in CITES and there has been no movement to get the plant listed in the United States as an Endangered or a Sensitive Species. Because there is a lack of research and data in general, the Rio Grande NF has initiated an *Osha* mapping project in

	partnership with Kansas University (KU) within the Cumbres project analysis area. The study is designed to help determine population density, help evaluate the effects of disturbance and decreasing canopy cover on the plants, and help determine sustainable rates of harvest (section 3.17). The RGNF has committed to a long term monitoring study and preservation of this unique medicinal plant.

Comment: EA4-44	**XV. Other Analysis Documentation**. RGNF should include a full set of color fold out, large scale maps[…] including […]: All alternatives, including slopes and access for each; Travelways, both system and non--system; Vegetation (i.e. Cover Type); Wildlife Habitat Structural stage, including stage 5 old growth; Lynx occupancy and travel corridors; Past timber harvest, including type, year, and mitigation measures required and their effectiveness; Riparian and wetland areas, including fens; Landslide Risk; Windthrow risk areas from high to low, and; Roadless areas, both inventoried (i.e. RARE II) and current. (Environmental Conservation/ Preservation)
Response:	Thank you for the suggestion. However, the maps that were included in the EIS were those needed to display the spatial locations of proposed activities for each alternative; to support the narrative; and/or where a map would be more effective than a narrative in describing resource information. The maps provided were at the scale considered sufficient to provide the necessary information to the Responsible Official.

Comment: EA4-45	**XVI. Cumulative Effects.** The analysis must consider cumulative impacts of other past, present, and reasonably foreseeable future actions. Cumulative impacts should be analyzed without regard to land ownership boundaries and should take into account actions of other agencies and individuals […]Among the actions that should be taken into consideration as part of the cumulative impact analysis are past logging and regeneration within and near the analysis area, livestock grazing and the current condition of range in the analysis area (including specifically potential effects on regeneration), and road construction and reconstruction. Past, present, and future projects must be assessed and disclosed in the analysis and should be considered at least at the level of the larger watershed(s). The planning area and surrounding areas have been heavily logged over recent decades, very little of this landscape remains unlogged. This fact should be disclosed and the effect on forests structural stages in the area disclosed. (Environmental Conservation/ Preservation)
Response:	Chapter 3 of the EIS considered potential activities on private or other land ownerships under cumulative effects for a variety of biological, physical, and social resources at relevant scales for each resource. For example, cumulative effects for wildlife are described under section 3.4 and potential effects on wildlife are evaluated at different scales depending on the species (i.e. effects on lynx were considered at both the LAU and Forest-wide scales; mule deer are considered at the Forest scale). For many resources, past and on-going activities are incorporated into the existing condition (EIS, chapter 3). Section 3.9 considered effects on the three watersheds partially in the analysis area, primarily at the 6th level HUC, but also at the sub-watershed scale for one 7^{th-} level HUC of concern. The direct, indirect, and cumulative effects analysis considered activities on both the Rio Grande NF and the Carson NF in New Mexico. The Carson had no past activities identified in those watersheds.

Comment: EA5-1	With removal of most dead and dying Engelmann spruce trees over eight inches in diameter, many cut areas would resemble clearcuts. Removal of much of the existing timber would cause impacts to lynx and other wildlife. Implementing the proposed action would necessitate the reopening of closed roads, some of them previously decommissioned. This would cause impacts to soils and watershed (Environmental Conservation/ Preservation)
Response:	The EIS describes the expected effects to a range of biological, physical, and social resources from implementing three alternatives, including No Action. The Responsible Official will use the EIS, specialist reports, public comments, and other information to determine the Selected Alternative.

Comment: EA5-2	Cumulative impacts to lynx must be disclosed and analyzed. Because such impacts may be significant, an environmental impact statement (EIS) should be prepared. (Environmental Conservation/ Preservation)
Response:	The Responsible Official determined that an EIS was appropriate and the Notice of Intent was published in the Federal Register on July 29, 2013. Expected cumulative effects for lynx were considered in the Biological Assessment prepared for this project and summarized in section 3.4 of the EIS. All project alternatives would be consistent with the SRLA and the Programmatic Biological Opinion (2008) and would meet all standards, guidelines, exemptions, and exceptions for the Forest and Lynx Analysis Unit. An official request for concurrence from the U.S. Fish and Wildlife Service will be requested following the determination of the Selected Alternative.

Comment: EA5-3	The proposed action would approve offering far more wood than current or foreseeable industry could handle. It would be much more appropriate to concentrate on removing hazard trees from areas adjacent to open roads and private land, and manage most of the reminder of the area to protect wildlife habitat, watershed, recreational opportunity, and scenery. (Environmental Conservation/ Preservation)
Response:	The distinction between this analysis and the amount of timber offered within a specific timber sale should be made. The estimated volume within this analysis would not be offered in one timber sale, but likely through a series of sales over several years (EIS, section 1.5). The alternative of removing hazard trees only was considered, but not in detail, since it did not meet the project purpose and need (EIS, section 2.4).

Comment: EA5-4, EA5-6, EA5-7	THE EMPHASIS IN THE PROPOSED ACTION IS INAPPROPRIATE, AND A NEW ALTERNATIVE NEEDS TO BE CONSIDERED. The proposed action seems to place the greatest emphasis on treating a large number of acres and supplying commercial wood [...] While we do not necessarily oppose sale of some commercial products from the area, the emphasis would more appropriately be placed on removing hazard trees and retaining watershed, wildlife habitat, recreational, and scenic values. [...] the proposed action seems designed to primarily provide wood. Application of this emphasis would diminish other multiple use values [...] While removal of all, or of any defined amount, of the dead and dying trees isn't mandated, the only requirements for leaving trees under the project design criteria are 4 snags per acre and enough trees, along with existing down dead wood, to provide 10-15 tons per acre of large woody debris. EA at 13. And Table 2-3 on page 14 shows that only 51 forested acres would not be treated under alternative 2. Thus nearly all dead and dying spruce could be cut under the proposed action. (Environmental Conservation/ Preservation)
Response:	The Forest Service feels that the purpose and need for the project, as well as the proposed action, are appropriate for the Management Area Prescriptions and circumstances for which they are written. Even within the 5.11 MAP (General Forest) is a guideline which states "Forest insect or disease infestations are evaluated against the potential for loss of commercial forest resources, with management emphasis on protecting the commercial resources," (USDA Forest Service 1996). The comment acknowledges the likelihood that most large spruce trees will be attacked and killed by the spruce beetle. The project does not diminish other resource values, but weighs them against the proposal and offers a range of alternative treatments that would allow the Responsible Official to balance conflicting values. Although salvage of dead trees is a project goal, many dead trees would be retained even under the proposed action. In addition to retaining a minimum of 4 snags per acre, streamside management zones would be protected along perennial, intermittent, and ephemeral streams. Steeper slopes would also be reserved from harvest. Therefore, between the PDC and the range of alternatives, not every dead stand would be cut.

Comment: EA5-8	Logging is likely to kill or damage a considerable portion of the existing (advance) regeneration. It would also increase the potential for windthrow of remaining stands. EA at 22. (Environmental Conservation/ Preservation)
Response:	The Forest Service agrees that a portion of advance regeneration would be killed or damaged by the proposed activities, but Project Design Criteria are included to limit the amount of damage (EIS, table 2-1). The potential for windthrow would increase. More open stands with past harvest activity may have greater windfirmness than an unharvested or lightly harvested stand, but as acknowledged in in section 3.2, the shallow-rooted growth habit of both spruce and fir can often result in blowdown of residual mature trees.

Comment: EA5-9, EA5-10, EA5-11	A much healthier project would emphasize removing hazard trees from areas along roads, adjacent to private property, and near the campground. In other areas, stands should remain mostly uncut, especially those that have a sizable component of fir. There are several such stands, as only two stands are 100 percent spruce, with the remainder having 8-42 percent fir.[...]Implementing such a project would mean that much of the future forest would be dominated by subalpine fir (SAF).[...]We believe the alternative described above meets much of the purpose and need for the Cumbres Project.[...]It would "treat potential hazard trees in areas of concentrated public use". It would reduce the concentration of fuels in areas adjacent to private land. It would better "utilize the existing transportation network" than would the proposed action because it would not require the reopening of closed and previously decommissioned roads.[...]At a minimum, the alternative described above should be an alternative in the EIS or final EA. (Environmental Conservation/ Preservation)
Response:	Removing only hazard trees to protect infrastructure was an alternative not considered in detail, since it did not meet the purpose and need for the project (EIS, section 1.3). Subalpine fir is part of the ecosystem and a mix of Engelmann spruce, subalpine fir, and aspen (where it occurs), is the desired long-term goal for most resources. The Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: EA5-12, EA5-13	PROTECT LYNX AND FULLY DISCLOSE POTENTIAL IMPACTS. THE FOREST SERVICE MUST PERFORM A FULL CUMULATIVE IMPACTS ANALYSIS AND MAKE IT READILY AVAILABLE TO THE PUBLIC. Amazingly, the EA does not consider the possible effects on Canada lynx to be a key issue.[...]Even more disturbingly, the EA declines to consider cumulative impacts involving other federal actions, stating that the Fish and Wildlife Service will address such actions separately. EA at 29. This is not permissible under NEPA. The Forest Service, as the lead agency, must disclose all potential impacts from the proposal(s) being analyzed (40 CFR 1502.16), including cumulative impacts (id. at 1508.25(a)(2)). The Forest Service absolutely cannot shirk its duty to disclose all potential impacts from the Cumbres Project.[...]This omission is in violation of the CEQ Regulations, and is very significant because there is a major project immediately adjacent to Cumbres, County Line, which has been at least partially implemented. Both are in the same Lynx Analysis Unit – Rito Archuleta. (Environmental Conservation/ Preservation)
Response:	The effects on lynx habitat was identified as an issue when the Responsible Official determined that and EIS was needed. See response to DEIS comment 3-3, appendix D.1.

Comment: EA5-14	The EA states that the Biological Assessment (BA) and consultation have been completed […] EA at 76. However, when commenters asked for the BA, we were told that it was "considered draft"[…] If the BA has already been used as the basis for consultation, it is more than "draft" and should be readily available to requestors, to be able to use in comments on the draft EA. (Environmental Conservation/ Preservation)
Response:	The referenced paragraph on in the Draft EA was an error; official consultation with the FWS does not occur until the Selected Alternative is determined by the Responsible Official. The Biological Assessment is considered draft until the Selected Alternative is determined and consultation is completed.

Comment: EA5-15	CUMULATIVE IMPACTS ON LYNX COULD BE SIGNIFICANT [...] Any logging would destroy some advance regeneration […] Removing standing dead reduces future denning habitat. If the project lasts 10 years, disturbance could occur during most or all of that time during the operating season (April 1 until December 15). Reopening closed roads would allow more recreational use year-round. This could cause lynx to flee the area, even if there was enough habitat left for them to use. Increased snowmobile use would compact snow, and increase access for wildlife species that compete with lynx for prey, especially coyotes. Snowmobile use could also damage existing and future conifer regeneration, which is needed for the project area to eventually become lynx habitat again after any major logging. See EA at 28. (Environmental Conservation/ Preservation)
Response:	Cumulative impacts on lynx habitat were fully evaluated and disclosed in the Biological Assessment and summarized in the EIS in section 3.4. The objectives and standards of the Southern Rockies Lynx Amendment (SRLA 2008) are fully incorporated into this analysis. As described in table 2-1, Project Design Criteria will be in place to limit disturbance to lynx and their habitat, live trees, understories and dense horizontal cover in a manner consistent with the SRLA. As shown in section 3.4, table 3-4, both action alternatives would add to the Forest exemptions and exceptions within the SRLA, however, the LAU will remain in full compliance with the SRLA Vegetation Standards.

Comment: EA5-16	The combined effects on lynx from proposed and approved activity in the area, including Cumbres and County Line, may be significant, given the large areas of removal of dead and dying spruce from suitable habitat, and the slow growth of any new trees planted or naturally regenerated. At a minimum, connectivity of lynx habitat between the area around Cumbres Pass and other areas would be reduced for many years. Given the large area that may be cut in Cumbres and County Line, maintaining riparian corridors, aspen, SAF, and any live spruce would likely not be sufficient to maintain connectivity, contrary to what is stated at EA p. 28..(Environmental Conservation/ Preservation)
Response:	See response to DEIS Comment 4-14, appendix D.1.

Comment: EA5-17	The action alternatives would likely violate the Southern Rockies Lynx Amendment. Standard Veg S6 does not permit reduction of snowshoe hare habitat in multi-story mature or late successional conifer forests, with four exceptions. Only one of these exceptions applies to Cumbres, "incidental removal during salvage harvest (e.g., removal due to location of skid trails)". Southern Rockies Lynx Management Direction, Record of Decision at Attachment 1-5. This would only allow construction of skid trails and landings for treatment that was outside snowshoe hare habitat. With the large amount of activity proposed and already occurring in lynx habitat on the Rio Grande National Forest, adding Cumbres to the list of projects could also violate Standard Veg S2, which limits the amount of lynx habitat converted to unsuitable to 15 percent of a national forest in any 10-year period. Id at 1-3. Logging the beetle-killed spruce would convert habitat to unsuitable because of removal of overhead cover and destruction of at least some of the understory hare habitat.(Environmental Conservation/ Preservation)
Response:	See responses to DEIS Comments 2-7 and 4-10, appendix D.1.

Comment: EA5-18	A SMALLER PROJECT COULD MEET SOME OF THE PURPOSE AND NEED AND PROVIDE MUCH BETTER PROTECTION FOR LYNX AND OTHER WILDLIFE. As discussed above in section II, a smaller project would meet much of the project's stated purpose and need. Retaining stands with a good mix of dead and dying spruce and mostly live SAF would conserve lynx habitat. As noted above, there are many such stands in the project area. See EA at 23. Such stands would provide sizable areas of habitat in a landscape where many stands (such as in the County Line Project and whatever is cut in Cumbres) have been, or will be, clearcut or nearly so. Stands dominated by fir often have some small conifers, which would help provide winter foraging habitat, but such trees are often damaged or destroyed in logging operations. The standing dead would eventually fall down and create denning habitat. […]The smaller alternative would also protect habitat for other species which prefer older forests, notably marten, boreal owl, brown creeper, and hermit thrush. (Environmental Conservation/ Preservation)
Response:	Potential effects on lynx were considered for three alternatives, including No Action. This range of alternatives considered the expected effects on all species identified, if fewer acres were harvested. Within the proposed harvest units, all live trees regardless of size or species would remain un-harvested, unless a safety or operational purpose dictates its removal. Table 3-4 provides a comparison of the expected effects to lynx habitat for the action alternatives. Project design criteria will be in place to limit disturbance to lynx and their habitat, remaining live trees, understories trees and shrubs, and dense horizontal cover in a manner consistent with the SRLA. Project Design Criteria are also in place to retain snags in various conditions of decay in any cutting unit, but focusing on the larger diameter snags, which many wildlife species prefer. Snags and other undisturbed areas would also be retained in water influence zones or other unharvested area, depending on the alternative selected.

Comment: EA5-19	Even with a much smaller project, the risk of a major fire in the area would remain low. The high elevation and high annual precipitation of the area make it unlikely that a major wildfire would occur. Also, with a majority of the overstory trees being dead before long (if not already), it would be difficult for a fire to jump from snag to snag, with no crown to help ignite each tree. To reduce this already small risk even further, concentrations of fuel could be removed from areas along roads and adjacent to private land. This is part of the proposed action and can be retained. But stands away from these areas do not need to be cut. They are better left alone to provide lynx habitat and protect watersheds. (Environmental Conservation/ Preservation)
Response:	See response to Comment EA4-7.

Comment: EA5-20	Note that the no action alternative would be much better for lynx: Overall, this alternative would allow natural disturbances such as spruce beetles to slowly re-shape the forest; providing the best opportunity for a continued and naturally created mosaic pattern across the landscape that would continue to provide suitable habitat for lynx. EA at 27. […] Removal of hazard trees and fuel reduction adjacent to private land would not create significant gaps in lynx habitat.(Environmental Conservation/ Preservation)
Response:	The comparisons of the expected effects of the alternatives on lynx habitat are disclosed in the Biological Assessment which is summarized in section 3.4 and tables 2-2 and 3-4. EIS. The balance or weighing of effects on lynx habitat and other resources will be done in the Record of Decision. Based on the analysis and other considerations the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: EA5-21	THE DISCUSSION OF EFFECTS ON WATER SHED IS CONFUSING. The discussion of impacts to watersheds from implementation of the action alternatives is difficult to follow. For example, the second paragraph under Alternative 2 – Proposed Action at EA p. 50 mixes connected disturbed area, road equivalent disturbance, and disturbance in the water influence zone. These are all important and different concepts that should be discussed separately and distinctly. (Environmental Conservation/ Preservation)
Response:	In response to this comment, we have determined that it would be appropriate to separate those terms within the discussion and this section was updated in the DEIS to improve clarity.

Comment: EA5-22	Is "road equivalent disturbance" discussed at ibid. the same as "watershed disturbance" discussed at id. p. 46? It appears to be, but it is not clear. These terms are not defined in the EA (see "Terms and Definitions", EA section A.1), and except for connected disturbed area, are not even found in the Watershed Conservation Practices Handbook (WCPH), FSH 2509.25, section 05. The analysis of impacts should clearly define terms, and use them consistently throughout the analysis. (Environmental Conservation/ Preservation)
Response:	The equivalent road disturbance is a method used in the forest plan to compare disturbance levels for each watershed. An explanation for "equivalent road disturbance" was added to table A.1 – Commonly used terms and definitions in appendix A.

Comment: EA5-23	THE CONNECTED DISTURBED AREA WOULD BE TOO HIGH. Under the proposed action, connected disturbed area (CDA) in the Headwaters Rio de los Pinos watershed would increase 13 percent. EA at 50. Notably, "[t]he increase in CDA would occur on currently closed or decommissioned roads".[...] The extent of CDA could easily be minimized by reducing the area that was to be cut, and thus reduce the road access needed. This could: eliminate the need to reopen closed roads, ensure that Forest Plan standards and guidelines would be met, and allow impacts from past activity to continue recovering. Notably, alternative 3 would not cut units that would require the reopening of road 118.1A. (Environmental Conservation/ Preservation)
Response:	The 13 percent increase in connected disturbed area (CDA) for Alternative 2 in the Headwater Rio de los Pinos watershed (EIS, section 2.5, table 2-2) represents the total proposed increase through the life of the project. Later in the same paragraph in section 3.9, it states: "The increase in CDA would occur on currently closed or decommissioned roads; these roads would be closed or decommissioned at the completion of the project, which would return the CDAs to existing conditions". As project activities are completed, the roads would be closed, lowering the permanent CDA increase for the project to below acceptable levels. Likewise, not all timber harvest units would be active through the project life. As the cutting is completed and harvest units and temporary roads are closed, disturbed areas would be seeded, waterbarred, and rehabilitated as needed. So, through the life of the project, the total increase in CDA would be less than 10 percent at a given time, since not all CDAs would be active during the same time.

Comment: EA5-24	THERE WOULD BE TOO MUCH SOIL DISTURBANCE IN AREAS PREVIOUSLY DISTURBED. Under the proposed action, an additional 124 acres would be disturbed in the seventh level watershed of concern (EA at 51), out of a total of 1066 acres (ibid). With 302 acres already disturbed by activities since 1980 (EA Table 3-15, at p. 49), the disturbance level would be just under 40 percent if there had been no recovery. The EA states that the disturbance level in this watershed would be 16-17 percent. Id. at 54. The maximum detrimental disturbance allowed is 15 percent. See WCPH at FSH 2509.25, section 14.1, and Soils Management Handbook, FSH 2509.18, R-2 Supplement No. 2509.18-92-1, section 2.2 (3). Detrimental soil disturbance is as high as 23 percent (EA at 54), with three units exceeding the 15 percent standard. Id. at 55. Disturbing these areas even more would violate the Soils Management Handbook, R-2 Supplement, id. Several units would need rehabilitation after logging to stay within the 15 percent limit – units 1, 2, 6, 7, 11, and 20 (id. at 54). All of these units except 20 would be accessed by reopening closed or previously decommissioned roads. See EA Proposed Action Map B-1, Figure 2-2, p. 9. (We do not find unit 20 on the proposed action map.) (Environmental Conservation/ Preservation)
Response:	For soils, disturbed acres are not counted twice. For instance, if the 124 acres of disturbance were inclusive within the 302 acres of previous disturbed area, the 302 and 124 would not be added together to get a total disturbance percent. Recovery has occurred to some extent and so a balance is struck to not discount old disturbance, but also not to overestimate new disturbance. The stated disturbance level in this watershed of 16-17 percent is in reference to the equivalent road disturbance area as discussed in the EIS in section 3.9. As stated in the Forest Plan Forest-wide Desired Conditions (Forest Plan pg. I-3): "Soils may be periodically disturbed by management activities, but are restored and reclaimed to original potentials after activities have been completed". Past timber harvest project design criteria did not necessarily follow the same guidelines as they do now. Some areas were impacted and exceed the 15 percent activity unit limit that is now in the Forest Plan. The requirement that units be brought under the 15 percent limit after harvest completion (EIS, table 2-1) provides an opportunity to accomplish multiple forest objectives, timber harvest as well as soil protection and improvement.

Comment: EA5-25	REOPENING DECOMMISSIONED ROADS WOULD CAUSE PROBLEMS.[…] Reopening the decommissioned road that parallels Rio de los Pinos (FSR 118.1A), poses serious concern with potential impacts to the stream. This road crosses several small tributaries and numerous seeps/springs that flow directly into Rio de los Pinos; it was previously closed and decommissioned due to impacts to the stream. The old roadbed has re-vegetated and the impacts to Rio de los Pinos have been minimal since the closure. The proposed re-opening of this road is a major concern to the health of Rio de los Pinos and would require careful design and monitoring to ensure impacts to stream habitat are minimized. [...] but the Forest Service wants to undertake activity that would set back this recovery. Sources of fine sediment from past activity are relatively minor (id. at 47), but reopening closed and decommissioned roads would create new sources of sediment […]. This is one more argument for a smaller project, one that stays out of treatment areas requiring closed or decommissioned roads to be reopened. (Environmental Conservation/ Preservation)
Response:	The expected effects of re-opening decommissioned road 118.1A are described in the EIS in sections 3.5 and 3.9 and associated specialist reports. The Responsible Official will consider these effects, along with other trade-offs, when determining the Selected Alternative.

Comment: EA5-26	The Project Design Criteria for soil and water protection (EA at 12-13) are good; they would likely reduce some impacts. However, "[t]here is a hazard of increased erosion created when old non-system timber roads, decommissioned roads, and new roads are reconstructed or constructed". […] Effects, at least short-term ones, are likely to occur with the reopening of these roads. For example, subsoiling would alleviate soil compaction, but would form loose soil that could easily be deposited into creeks during a rainstorm or snowmelt. (Environmental Conservation/ Preservation)
Response:	Project design criteria (PDC) are designed to minimize disturbance and effects. As described in the EIS, some short term effects could be expected; PDCs are designed to minimize those effects. Forest Service personnel ensure that PDCs are applied correctly and monitored for effectiveness to ensure that detrimental effects are minimized. Activities such as subsoiling are used to ameliorate issues, such as compaction. Subsoiling breaks up the soil and allows for more natural water movement within the soil and leads to easier establishment of vegetation. It does lead to surface disturbance which may lead to short term increases in erosion; however Kolka and Smidt (2004) found that subsoiling, with seeding or just "cover crop seeding" a road had similar run-off amounts.

Comment: EA5-27	The soils and watersheds would be able to recover from past activity much sooner and not incur as much new impact if the Cumbres Project was designed to use existing, open roads only. Also, any and all non-system roads should be fully obliterated. (Environmental Conservation/ Preservation)
Response:	In general the soils and watershed as a whole would recover sooner without additional disturbance in the area. However, soil compaction has been shown to persist for many years. In a study conducted on the Rio Grande National Forest it was found that compaction was largely unchanged 16 years after logging occurred (Rawinski and Page-Dumrose, 2008). If PDCs are followed and skid trails and landings are re-used, additional compaction would be minimized. The benefit comes in the rehabilitation, which would occur after harvest, where subsoiling could effectively reduce these compacted corridors and decrease the time needed for soils to recover. Full obliteration of roads is only one option which the Forest Service employs. Full obliteration is often cost prohibitive and was not determined to be necessary to meet hydrologic objectives. See response to comment EA3-3 for description of the different levels of decommissioning.

Comment: EA5-28	THE PROPOSED PROJECT IS UNREALISTICALLY LARGE. Even if the proposed action was appropriate for the Cumbres area, it is much too large to implement, as proposed, in 10 years (EA at 4) or five years (id at 25.) Under this proposed action, 2498 acres would be salvaged logged (id. at 4), producing an estimated 20-30 million board feet (MMBF) (id. at 14). Currently, industry that could handle this amount of wood, even over 10 years, likely does not exist. The one large mill in Colorado, run by Intermountain Resources in Montrose, is in receivership […] Even if the wood that would be offered for sale […] could be logged in the 10-year life of the project, it would deteriorate well before the end of that period to the point that it could not be made into dimension lumber. It could be made into house logs, probably for a least a few decades; however, there is no facility in the project area to make this product. Given the state of the economy, and the fact that house logs are usually used for second homes, which are a luxury, development of such a facility does not seem likely in the near future. (Environmental Conservation/ Preservation)
Response:	See response to Comment EA5-3 concerning the size of the analysis area versus timber sale implementation. Currently the RGNF offers and sells approximately 10 MMBF per year. At that rate, the volume within this project could realistically be sold within a 2-3 year span. Because these sales would be combined with sales from the other projects mentioned, we anticipate sales over a 5 year span. Intermountain Resource in Montrose has also been recently purchased and is now buying lumber under the ownership of Montrose Forest Products. The Forest Service agrees with the commenter that some of the dead trees will eventually become unsuitable for dimensional lumber due to defect and checking. Products not utilized for dimensional lumber are currently being utilized for firewood, house logs, and other products. The offer of a smaller amount of wood from the Cumbres area is an option considered under the current range of alternatives.

Comment: EA5-29	SCENIC INTEGRITY WOULD NOT BE PROTECTED UNDER THE PROPOSED ACTION. The scenic integrity level for the area is moderate. [...] Under Forest Plan FEIS alternative G (selected in the Record of Decision), "[m]apped Scenic Integrity Levels will become Scenic Integrity Objectives". Plan FEIS at IV-429. Under management area 5.11, which covers most of the project area, "[a]ctivities meet the adopted Scenic Integrity Objective". Forest Plan at IV-29.[ ] With alternative 2, units 5, 6, 8-11 and Trujillo Meadows Campground will be visible from concern areas. EA at 71. These units are 58-92 percent spruce (EA at 23), meaning that they could be clearcut, or nearly so. If that occurred, the scenic integrity would surely drop to low or even very low, in violation of the Forest Plan. It is thus necessary to limit the portion of dead and dying spruce trees that can be removed from proposed treatment units to ensure the moderate scenic integrity level is met. (Environmental Conservation/ Preservation)
Response:	See response to comments EA4-34 and EA4-35.

Comment: EA5-30	Distance for hazard tree removal. Under the action alternatives, hazard trees could be cut "1.1 to 2.0 tree heights from open roads, fences, private land, or recreation facilities". EA at 4. This distance is excessive. Removal for a distance of the height of the tallest tree plus 10 percent should be sufficient to properly protect resources and people. (Environmental Conservation/ Preservation)
Response:	As stated in the EIS, it was felt that a *range* of hazard tree removal distance would best meet the needs of the variety of situations as needed to protect the infrastructure in the analysis area while also meeting other resource objectives. Types of infrastructure present in the analysis area include yurts, a campground water system, linear roads and fences, livestock water developments, land survey monuments, and adjacent homes or other structures. It is felt that a fixed distance would not provide sufficient flexibility to meet protection objectivities in all these situations, especially considering the shallow-rooted growth habitat of subalpine fir and Engelmann spruce. Partial removal of any of these species may result in the residual trees becoming hazardous due to an increase in blowdown risk. The maximum distance of 2 tree heights may be needed if it is expected that trees are likely to blow over, knocking over other trees into a high risk site with potential to affect public safety or damage infrastructure.

Comment: EA5-31	Coverage and depth of chunks and chips. Chips (from chipping or grinding) and chunks (from mastication) would be allowed to cover up to 50 percent of an area to a depth of four inches in WUI areas [..]. This is too great a coverage and depth. Chips and chunks decay slowly and may use most of the available nitrogen. This would prohibit or retard growth of ground vegetation and regeneration of trees. (Environmental Conservation/ Preservation)
Response:	The Joint Fire Science Program project #06-3-2-36- *A regional assessment of the ecological effects of chipping and mastication fuels reduction and forest restoration treatments*, found that understory vegetation was suppressed at mulch depth greater than 12.5 cm (4.9 inches) in ponderosa pine. There was no data available for spruce/fir forest types. The project design criteria of less than 4 inch depth over no more than 50 percent of the area should be interpreted as the *maximum* allowable, not as a condition that would occur over the whole WUI fuel treatment area. If mastication would result in more than the maximum, a different treatment would be used. The more likely scenario is that small hand piles would be created, which would then be burned the following winter with adequate snow cover.

Comment: EA5-32	Noxious weeds. The EA contains some good measures for fighting weeds, notably the requirement to treat any weeds on haul routes and other "highly disturbed" areas for five years as needed[..]. However, there is no requirement to pre-survey any part of the project area prior to the commencement of ground-disturbing activities, and to eradicate any populations discovered. Such a measure should be added to the Project Design Criteria. "Highly disturbed" areas to be treated (if needed) should include any areas burned. (Environmental Conservation/ Preservation)
Response:	This suggestion was included in the Project Design Criteria listed in table 2-1, EIS.

Comment: EA5-33	Costs for roadwork. The EA uses figures for the costs of roadwork that seems very low: $3615-$3810 per mile for reconstruction/maintenance and $3000 per mile for construction/ reconstruction. Calculated from Tables 3-24 and 3-25 at EA p. 68. The Forest Service should state where these cost figures were obtained and why they are much lower than costs for similar roadwork elsewhere. (Environmental Conservation/ Preservation)
Response:	Cost-estimate values for NFS road reconstruction/maintenance used in the EIS were derived from preliminary review of existing road and ground conditions, inferring necessary maintenance and needed improvements. Dollar values for tasks are from the Forest Service *Intermountain, Southwestern, and Rocky Mountain Regions Engineering Cost Estimating Guide for Road Construction* (2011). These values are for Alternative comparison purposes. The processes and values used are the same between Alternatives, but the scale of the required work is changed. Estimated costs for these roads are relatively low on average because the system roads are in-place and drainage is generally functioning adequately or would need relatively minor upgrades (maintenance). Road reconstruction is necessary when new features are needed on existing road templates to correct inadequate drainage or to install a culvert, for amending road subsurface defects, to mitigate existing or un-foreseen resource problems, and/or to barricade roads for travel management during the proposed management activities. There would be no classified (NFS) road construction occurring under any alternative. Reconstruction or construction of proposed temporary roads may occur on unclassified roads, re-using old road templates (old, non-system roads), or, minimally, as new temporary road construction. This work would not bring roads up to a level above what is necessary for log truck access and resource protection.

Comment: EA5-34	CONCLUSION: The proposed action would treat much too large of an area and inappropriately places emphasis on acres treated and wood produced, rather than on protecting wildlife habitat, watersheds, recreational opportunity, and scenic resources. A much smaller project, one that considerably limits the cutting of dead and dying spruce and protects resources must be considered, and should be approved if any action will be taken in the project area. (Environmental Conservation/ Preservation)
Response:	After review and consideration of the effects described in chapter 3, the specialist reports that are part of the project record, public comments, and other criteria, the Responsible Official may choose to implement any of the action alternatives, no action, or a combination of the analyzed alternatives.

Comment: EA5-35	An EIS should be prepared, especially to examine the cumulative impacts to lynx, watershed, and scenery from Cumbres and other projects such as County Line. (Environmental Conservation/ Preservation)
Response:	The Responsible Official determined that an EIS was appropriate and the Notice of Intent was published in the Federal Register on July 29, 2013.

Comment: EA5-36	The BA, describing possible effects to lynx, must be available for comment. (Environmental Conservation/ Preservation)
Response:	As requested, the draft BA for the EA was released for review in July 2012.

D.3. Comment Letters Received on the DEIS

Letter 1
Comment 1-1

From: Raymond Johnson [mailto:ray@century21valleyrealty.com]
Sent: Thursday, December 12, 2013 1:06 PM
To: FS-comments-rocky-mountain-rio-grande-conejos-peak
Subject: Cumbres Vegetation Management Project

Dear District Ranger,

As a property owner in the immediate area, we are totally in favor of any harvest efforts in the area to remove the pine beatle infestation of the Englemann Spruce forest.
Thank you allowing input to the Forest Service plan.
Rincones Ranch LLC.

Your Community Voice in the Carson

Dec. 23, 2013 DEIS - Cumbres Project

Letter 2
Comments 2-1 through 2-12

Andrea Jones -
District Ranger
Conejos Peak District
15571 County Rd. T.5
La Jara, CO 81140

CONEJOS PEAK RANGER STATION
RECEIVED
JAN 06 2014

Carson Forest Watch
Box 15 Llano, NM • 87543
(505) 587-2848

On behalf of our citizens group in Northern New Mexico, the following are comments regarding the Cumbres Vegetation management Project DEIS:

1) Carson Forest Watch has been involved in monitoring projects in the Cumbres & La Manga Pass areas of the Conejos Ranger District for over 20 years. We have attended field trips, written comments and participated in the NEPA process here for many years.

2) I also hike, photograph & birdwatch in this area - and have done scientific study here for years.

3) While we share the concern regarding the tree mortality in this area (and throughout the West & Southwest) - we believe that Climate Change and associated droughts mean this is the "new normal" for our high elevation ->

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we will begin to use it with love and respect."

— Aldo Leopold

A Sand County Almanac

Spruce-fir forests. Because of this - we believe the changes in our forest structure and composition makes large salvage sale treatments questionable and likely to have increased adverse impacts than in the past.

4) The DEIS failed to acknowledge this loss of resilience and makes assumptions based upon past, cooler & wetter climate conditions.

5) We recommend additional analysis that factors in such climate & ecosystem changes - esp. here in the spruce-fir forest. The preferred alternative 2 bases effects determinations upon current & past climate - yet most western ecologists agree that in the near future many of these areas will just not be able to support such spruce-fir forests due to climate change.

6) The alternative 2 of the DEIS fails to account for the above changes and will have negative effects on wildlife & watersheds here - already under stress from changing ecological patterns.

7) We are especially concerned regarding the impacts of this project upon Canada Lynx. Because of recent large fires in its range from Creede to Wolf Creek, etc) - and the large, numerous salvage sales (County Line, Black Mesa & others near Creede & Wolf Creek) - the cumulative effects of further treatment in this area of National Forest will cause unacceptable disturbance for Canada Lynx at this time. We disagree that this project complies with Lynx conservation standards in the Lynx amendment to the Forest Plan. →

Page 2)

P.O. Box 15
Llano, NM 87543

8) We recommend a re-evaluation of Lynx affects in the DEIS that does a better analysis of cumulative effects - and includes this past Summer's wildfires.

9) We share these same concerns regarding watershed impacts - and again. There needs to be greater cumulative analysis of recent wildland fires and climate change - esp. earlier run-off in Spring and reduced snowpack in this area.

10) It appears that Standard VEG S2 in the Lynx amendment is violated in the DEIS alt. 2. (See p. 45 DEIS) It is clear the alternative will change the areas treated to unsuitable - and when combined with recent fires & nearby Salvage Sales - this violates the standards to further Lynx Recovery.

11) Any action alternative needs to not adversely affect the Canada Lynx. There are just too many nearby impacts (with the fires, Salvage Sales, and climate change, reduced snowpacks and tree mortality, etc. - and this project only further threatens Lynx viability in the Southern Rockies. This area is vital to persistance & Recovery of Lynx & many other species dependent upon Spruce-Fir forest. We are also concerned about Boreal Owl, Boreal Toad, Pika, and other species in this habitat type.

12) Future re-generation of regeneration cannot be relied upon to provide adequate wildlife habitat for many years, if at all. (p. 49) Again - with a warmer climate & reduced snowpack - any reliance upon regeneration needs to be modified and more conservative.

13) Since 79% of lynx habitat would be impacted in the project area (p. 49) - there needs to be more effort to develop an alternative that does more to protect lynx viability in this area. Because so much of the Rito Architecture & other LAUs have been affected by fires, salvage sales, tree mortality, etc - any further actions that adversely affect lynx are not allegiable at this time.

14) While alternative 3 is an improvement in having lesser adverse impacts to lynx - again - it is overly optimistic regarding regeneration success and also fails to adequately address cumulative, additive effects from recent fires, salvage sales, tree mortality, recreation, etc. We appreciate the discussion on p. 51 of the DEIS regarding lynx affects from this project -

15) However, the decision to choose Alt. 2 basically fails to follow the science and conservation of lynx and other species documented in the Biological Evaluation - there is no rationale (except timber harvest) for choosing Alt. 2 and it threatens lynx viability and violates the Forest Plan & NEPA. Please do more to address lynx protection in the FEIS.

Sincerely, Tonnie Berde for (FTA)

January 5, 2013

Letter 3
Comments 3-1 through 3-32

Dear Ranger Jones,

I have read hundreds of EAs and EISs, but none have described a project as tragic as your proposed Cumbres timber sale. Don't rely on the Objection Deciding Officer to save your timber sale when he/she rejects each of the scores of objections they will receive. I guarantee you will be sued multiple times and loose multiple times unless you cease all work on this timber sale **immediately**. Modifying this corporate gift won't reduce the ecosystem destruction described by well-respected scientists in the attachments to these comments.

Then, you should admit your neurotic fascination with pleasing the natural resource extraction corporations makes you unfit for public service. Please seek other employment where you will cause less damage and don't collect a salary paid with tax dollars supplied by the people you enthusiastically violate and abuse.

How could anyone pursue a project on land owned by 307 million other Americans with knowledge that will cause the carnage described by your IDT below?

> Comment #1: The DEIS at page 45 says: "The purpose and need for the amendment was 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." Incredibly, Jones with this knowledge you describe the following adverse effects caused by implementing the Proposed Action to the Canadian Lynx (listed as threatened under ESA) in Chapter 3. Are you proud?
>
> "If present, lynx are expected to be disturbed and displaced from salvage activities." (DEIS at page 46)
>
> "However, if salvage activities could resume earlier (snow conditions warranting) during the May/June kitten birth time period, denning disturbance would be expected to occur. Parent lynx may then abruptly move kittens in order to avoid such disturbance. Progressively, it's expected that lynx would remove themselves from disturbance and not occupy, or greatly limit their presence within the analysis area." (DEIS at page 47)
>
> "Post-salvage canopy conditions are not expected to support lynx habitat suitability in most units." (DEIS at page 47)
>
> "Lynx are expected to see a reduction in the amount of prey that's available with the area from the reduction in the stands capacity to support snowshoe hares, because of the removal of mature trees and DHC." (DEIS at page 47)
>
> "Overall, these changes in prey abundance (primary and secondary) are be expected to result in very low to no lynx reproduction that could cause lynx to abandon their home range and look for prey resources elsewhere." (sic) (DEIS at page 47)
>
> "Damage and reductions in this type of habitat can have effects on lynx because it will also reduce the timber stands capacity to support snowshoe hares." (DEIS at page 47)

1

"This can also prevent or delay habitat suitability, and future occupancy of lynx and associated prey." (DEIS at page 47)

"Road construction/maintenance is expected to add to species disturbance and displacement, and increase the potential for more reductions in prey species." (DEIS at page 48)

"An increase in snowmobile traffic and compaction in the area would increase the potential for lynx disturbance and potentially hinder regeneration efforts." (DEIS at page 48)

"Therefore effects of these treatments would be nearly identical to effects from harvest activities discussed in previous sections, where lynx would be affected through the reduction of the quality and productivity of their habitat, and the habitat of snowshoe hares." (DEIS at page 48 and 49)

Comment #2: Table 1-1 at page 3 of the DEIS indicates one of the Forest-wide Desired Conditions for the Rio Grande National Forest is to "**Conserve and promote Canada lynx recovery (SRLA 2008).**" The Cumbres timber sale violates NFMA by not complying with the forest plan. The DEIS indicates: 1) lynx will be displaced from the timber sale area (pg. 46), 2) lynx habitat suitability will be

reduced in logging units." (pg. 47), 3) lynx prey (snowshoe hare) will be reduced by logging, 4) the reduction in prey abundance will result in very low to no lynx reproduction (pg. 47), and 5) Road construction/maintenance will disturb and displace lynx (pg. 48).

The DEIS at page 52 states "Federal actions are not addressed under Endangered Species Act (ESA) requirements." The DEIS conveniently fails to disclose to the lay public that the USFS must comply (emphasis added) with the ESA.

There is no acceptable level of Lynx habitat and prey base damage! Logging less acres (Alternative 3) will also cause the damage described above. "No Action" is the only alternative that doesn't drive the Canadian Lynx closer to extinction.

Jones, as if this weren't bad enough you still purse your tragic proposed action in spite of this damage described below. Did you read the DEIS?

R2 Sensitive species
"Removal of dead and dying trees could degrade habitat for boreal owl, northern goshawk and the olive-sided flycatcher within the project area. For the boreal owl, the most likely direct effect that could occur outside of the nesting season from salvage activities would be disturbance (leaving the area). However, during the nesting season (mid-April to late May), nest destruction, displacement and/or adult and nestling mortality could also occur if nesting trees are felled. Indirect effects could include the reduction in existing large diameter snags and future snag recruitment, which may influence potential nesting habitat and occupancy. The reduction of understory components such as surface litter and CWD, could also reduce habitat of the boreal owls primary prey species--the red-backed vole." (DEIS at page 56)

"Disturbance of species such as the northern goshawk around the breeding season can be very detrimental to reproductive success. Northern goshawks are very sensitive to human disturbance within the breeding season, as goshawks can be very aggressive to any disturbance during this time period. Harvest activities during the breeding season (May thru early July) may inhibit breeding activity, cause nest abandonment or mortality and failure." (DEIS at page 56)

"Indirectly, the removal of beetle killed trees, understories, regeneration and any vegetative components that might support prey base resources, could impact the northern goshawk. Reductions in prey could induce displacement of the goshawk into other areas in search of food." (DEIS at page 57)

"There is a potential for nesting raptors and birds such as the olive-sided flycatcher to be disturbed or suffer direct mortality as the result of tree felling activities." (DEIS at page 57)

"There is a possibility that direct boreal toad mortality could occur during harvest operations through crushing of individuals, eggs, or underground burrows by vehicles or heavy equipment. The potential for crushing can increase with the re-construction and re-opening of roads." (DEIS at page 57)

"Indirectly, the removal of a large amount of overstory would change habitat conditions on the ground and could impact boreal toad survival and reproduction by changing the microclimate within the understory." (DEIS at page 57)

"More openings could impact toad habitat by increasing the risk of predation and decreasing surface moisture. The loss of micro habitats and burrow opportunities may impact future survival and reproduction. In addition, the removal of forest canopies may increase the potential for desiccation in and around northern leopard frog habitat by removing the mature components that provided shade and helped maintain moisture." (DEIS at page 57)

"Martins may be disturbed and or displaced by harvest activities. In addition, martins can be impacted from those activities that modify late-successional stand characteristics preferred by the species and/or its food resources." (DEIS at page 57)

Management Indicator species
"Up to 2,498 total acres of harvesting would occur throughout the analysis area, which could negatively impact the brown creeper. Disturbance could occur from human activity associated with timber harvest. Some nest destruction could also occur with the removal of timber." (DEIS at page 60)

Migratory Birds
"Proposed harvest activities could cause some disturbance of individuals. There is the potential to impact active nests, if harvest occurred in a unit during breeding season. In harvested areas the number of snags would be reduced following harvest." (DEIS at page 64)

"However, reopening the decommissioned road that parallels Rio de los Pinos (FSR 118.1A), poses serious concern with potential impacts to the stream." (DEIS at page 67)

Hydrology, Watershed, Aquatics
"Alternative 2 has the most mileage of proposed haul routes, opening of closed roads, and new temporary road construction of the action alternatives and would have the highest total watershed disturbance area." (DEIS at page 79)

Soils
"Direct effects are the most obvious and are directly related to timber harvest activities (i.e. compaction, soil displacement and disturbance) that occur primarily on skid trails, landings, or areas where machines turn and displace soil or organic matter. Indirect effects may include increase erosion due to loss of soil cover, reduction of nutrients or disruption of nutrient cycling, and hydrological consequences such as fine sediment from erosion entering streams." (DEIS at page 86)

"As timber is removed from the stand many nutrients can also be removed. If nutrients are removed, those available for plant growth are also reduced over time, depleting the soil." (DEIS at page 86)

"There is a hazard of increased erosion created when old non-system temporary roads, decommissioned roads, and new temporary roads are reconstructed or constructed." (DEIS at page 86)

"Ground based harvesting leads to soil compaction and soil erosion. Skid trails are compacted and can become conduits which can accelerate erosion and thus increase sedimentation to streams. This loss of soil can be extreme;" (DEIS at page 87)

Air Quality
"Proposed project activities in the action alternatives that could directly affect air quality would include the combustion of fuel from equipment use in cutting, transporting, and hauling logs, burning slash piles at landings following harvest completion, and, if used, burning handpiles as part of WUI fuel reduction treatments." (DEIS at page 92)

"Vehicles used in harvesting operations and gas and diesel powered equipment used to cut and remove trees would result in emissions typically found in gas and diesel exhaust, including sulfur dioxide, particulates, volatile organic compounds, carbon dioxide, and nitrogen oxides. Depending on the season of logging (winter vs. summer), some amount of dust could be generated by harvest activities which could be more visible than vehicle emissions." (DEIS at page 92)

"It is estimated that logging activities would generate between 15 and 22 larger piles at landings, depending on the alternative. Pile burning would result in emissions typically associated with wood combustion, particularly volatile organic compounds, nitrogen oxides, soot, particulates, carbon dioxide, and carbon monoxide. Fires could also emit hazardous air pollutants, such as polynuclear aromatic hydrocarbons and aldehydes (such as formaldehyde)." (DEIS at page 92)

Scenic Resources
"Under alternative 2, portions of units 5, 6, 8, 9, 10, 11, and Trujillo Meadows Campground harvest are expected to be seen. Additional other units may be visible as harvesting is completed and potential blowdown takes place." (DEIS at page 108)

"but portions of some roads and landings could be visible; these could result a short-term effect on scenic integrity." (DEIS at page 108)

Heritage
"Salvage, fuels reduction treatments (thinning), tree planting, landings and new road construction all have the potential to negatively impact heritage resources. Direct negative effects could include the potential destruction and/or alteration of unidentified heritage resources and contexts within the APE. Activities such as road maintenance and the opening of old roads would not be expected to directly impact heritage resources, if maintenance is relegated to the original road foot print. New temporary road construction has the potential to negatively affect unidentified buried cultural deposits for all the action alternatives. Indirect effects from project activities can include the erosion of buried cultural deposits precipitated by temporary road construction and the removal of trees. Potential indirect effects from vandalism to heritage resources perpetrated by individuals associated with project activities is possible under each action alternative." (DEIS at page 111)

You and I both know you made the decision to advertise this timber sale before you sent out your first public scoping package. After making this decision you said to yourself "now I have to do NEPA on this" as if NEPA were some inconvenient, costly, pesky, needless obligation you must deal with.

Any competent public servant charged with protecting and conserving the public resources who had read the damage discussed above would drop this tragic timber sale and not spend another penny of taxpayers money developing a project that trashes what the public wants to pass to future generations.

When Congress passed NEPA in 1969 they inserted into the law a mandate that the Responsible Official must analyze a "No Action" alternative. They did this for a reason. They had the expectation that the Responsible Official would take the Proposed Action through the process, read the EA or EIS, and then decide whether or not to proceed with the Proposed Action or select another alternative for action. They wanted the "No Action" alternative chosen if the impacts described by the IDT in Chapter 3 would do more harm than the benefits gained by implementing any action alternative.

Jones you have failed to implement NEPA the way Congress intended. It's inconceivable that any caring person who cares more about the public than their NFTM budget would inflict such damage the IDT describes above to sell a timber sale. I know IDT member know they must describe the damage and then follow the description of the damage with a "but", "although" or "however" statements claiming it will "only be short-term, "minor", "unmeasurable", "temporary" etc.etc. in order make it appear to the public the damage is no big deal.

Why do you put together an ID team and ignore them?

You know I'm right. Now, please remove yourself from your denial mode and serve the public that supplies the money for your salary. Assure the ROD says you have selected the "No Action" alternative.

The Cumbres timber sale is inconsistent with best science. The USFS is mandated by law to base their projects on best science.

I have included **attachments** to these comments. Hopefully, the other resource specialists IDT members will read each attachment closely. Frankly, I'm surprised these specialists didn't already know about the scientific information contained in the attachments. Jones, had they known, they would have recommended that you abandon your tragic proposal. If you still chose to pursue the timber sale, competent IDT members who really cared about the resources that are their responsibility to protect would not have allowed their name to appear as an IDT member.

Professional resource scientists realize and take seriously their IDT role to honestly identify and describe how the proper functioning of their resource is harmed and sometimes destroyed by commercial logging activities.

Most USFS biologists, archaeologists, recreation specialists and ecologists understand that they contribute to this resource damage each time they participate on IDTs when they keep quiet about their concerns. They maintain silence because they don't want to jeopardize their USFS employment by not supporting their supervisor's proposed timber sale. As an IDT leader, I saw this occur too frequently.

It gives me hope to know that there are still a few USFS specialists who fight to protect their resource from the damage caused by timber sale actions. They know IDT participation gives them the platform to effectively take action to eliminate damage to the resource(s) for which they are responsible. Sadly, you did not choose these types of scientists for your IDT.

Request for final NEPA document modifications: Please review this project in light of the best science attached to the objector's comments and acknowledge the science conclusions of 421 independent, unbiased scientists regarding the impacts of timber sale activities. The scientists quoted in each **attachment** describe how natural resources are harmed by logging. Please assure that literature written by USDA employees does not dominate the References Cited section of the final NEPA document. Add at least as many source documents for the quotes in the **attachments** as there is literature written by USDA employees.

Please see **Attachment #15**.

Please assure that the Responsible Official's responses to public comments are posted online as well as hardcopy in the Project File

Request for final NEPA document modifications: If the Responsible Official's responses to public comments are not posted online, then consider this a FOIA (per 36 CFR 200.6) for these responses to be mailed to me (hard copy of email) prior to the time the objection period begins.

The DEIS does not analyze an alternative in detail that does not construct any new roads (temp or system)

The Responsible Official could analyze an infinite number of alternatives by simply adjusting the acres harvested up or down. If adjusted upwards, the harvest goals will be achieved sooner. If adjusted down, it will take longer to achieve the harvest goals.

Of course the law does not require this, nor should it.

It would waste taxpayer's money to analyze an alternative simply because it exists. United States law codifies this:

> Question and answer 1b in the **Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations** responds to this situation:
>
> 1b. **How many alternatives** have to be discussed when there is an infinite number of possible alternatives?
>
> A. For some proposals there may exist a very large or even an infinite number of possible reasonable alternatives. For example, a proposal to designate wilderness areas within a National Forest could be said to involve an infinite number of alternatives from 0 to 100 percent of the forest. When there are potentially a very large number of alternatives, only a reasonable number of examples, covering the full spectrum of alternatives, must be analyzed and compared in the EIS. An appropriate series of alternatives might include dedicating 0, 10, 30, 50, 70, 90, or 100 percent of the Forest to wilderness. What constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts in each case.

The no new roads alternative stands out among the infinite number of alternatives because it reduces the adverse environmental effects of the proposed action while still meeting the purpose and need for the project.

New road construction is an activity that causes damage to some important natural resources in the sale area. This activity is particularly detrimental to aquatic and wildlife resources. Chief Dombeck's statement below supports this fact.

"Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road."

Dr. Mike Dombeck, Chief, US Forest Service
Remarks to Forest Service employees
and retirees at the University of Montana
February 1998

Link to statement:
https://www.uwsp.edu/cnr/gem/Dombeck/MDSpeeches/CD%20COPY/Chief%20Mike%20Dombeck%27s%20Remarks%20to%20Forest%20Service%20Employees%20and%20.htm

> **Comment #3:** Since best science and Chief Dombeck agree that ""There are few more irreparable marks we can leave on the land than to build a road," this is a valid reason to analyze a no new temporary or system road alternative in detail. The acres harvested would be reduced slightly, but the alternative would still be responsive to the Purpose & Need and most importantly the road-related natural resource damage will be eliminated.
>
> **Comment #4:** Please respond to the statements by these scientists quoted below:

Dr. Bunnell concludes from his research on logging roads that: "Sediment input to freshwater is due to either the slower, large-scale process of soil erosion, or to rapid, localized "mass movements," such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991)."

"Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981)."

"More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads." Source: http://warehouse.pfc.forestry.ca/pfc/25154.pdf

Comment #5: In the final EIS please tell the public why you believe road-related natural resource damage will not occur on the Cumbres timber sale, or if it will occur, explain why the resource damage is an acceptable tradeoff for P&N goals.

Request for final NEPA document modifications: Please analyze an alternative in detail that does not construct any new roads (temp or system). The no new roads alternative stands out among the infinite number of alternatives because it reduces the adverse environmental effects of the proposed action while still meeting the purpose and need for the project even though slightly less output would be generated.

Please see **Attachment #4**.

Most American recreationists will avoid areas that have been logged. Jones, you are proposing to take action that will reduce the revenue for businesses in local communities that rely on recreation dollars: motels, sporting goods stores, restaurants, gas stations, grocery stores etc. You cannot have both.

The following is one Purpose & Need statement in the DEIS:

"Provide forest and wood products, such as fuelwood, sawtimber or house logs, to the people of the San Luis Valley and/or other areas." (DEIS P&N at page 2)

"By not salvaging the dead spruce, approximately 20 to 30 MMBF of National Forest timber would not be utilized for wood products or contribute to sustained yield of forest products. The public would most likely obtain an equivalent amount of wood products from other sources, including private land or other countries." (DEIS at page 39)

Comment #6: Jones, at page 39 of the DEIS you say: "*The public would most likely obtain an equivalent amount of wood products from other sources, including private land or other countries."* Since the volume doesn't have to come off the why do you inflict the massive damage to the natural resources described in Chapter 3 in the sale area when you know you don't have to? There is much more value to dead trees if left in the woods than there is logging them to assure all of your NFTM dollars are spent this FY.

U.S. Undersecretary of Agriculture Jim Lyons states that recreation revenues from national forests significantly exceed timber revenues. See; http://www.americantrails.org/resources/economics/EconForestRec.html

There are more businesses in communities near the Rio Grande National Forest that depend on recreation revenues than there are businesses that depend on timber revenues. How will these business owners react when they read in the paper the USFS is taking action that will reduce their revenues?

Request for final NEPA document modifications that appeared in the objector's comments: Please omit the Purpose & Need statement that tells the public this project is needed to "*Provide forest and wood products"* and "*utilized for wood products or contribute to sustained yield of forest products*"

Please see **Attachment #1**.

Herbicides Containing Glyphosate must Never be used on Public Land for Any Reason
At page 3-43 the DEIS states:

"Canada thistle is very treatable and easy to control if caught early;"

The DEIS does not indicate which herbicides will be applied. All herbicides are not the same

Herbicides containing glyphosate are potentially lethal. Other herbicides are toxic but not lethal.

As a retired USFS employee I understand the potential damage to natural vegetation that will occur if non-native invasive plants are not eradicated. I also know there are effective (although a little more costly) alternatives to killing these plants other than applying the lethal herbicides that contain glyphosate.

Comment #7: Literature authored by independent scientists not connected with Monsanto or the USFS indicates mammals that eat contaminated foliage and humans that might brush against contaminated foliage or eat contaminated berries have been known to suffer from the following as a result of glyphosate contact: birth defects, non-Hodgkin's lymphoma, mitochondrial damage, cell asphyxia, miscarriages, attention deficit disorder endocrine disruption, DNA damage, skin tumors, thyroid damage, hairy cell leukemia, Parkinson disease, premature births, decrease in the sperm count, harm to the immune system in fish death of liver cells, severe reproductive system disruptions and chromosomal damage. Glyphosate is persistent and remains active for several days after being applied.

The following web sites are just a few that describe the terrible effects to the health of organisms that are unfortunate enough to make contact with glyphosate-containing herbicides and the USDA involvement:

http://www.organicconsumers.org/articles/article_15573.cfm
http://www.counterpunch.org/2008/12/18/another-shill-for-monsanto/
http://www.veganreader.com/2008/12/18/obama-blows-it-with-monsantos-vilsack-lbam-spray-victims-beware/
http://www.dirtdoctor.com/Glyphosate-Danger-to-Livestock-Plantsbr_vq3915.htm

There are many, many more sites with similar information.

You see, there is a reason Chief Tidwell looks the other way when confronted by recent science from labs that aren't funded by Monsanto. He works for Secretary Vilsack.

Glyphosate kills aquatic life even if the concentrations of the chemical in water are very low. The fish deaths will occur in the streams in the project area and a few miles downstream. Herbicide mist should never be allowed to contact water … even so-called aquatic-safe herbicides.

As you already know, corporations will do anything for profit, including misrepresenting the safety of a toxic chemical they manufacture.

NEPA requires you to analyze environmental effects that may or might (emphasis added) occur when the Proposed Action is implemented. The 2 attachments to these comments related to glyphosate (**Attachments 9a and 18**) contain detailed explanations by hundreds of unbiased scientists about the horrid health effects of glyphosate exposure listed above. Just because you have a single outdated USFS-sanctioned document showing glyphosate is safe does not relieve you from analyzing the possible dangers to mammals (including humans) and fish based on hundreds of science documents presented in the attachments that describe how glyphosate is potentially lethal.

Comment #8: Jones, would you apply a chemical to your yard where children play in the grass that was banned in Denmark 10 years ago because of its lethal effects? See http://www.twnside.org.sg/title/service76.htm

Comment #9: Jones, would you apply a chemical to your yard where children play in the grass that the Institute of Science in Society based in London England calls for banning in England? See:
http://www.i-sis.org.uk/about.php and
http://www.i-sis.org.uk/Ban_Glyphosate_Herbicides_Now.php

Glyphosate-containing herbicides are also connected to bee Colony Collapse Disorder (CCD) that's currently driving bees towards ESA listing. The websites below describing the possible link between glyphosate and CCD are too numerous to ignore.

http://www.petitiononline.com/Bees/petition.html

http://www.organicconsumers.org/articles/article_4557.cfm

http://www.i-sis.org.uk/SmartStaxCornCorporateWarOnBees.php

http://pmep.cce.cornell.edu/profiles/extoxnet/dienochlor-glyphosate/glyphosate-ext.html

http://www.k12science.missouristate.edu/Junior_Academy/MJAS%20Docs/State%202009/Papers%202009/HS_ENV/Foulk_Kayla_HS.pdf

http://www.saynotogmos.org/ud2010/umar10a.php

http://npic.orst.edu/factsheets/glyphotech.html

http://www.pacificfreepress.com/news/1/11161-monsantos-butterfly-effect-roundup-wiping-out-pollinator-insect.html

http://beesafelawns.com/Facts.aspx?lnkID=service3

http://natureinstitute.org/nontarget/reports/sugarbeet_001.php

http://articles.mercola.com/sites/articles/archive/2012/04/21/vanishing-bees-film.aspx

http://thewatchers.adorraeli.com/2012/05/24/colony-collapse-disorder-i-keep-finding-dead-bees-everywhere/

http://foodfreedomgroup.com/2012/06/29/monsanto-expose-from-agent-orange-to-colony-collapse-disorder/

http://www.stonyfield.com/blog/2012/09/06/colony-collapse-disorder/

http://www.r8ny.com/blog/vincent_nunes/monsantos_roundup_causing_colony_collapse_disorder_in_bees_four_years_after_the_bees_are_gone_were_next.html

http://www.naturalnews.com/035688_Monsanto_honey_bees_colony_collapse.html

http://articles.mercola.com/sites/articles/archive/2012/05/08/what-biotech-company-blamed-for-bee-collapse-just-bought-leading-bee-research-firm.aspx

http://www.infowars.com/monsanto-buys-top-bee-research-firm-after-being-implicated-in-colony-collapse/

http://readersupportednews.org/opinion2/271-38/11296-the-fox-monsanto-buys-the-chicken-coop-beeologics

http://aristonicobelargios.wordpress.com/2012/10/03/monsanto-buys-leading-bee-research-firm-after-being-implicated-in-bee-colony-collapse-banoosh-world/

http://www.thrivemovement.com/Monsanto-Buys-Leading-Bee-Research-Firm

Are you still unsure about Monsanto's glyphosate safety? Please read this article in the April 2013 issue of *Entropy* magazine: http://www.mdpi.com/1099-4300/15/4/1416

Request for final NEPA document modifications: Please tell the public there are alternatives to herbicides that effectively eradicate noxious weeds non-native plant species. Make sure you don't tell the public you will not use these alternatives because they are too expensive. I'm sure the vast majority of the general public will think using the more expensive alternatives to herbicides is a wise use of their tax dollar. Please tell the public that no glyphosate-containing herbicides will be used to treat non-native plants noxious weeds in the ROD. Jones, if you insist on applying glyphosate-containing herbicides, then include Attachments #9a and #18 in an electronically available appendix to the final EIS.

Jones, here's another law that might interest you:

18 USC § 4 - Misprision of felony
Whoever, having knowledge of the actual commission of a felony cognizable by a court of the United States, conceals and does not as soon as possible make known the same to some judge or other person in civil or military authority under the United States, shall be fined under this title or imprisoned not more than three years, or both.

18 USC § 1001 - Statements or entries generally
(a) Except as otherwise provided in this section, whoever, in any matter within the jurisdiction of the executive, legislative, or judicial branch of the Government of the United States, knowingly and willfully—
(1) falsifies, conceals, or covers up by any trick, scheme, or device a material fact;
(2) makes any materially false, fictitious, or fraudulent statement or representation; or
(3) makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry; shall be fined under this title, imprisoned not more than 5 years or, if the offense involves international or domestic terrorism (as defined in section 2331), imprisoned not more than 8 years, or both. If the matter relates to an offense under chapter 109A, 109B, 110, or 117, or section 1591, then the term of imprisonment imposed under this section shall be not more than 8 years.

(b) Subsection (a) does not apply to a party to a judicial proceeding, or that party's counsel, for statements, representations, writings or documents submitted by such party or counsel to a judge or magistrate in that proceeding.

(c) With respect to any matter within the jurisdiction of the legislative branch, subsection (a) shall apply only to—

(1) administrative matters, including a claim for payment, a matter related to the procurement of property or services, personnel or employment practices, or support services, or a document required by law, rule, or regulation to be submitted to the Congress or any office or officer within the legislative branch; or
(2) any investigation or review, conducted pursuant to the authority of any committee, subcommittee, commission or office of the Congress, consistent with applicable rules of the House or Senate.

The DEIS for the Cumbres timber sale does not "identify methods and procedures required by to "Identify methods and procedures to insure that presently unquantified environmental amenities and values may be given appropriate consideration."

> **Comment #10:** Simply stating that amenity resource values have been considered in the NEPA document is not enough. The Responsible Official must "identify the methods and procedures used to assure appropriate consideration."

Request for final NEPA document modifications: Please identify and discuss the methods and procedures used by the Responsible Official to insure that presently unquantified environmental amenities and values are given appropriate consideration.

Jones, if you are really concerned about aquatic species' health the final EIS MUST indicate that all newly constructed temporary roads will be obliterated after use and you must do it.

The DEIS indicates temporary road construction is a connected action to this timber sale.

Please obliterate all temporary roads after use and tell the public this will be done in the final EIS. An obliterated road contains no running surface, because the natural sideslope that existed before the road was constructed is reestablished. Not obliterating a road because the line-officer will use it again to haul logs from the area means the road is not temporary! Road that will be used again in the future should be constructed to system road standards, or not at all.

Comment #11: Since temporary roads are outsloped with no ditch, sediment that is generated during precipitation events, find its way to streams and harms the aquatic resources for decades until the next timber sale reconstructs the so-called "temporary" road. Then the riparian resource

cycle of destruction begins again. The final EIS should clearly state these roads will be obliterated after use such that the sideslopes are as they were before construction. The CMPs will be removed and a running surface does not exist.

Request for final NEPA document modifications: Please obliterate temporary roads to reduce sediment generation rather than decommissioning them.

Please see **Attachment #4**.

The Opposing Views Attached to these Comments Describe the Resource Degradation and Destruction of Conditions Necessary for Proper Natural Resource Functioning that will Occur when the Timber Sale is Implemented

The attachments to these comments present the "responsible" opposing views of hundreds of independent, unbiased Ph.D. biological scientists who describe the resource damage caused by the majority of commercial timber and road construction sale activities taken at any location, on any topography, at any elevation, at any time.

Comment #12: Jones, your responses to each of these opposing views is governed by 40 C.F.R. § 1502.9(a) and 1502.9(b) which mandate a response to each opposing view. Please note that these laws do not allow the Responsible Official to **NOT** provide the public with meaningful responses to opposing views:

1) because they are opinions. Indeed, viewpoints and opinion are synonyms,
2) because of their source (e.g. newspapers, professional journals, scientific literature etc.),
3) because their source has not been peer reviewed,
4) because the opposing views are not site-specific to this timber sale,

Request for final NEPA document modifications: Please review this project in light of the best science attached to the objector's comments and acknowledge, summarize and describe the science conclusions of hundreds of independent, unbiased scientists regarding the adverse impacts of timber sale activities at any location. This would include the science viewpoints quoted in **attachments #1, #4, #9a, #15 and #18**. When acknowledging these science viewpoints please organize them by issue.

The Cumbres timber sale proposal is the antithesis of what the American public wants to occur in their national forests

The following quote comes from a forest service publication that describes what the public wants from their national forests:

"The public sees the restriction of mineral development and of timber harvest and grazing as being more important than the provision of natural resources to dependent communities (although this is still seen as somewhat important)." (Pg. 28)

Source: "Survey results of the American public's values, objectives, beliefs, and attitudes regarding forests and grasslands: A technical document supporting the 2000 USDA Forest Service RPA Assessment". Gen. Tech. Rep. RMRS-GTR-95. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 111 p.
Link to Complete Report: http://www.fs.fed.us/rm/pubs/rmrs_gtr095.pdf

> **Comment #13:** Jones, there is no "timber famine" as the USFS has been so fond of predicting for many decades. There is no shortage of raw materials for paper and wood products in the United States otherwise the owners of private timberland would not be exporting their lumber. Any national or regional poll or survey indicates the vast majority of the public doesn't want their public land harvested for any reason. In the final EIS please tell the public why this sale is an exception.

Request for final NEPA document modifications that appeared in the objector's comments: Please include a discussion and supporting data in the final EIS showing either:

1) the majority of the general public approves of logging their national forests, or

2) majority of the general public does not approve of logging their national forests.

Please designate the resource damage describe in **Attachment #1** that the public appreciates and hopes for.

The EIS does not specifically state "whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted."

Some lay members of the public will not be able to determine if all practicable means to avoid or minimize environmental harm to the natural resources in the forest unless the Responsible makes this statement. However, don't include this statement unless it's true and the "practicable means to avoid or minimize environmental harm" are listed and discussed.

Request for final NEPA document modifications: Please assure that the selected alternative avoids or minimizes environmental harm and state in the EIS that "all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted."

The DEIS fails to disclose responsible scientific opinion in opposition to the proposed action, and make a good faith, reasoned response to it

The DEIS for the Cumbres timber sale does not "promote the advancement of scientific knowledge of the effects of actions and technology on the environment and encouraging the development of the means to prevent or reduce adverse effects that endanger the health and well-being of

man." Not only does this timber sale not promote the advancement of scientific knowledge of the effects of logging, but it ignores and fails to discuss existing scientific knowledge about logging.

Request for final NEPA document modifications that appeared in the objector's comments: Please provide meaningful and specific responses to each opposing view includes in the attachments to these comments in the final EIS.

The Purpose & Need is written so narrowly that it excludes all reasonable alternatives to the Proposed Action. Such a narrow Purpose & Need allows you to reject all (emphasis added) alternatives submitted by the public in good faith in the "Alternatives considered but eliminated from detailed study" category. This behavior is not acceptable.

> **Comment #14:** Jones, you follow the USFS script perfectly. You have approved a Purpose & Need statement written by the IDT so narrowly it gives you justification to reject all alternatives suggested by the people you supposedly serve by placing them in the "Alternatives considered but eliminated from detailed study" category. This assures your Proposed Action that you selected for implementation before you scoped the project would have no competition.

Request for final NEPA document modifications: Please write a new (expanded) Purpose & Need that allows reasonable alternatives to the Proposed Action to be analyzed in detail. This Purpose & Need must deal with project goals that are not mutually exclusive. That is, achieving one goal must not degrade the resources indicated by another goal that need improvement. Then reinitiate the NEPA comment and analysis process to analyze the new reasonable alternatives, especially those suggested by the public during the comment period.

Jones, here's the bottom line.

By now you will have read my letters to the editor describing your most recent proposal to assault the precious land owned collectively by every American. Although you couldn't care less, most Americans want future generations of kids to have the opportunity for quietness and solitude. This will become more important in 2050 when the predicted population of the United States will be 438 million people. The wild **UNDEVELOPED** national forests will provide one of the only escapes from the insanity of a world driven even more by money than it is now.

Look yourself in the eye Jones. With the Cumbres timber sale you witlessly take away more undeveloped national forest acres from the legacy the unborn kids of the future deserve. Why? To provide short term profit for the natural resource extraction corporations.

Please don't fall back on the P&N for the Cumbres timber sale and sooth yourself by believing this timber sale actually benefits the resources in the forest and/or the people who use the forest. Your P&N describes goals that either 1) will never be accomplished by logging/roading, or 2) will manipulate the conifer tree species by in such a way as to mimic a private industrial tree farm. You might know there is no biodiversity in such a pseudo forest you are attempting to create.

My letters to the editor that you are dealing with now are intended to disclose your treachery by telling the recreating public the truth. Most people won't stand for being deceived by people who accept their tax dollars while simultaneously backhanding them for corporate benefit. I'm hoping to reach members of the public with the resources to stop this senseless, irrational project in Federal District Court when their objections are rejected by the USFS objection Deciding Officer.

Of course I'll file an objection expecting it to be slam dunked before it is read like all the rest. You see, my 11 years of experience as a forest appeals/litigation coordinator taught me USFS employees with ARO responsibility are directed to reject **all** (emphasis added) appeals & objections submitted by members of the public who don't have the resources to take follow-up court action.

Filing an objection is a way for me to pass the time.

Jones, you have a history of proposing corporate-friendly timber sales that are especially damaging. I'll be monitoring your future projects. You can expect to see more letters.

Soon the public will become aware of just how far you will go to assure all of your NFTM dollars are spent each FY.

I learned long-ago that the court of public opinion is often more effective than a court of law to convince the USFS to do what they are paid to do. As you know, the USFS will take extraordinary measures to avoid bad press. The bad press relating to your proposed timber sales will continue until you decide serving the public is more consistent with the actions of a public servant than abusing and ignoring the public in your senseless crusade to reward corporate America.

Don't even think about selecting alternative 3 in the ROD. Causing 62% less ecosystem damage by logging 1,549 acres under Alternative 3 vs. logging 2,498 acres under Alternative 2 is unacceptable! Your only choice is to inflict 0% ecosystem damage by selecting "No Action."

When I send hardcopies of these comments to the newspapers in your area you can be sure they will publish a feature article detailing how you plan to trash the natural resources (and recreation opportunities) in the Cumbres timber sale area to provide opportunities for short-term corporate profit.

When certain members of the public read the details of how they will be personally harmed by the Cumbres timber sale they will have time to start working with their attorneys. This will include folks who 1) own businesses that depend on recreation dollars, 2) will be outraged that this timber sale causes major damage to their recreational opportunities, and 3) will be infuriated that their tax dollars are being used to inflict such devastation to the amenity resources they love.

Some of these citizens also probably understand that taking the time to write a project objection trying to influence the final USFS decision is a waste of their time. Hopefully, they will care enough to take action that will place you in the defendant's chair.

Jones, you don't have the option to ignore the FOIA contained in my comments above. Federal officials cannot withhold documents requested under a FOIA because they might be damaging to the agency or the decision-maker.

Request for final NEPA document modifications: If the Responsible Official chooses not to post the responses to public comments online, then consider this a FOIA (per 36 CFR 200.6) for these responses to be mailed to me prior to the time the objection period begins for the Cumbres timber sale.

Sincerely,

Dick Artley's scanned signature is contained in the "signature" attachment.

Dick Artley [retired USFS forest planner and a person who believes the availability of undeveloped public land for his grandchildren is more important than short-term corporate profit)
415 NE 2nd Street
Grangeville, Idaho 83530
208-983-0181
da99333@gmail.com

PS: As you can tell I have no respect for someone who spends my tax dollars to provide short-term corporate profit opportunities while simultaneously and enthusiastically devastating and abusing the amenity resources I love. Does it make you proud to back-hand the public?

Letter 4
Comments 4-28 through 4-30

Andrea M. Jones
Conejos Peak Ranger District, USDA Forest Service
15571 County Road T.5
La Jara, CO 81140

Via e-mail: comments-rocky-mountain-rio-grande-conejos-peak@fs.fed.us

August 14, 2013

Dear Ms. Jones,

The following are the supplemental comments of Rocky Smith, San Luis Valley Ecosystem Council, Rocky Mountain Recreation Initiative, and Quiet Use Coalition on the proposed Cumbres Vegetation Management Project, per your notice letter dated July 22, 2013. These comments supplement our previously submitted comments on the environmental assessment for this project dated July 26, 2012.

We commend the Forest Service for choosing to prepare an EIS for the Cumbres Project. We believe that impacts to lynx, a threatened species, may be significant because about 2500 acres would be treated under the proposed action (project environmental assessment (EA) at 7). In the project area, a large amount of dead and dying trees would be removed, leaving the area to resemble several very large clearcuts. Impacts to watershed may also be significant.

It is also very important to analyze the possible cumulative impacts on lynx, soils, watershed, and scenery because there have been other large projects nearby, like County Line. The cumulative effects on lynx were not included in the Cumbres EA, as detailed at p. 4 of our previous comments. The draft EIS must thoroughly examine the possible cumulative impacts to lynx from all past, present, and reasonably foreseeable future projects. See 40 CFR 1508.7. The DEIS must also disclose the results of any consultation with the U. S. Fish and Wildlife Service.

It is our understanding that there have been problems in the County Line project with blowdown of residual trees and with soil impacts. These impacts and how they might be minimized in the Cumbres Project must be discussed in the EIS.

As we detailed in our 2012 comments on the EA, a much smaller project would likely considerably reduce impacts to lynx and watershed. One of the purposes of the National Environmental Policy Act (NEPA) is to "promote efforts which will prevent or eliminate damage to the environment and biosphere". 42 U.S.C. 4321. Under the Council on Environmental Quality regulations implementing NEPA

> Federal agencies shall to the fullest extent possible …
>
> (f) Use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.

40 CFR 1500.2.

Therefore, the EIS must examine at least one new alternative in addition to the ones analyzed in the environmental assessment. An alternative that must be considered would primarily remove hazard trees from areas adjacent to roads and other infrastructure, and near private land, while minimizing treatments elsewhere in order to protect lynx habitat and watersheds. See our previous comments, especially at 3-4.

We appreciate this opportunity to comment, and we look forward to reviewing the draft EIS.

Sincerely,

Rocky Smith, consultant
1030 Pearl #9

Denver, CO 80203
303 839-5900
2rockwsmith@gmail.com

Christine Canaly, Director
San Luis Valley Ecosystem Council
P.O. Box 223
Alamosa, CO 81101
(719) 589-1518
slvwater@fairpoint.net, info@slvec.org, www.slvec.org

Roz McClellan, Director
Rocky Mountain Recretion Initiative
1567 Twin Sisters Rd.
Nederland, CO 80466
303 447-9409
mccmlelr@colorado.edu

Tom Sobal, Director
Quiet Use Coalition
POB 1452
Salida, CO 81201
719-207-4112
quietuse@gmail.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Letter 5
Comments 5-1 through 5-3

FEB - 3 2014

Ref: 8EPR-N

Diana McGinn, Team Leader
San Luis Valley Public Lands Center
Rio Grande National Forest
1083 W. Hwy 160
Monte Vista, CO 81144

RE: EPA Comments for the Cumbres Vegetation Management Project Draft Environmental Impact Statement, CEQ # 20130372

Dear Ms. McGinn:

In accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA), and Section 309 of the Clean Air Act (CAA), the U.S. Environmental Protection Agency Region 8 (EPA) has reviewed the Draft Environmental Impact Statement (EIS) for the Cumbres Vegetation Management Project. As provided in more detail at the end of the letter, our review has resulted in a rating of "Lack of Objections" (LO).

The Draft EIS was prepared by the Conejos Peak Ranger District of the U.S. Department of Agriculture Forest Service (USFS) Rio Grande National Forest to analyze potential environmental impacts associated with salvaging timber stands being killed by spruce beetle and the need for long-term regeneration of the future forest, implementing fuel reduction treatments adjacent to private lands, and managing hazard trees that may impact infrastructure in the project area. The project area is located in Conejos County approximately 23 miles west of the town of Antonito, Colorado, and includes approximately 3,541 acres. Private land is located on the northeast and southwest edges. A summary of the three alternatives analyzed in the Draft EIS is as follows:

Alternative 1 (No Action) - no vegetation or fuels management actions.

Alternative 2 (Preferred Alternative) - salvage harvesting on up to 2,498 acres of beetle infested spruce stands; plant approximately 650 acres; construct or reuse 8.3 miles of temporary road; maintenance and reconstruction of 5.8 miles of decommissioned NFS roads; maintenance and use of 17.5 miles NFS existing roads; and winter burning of slash piles created during the project. It is estimated that 22 acres of landings would be needed across the project area.

Alternative 3 - salvage harvesting on up to 1,549 acres of beetle infested spruce stands; plant approximately 170 acres; construct or reuse approximately 4.4 miles of temporary road; maintenance and reconstruction of 0.6 miles of decommissioned NFS roads; maintenance and use of 15.8 miles NFS; and winter burning of slash piles created during the project. It is estimated that 15 acres of landings would be needed across the project area.

The EPA understands the need to address the tree mortality, forest health, fuels and fire risk, and timber salvage issues in the project area. We consider protection of aquatic resources to be among the most critical issues to be addressed in any NEPA analysis for vegetation management activities. The Draft EIS states that reopening of the decommissioned road that parallels the Rio de los Pinos is likely to negatively impact the stream. It further notes that the road was previously closed due to the impact it had on the stream. We support the USFS plans to carefully design the road reopening and monitoring to ensure the impact to the stream habitat is minimized. We suggest the Final EIS provide further information on how the road and monitoring will be designed to accomplish this objective. We recommend the stream/road area is highlighted in Figure 2-2, or additional detail on the location of this road and stream is provided in the text. Further, we recommend that the USFS consider whether another alternative that excludes this area from the proposed project would effectively meet the project purpose and need.

The burning of slash piles in winter is part of the project and described in Section 3.11. As noted on page 93, this burning will occur under a Colorado Air Pollution Control Division permit. The same page references "prescribed burns." Since prescribed burns can be an independent vegetation treatment, we suggest that the text clarify that the term prescribed burns for this project references the burning of the slash piles.

EPA's Rating and Recommendations

Consistent with Section 309 of the CAA, it is the EPA's responsibility to provide an independent review and evaluation of the potential environmental impacts of this project. Based on the procedures used to evaluate the adequacy of the information and the potential environmental impacts of the proposed action, the EPA is rating this Draft EIS as "Lack of Objections" (LO). The "LO" rating indicates that the EPA review has not identified environmental impacts requiring substantive changes to the preferred alternative. A description of EPA's rating system can be found at: http://www.epa.gov/compliance/nepa/comments/ratings.html.

We appreciate your consideration of our suggestions. These comments are intended to help ensure a comprehensive assessment of the project's environmental impacts, adequate public disclosure, and an informed decision-making process. If further explanation is desired, please contact me at 303-312-6704, or Lisa Lloyd of my staff, at 303-312-6537.

Sincerely,

David Francyk

for Philip S. Strobel
Acting Director, NEPA Compliance and Review Program
Office of Ecosystems Protection and Remediation

cc: Andrea Jones, District Ranger

2

United States Department of the Interior
OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Denver Federal Center, Building 67, Room 118
Post Office Box 25007 (D-108)
Denver, Colorado 80225-0007

TAKE PRIDE IN AMERICA

January 30, 2014

9043.1
ER 13/797

Letter 6

Andrea Jones, District Ranger
Conejos Peak Ranger District
Rio Grande National Forest
15571 County Rd T.5
La Jara, CO 81140

Dear Ms. Jones:

The U.S. Department of the Interior has reviewed the Draft Environmental Impact Statement for the Cumbres Vegetation Management Project, Conejos Ranger District, Rio Grande National Forest; CO, and has no comments on the document. The U.S. Fish and Wildlife Service advises that their concerns will be addressed through the Section 7 consultation process.

Sincerely,

Robert F. Stewart
Regional Environmental Officer

SOUTHERN UTE INDIAN TRIBE

Southern Ute Cultural & Preservation Department
P O. Box 737, Mail Stop #73, Ignacio Co 81137
970-563-0100: Fax. 970-563-1098

Letter 7

February 13, 2014

Ms. Diana McGinn
Conejos Peak Ranger District
15571 CR T.5
La Jara, CO 81140

Re: Review of Draft Environmental Impact Statement for the Cumbres Vegetation Management Project

Dear Ms. McGinn,

I have reviewed your letter requesting comment on proposed Draft and any affects that it may have to tribal sites, cultural resources and sites. The Southern Ute Indian Tribe offers the following response as indicated by the box that is checked.

- ☐ **NO INTEREST**: I have determined that there is not a likelihood of eligible properties of religious and cultural significant to the Southern Ute Indian Tribe.
- ☒ **NO EFFECT**: I have determined that there are no properties of religious and cultural significance to the Southern Ute Indian Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.
- ☐ **NO ADVERSE EFFECT**: I have identified properties of cultural and religious significance within the area of effect that I believe are eligible for listing in the National Register, for which there would be no adverse effect as a result of the proposed tower construction project.
- ☐ **ADVERSE EFFECT:** I have identified properties of cultural and religious significance within the Area of Potential Effect (APE) that are eligible for listing in the National Register. I believe the proposed communication tower construction project would cause an adverse effect on these properties.
- ☐ **REQUEST FOR ADDITIONAL INFORMATION:** The Southern Ute Indian Tribe requests additional information on the planned site for its impact on properties of religious & cultural importance to the Tribe as follows:

_____.

Please contact me at 970-563-0100, ext. 2257, if you have any questions or concerns.

Sincerely,

Alden Naranjo
NAGPRA Coordinator

P.O. Box 737 ✦ Ignacio, CO 81137 ✦ Phone: 970-563-0100

Letter 8

From: bk1492@aol.com [mailto:bk1492@aol.com]
Sent: Tuesday, July 30, 2013 6:15 PM

To: FS-comments-rocky-mountain-rio-grande-conejos-peak; HUMANELINES@HSUS.ORG; INFO@PETA.ORG; INFO@EARTHJUSTICE.ORG; INFO@IDAUSA.ORG; INFO@COK.NET
Cc: AMERICANVOICES@MAIL.HOUSE.GOV; speakerboehne@mail.house.gov; president@whitehouse.gov

Subject: Fwd: PUBLIC COMMENT ON FEDERAL REGISTER
THIS IS A LOGGING SLASH AND BURN PLAN AS USUAL BY THE FOREST SERVICE. THEY HAVE BEENLOGGING LIKE THIS FOR THE LAST 50 YEARS. FS IS RESPONSIBLE FOR THE LYNX BEING PRACTICALLY EXTINCT. I OBJECT TO FS TURNING OUR NATIONAL LANDS INTO LUMBERYARDS. SUCH A PLAN IS VERY DESTRUCTIVE TO ECOLOGY OF AMERICA. PLEASE PUT ME ON THE LIST TO KEEPUP WITH ALL DEVELOPMENTS IN THIS PLAN AS IT OVES THROUGH AND BECOMES WHAT THE FS WANTS AND NOT WHAT THE PUBLIC WANTS. LEAVING THE FOREST ALONE FOR NATURAL REGROWTH TO TAKE PLACE IS WHAT NATURE REQUIRES. THE FS PLAN IS A DESTRUCTIVE PLAN WHICH DOES NOT WORK AND IS RESPONSIBLE FOR WHAT IS HAPPENING TO NATURE IN AMERICA.
THIS COMMENT IS FOR THE PUBLIC RECORD. PLEASE ACKNOWLEDGE RECEIPT. FS MAKES PLANS SO ITS EMPLOYEES KEEP WORKING AND MAKE AALOT OF MONEY. THAT IS WHAT THEY DO. JEAN PUBILC

[Federal Register Volume 78, Number 145 (Monday, July 29, 2013)]
[Notices]
[Pages 45495-45496]
From the Federal Register Online via the Government Printing Office
[www.gpo.gov]
[FR Doc No: 2013-17968]

Letter 9

THE NAVAJO NATION

Historic Preservation Department, POB 4950, Window Rock, AZ 86515 • PH: 928.871-7198 • FAX: 928.871.7886

BEN SHELLY
PRESIDENT

REX LEE JIM
VICE-PRESIDENT

January 6, 2014

Andrea M. Jones, District Ranger
Rio Grande National Forest
Conejos Peak Ranger District
15571 County Road T.5
La Jara, CO 81140

Subject: **File Code: 1950-Conejos Peak Ranger District-Draft Environmental Impact State (DEIS)**

Dear Ms. Jones:

The Historic Preservation Department-Traditional Culture Program (HPD-TCP) is in receipt of an invitation to participate in consultation regarding proposed plans for the Conejos Peak Ranger District, Rio Grande National Forests Draft Environmental Impact Statement (DEIS) for the *Cumbres Vegetation Management Project*.

The HPD-TCP would like to advise that there are Navajo Traditional Properties (TCPs) located within and around the project area. We would like to have further in depth consultation for this particular undertaking. ***The Navajo Nation claims cultural affiliation to all Anaasazi people (periods from Archaic to Pueblo IV) of the southwest. The Navajo Nation makes this claim through Navajo oral history and ceremonial history, which has been documented as early as 1880 and taught from generation to generations.***

The HPD-TCP appreciates the Conejos Peak Ranger District's consultation efforts regarding this project. Should you have any additional concerns and/or questions do not hesitate to contact me electronically at tony@navajohistoricpreservation.org or telephone at 928-871-7750.

Sincerely,

Tony H. Joe, Jr., Supervisory Anthropologist (Section 106 Consultation)
Traditional Culture Program
Historic Preservation Department

TCP
cc: 14-1
Office File/Chrono

Letter 9 - Followup

From: Krall, Angie M -FS
To: Jones, Andrea M -FS; McGinn, Diana -FS
Subject: Follow-up Navajo Consultation for the Cumbres EIS
Date: Wednesday, January 22, 2014 4:32:50 PM
Attachments: CPRD DEIS.pdf

All,
I followed –up with the Navajo Nation regarding their letter dated January 6, 2014 requesting "further in-depth consultation for this particular undertaking". I called and left a message on January17th, and send a follow-up email the same day. Today, January 22, I was able to speak with Tony Joe, the supervisory anthropologist who signed the letter. He did not recall what the concerns were and brought in a colleague to look over the scoping letter. After their conversation they stated to me they have no further concerns and the project may proceed without further consultation with theTribe. This email will suffice for documenting "further in-depth consultation" and should be placed in the project record.

Angie M. Krall
Heritage Program Manager
Rio Grande National Forest
1803 W. Hwy 160
Monte Vista, CO 81144
Office: (719) 852-6242
Email: akrall@fs.fed.us

D.4. Comment Letters Received on the EA for Comment

Letter 1
Comment EA1-1

6/30/2012

As an owner of a small parcel of private property in the area, we would request the Forest Service actively move forward in mitigating the pine beetle infestation in the area by harvesting the infested timber.

Raymond Johnson

Rincones Ranch

Letter 2
Comment EA2-1

7/22/2012

I am worried about forest fires in the area. I believe the trees should be removed however necessary to mitigate potential wildfires in the area.

Thanks,

Jason Miller

Letter 3
Comment EA3-1 through EA3-14

July 26, 2012

Dear Ranger Jones,

I have reviewed the pre-decisional EA for the Cumbres Vegetation Management Project (a.k.a. Cumbres commercial timber sale). As a communal owner of the Rio Grande National Forest I am disturbed that you are proposing a project that will cause long-term harm to my natural resources using my tax dollars to prepare this corporate-friendly project.

First I'll inform you that draft EAs do not exist … only draft EISs.

Incredibly, the Cumbres project proposes to log 2,498 acres (4 square miles) and construct 0.8 miles of road.

I am providing links to the literature containing opposing view statements of hundreds of Ph.D. biological scientists who describe over a dozen logging and road construction related activities that inflict ecological damage to the forest's natural resources.

Temporary Roads?
The draft (sic.) EA at page 7 states:

> This alternative would require the following road system:
>
> • Construction of 0.8 miles of new temporary road segments;
>
> • Maintenance and use of about 7.5 miles of old, non-system roads from previous harvests;

How long was this "7.5 miles of old, non-system roads from previous harvests" pumping sediment? When were the sales sold that were associated with these 7.5 miles of "non-system" roads?

I will expect the final EA to indicate that the 0.6 miles of temporary road will be obliterated after use such that the running surface and CMPs no longer exist. Obliteration also means that the fills are put back in place such that the original sideslope is again in place.

Comment #1: Clearly the line-officers on the Rio Grande National Forest trick the public into believing their temporary roads are really temporary. If the "7.5 miles of old, non-system roads from previous harvests" were really temporary they would not be useable after "maintenance."

The specialists on the IDT point out adverse natural resource impact that are more than enough to sink the timber sale
The American owners of the Rio Grande National Forest depend on the natural resource specialists to stick-up for and defend the resources for which they are responsible for. It's not enough for the specialists to provide sanitized statements describing how this timber sale might "potentially" or "may" destroy their natural resources in and downstream from the sale area. It's not enough for the specialists to sidestep the fact that it's highly likely that their resource will be unable to function naturally for many years as a result of this timber sale.

Chris Boone, you wrote:

> ***"Effects from Roads-*** Road construction is expected to add to the amount of temporary suitable habitat loss, species disturbance and displacement, and increase the potential for more reductions in prey species. In addition, road construction would likely increase the presence of humans, if access is available." (page 28)
>
> **"Alternatives 2 and 3**: Removal of beetle infested trees could degrade habitat for boreal owl, northern goshawk and the olive-sided flycatcher within the project area." (Page 34)
>
> "Indirectly, the removal of beetle killed trees, understories, regeneration and any vegetative components that might support prey base resources, could impact the northern goshawk. Reductions in prey could induce displacement of the goshawk into other areas in search of food." (page 34)
>
> ***"Sensitive Amphibians*** - There is a possibility that direct boreal toad mortality could occur during harvest operations through crushing of individuals, eggs, or underground burrows by vehicles and heavy equipment. The potential for crushing can increase with the re-construction and re-opening of roads." (page 34)
>
> ***"Sensitive Mammals*** Human and harvest activity can directly disturb wolverines during winter foraging and summer young raising. Indirectly, winter foraging and summer young raising habitats may be limited and sensitive within the analysis area, therefore these habitats could be subject to abandonment and avoidance if disturbed by humans and/or harvest activities." (page 35)

Vaughn Thacker, on pages 55 to 57 you wrote:

> **"Effects Common to Both Action Alternatives**

Direct effects are the most obvious and are directly related to timber harvest activities (i.e. compaction, soil displacement and disturbance) that occur primarily on skid trails, landings, or areas where machines turn and displace soil or organic matter. Indirect effects may include increase erosion due to loss of soil cover, reduction of nutrients or disruption of nutrient cycling, and hydrological consequences such as fine sediment from erosion entering streams."

"As timber is removed from the stand many nutrients are removed. If nutrients are removed, those available for plant growth are also reduced over time, depleting the soil. Nutrient cycling depends on the return of nutrients from dead trees and plants to return to the soil to be used for plant growth."

"Ground based harvesting leads to soil compaction and soil erosion."

"Tree removal from units potentially could reduce soil nutrient and thus soil productivity."

Kelly Ortiz, on pages 71 and 72 you wrote:

"The mix of harvested and non-harvested areas visible from Concern areas may appear less natural, especially in the short-term, due to more abrupt lines and edges between cut and uncut areas."

"Rehabilitated landings may not meet high scenic integrity upon project completion, but would by the end of the short-term time frame, as re-vegetation progresses and begins to soften signs of activities."

Angie Krall, on page 73 you wrote:

"Action Alternatives: Salvage, fuels reduction treatments, tree planting, landings and new road construction all have the potential to negatively impact heritage resources. Direct negative effects could include the potential destruction and/or alteration of unidentified heritage resources and contexts within the APE. Activities such as road maintenance and the opening of old roads would not be expected to directly impact heritage resources, if maintenance is relegated to the original road foot print. Temporary road construction has the potential to negatively affect unidentified buried cultural deposits for all the action alternatives. Indirect effects from project activities can include the erosion of buried cultural deposits precipitated by temporary road construction and the removal of trees. Potential indirect effects from vandalism to heritage resources perpetrated by individuals associated with project activities is possible under each action alternative."

"It is expected that visitors to the Continental Divide National Scenic Trail (CDNST) may see some activities related to timber harvesting; however, at the closest point, the Cumbres project area is roughly 200 feet from the trail and over the ridge from any direct viewing angles. This would minimize any visual impacts the harvest may have to hikers along the trail."

Barry Wiley, on page 42 you wrote:

"However, reopening the decommissioned road that parallels Rio de los Pinos (FSR 118.1A), poses serious concern with potential impacts to the stream. This road crosses several small tributaries and numerous seeps/springs that flow directly into Rio de los Pinos; it was previously closed and decommissioned due to impacts to the stream. The old roadbed has re-vegetated and the impacts to Rio de los Pinos have been minimal since the closure. The proposed re-opening of this road is a major concern to the health of Rio de los Pinos and would require careful design and monitoring to ensure impacts to stream habitat are minimized."

You all know there is no "timber famine" that the USFS has been predicting for decades.

You all know that past Chiefs have told the public that trees will not be removed unless the logging provides beneficial effects to the resources in the area … with no adverse resource effects.

You all know that Ranger Jones is proposing this timber sale to guarantee that she receives at least as much timber funding next year as she received this year.

You know that if you would all speak-up and demand that the "potential" adverse effects to your resource be significantly reduced by 1) applying additional mitigation, 2) modifying the sale to eliminate all chances of damage, or 3) demanding that Ranger Jones strike withdraw the sale proposal. This is your obligation to the American citizens that pay your salary.

You should all be ashamed to stand back and sell your good name to benefit the corporation that will purchase this timber sale. Did the forest supervisor hired you to sign your names as preparers of the NEPA documents so it appears that you took action to protect the resource you are responsible for.

Mr. Tooley, as opposing views attachments #1 and #4 demonstrate, a commercial timber sale is the last thing a person would prescribe to maintain forest health. Indeed, "forest health" as used in your title must include the health of countless natural resources … not just conifer trees. I challenge you to find the word "timber" in the dictionary definition of "management." It's sad that the USFS uses "management" as a synonym for timber harvest.

Please do your jobs between now and the final EA/DN. You all work for the public … not Ranger Jones.

Ranger Jones, any caring competent land manager would drop the Cumbres timber sale in the blink of an eye after reading Chapter3.

Dr. Jack Cohen's fire damage risk reduction methods

The pre-decisional EA at page 4 states:

"To improve defensible space, fuel reduction treatments would be implemented in Wildland-Urban Interface (WUI) areas up to 400 feet from adjacent private land on approximately 171 acres."

The American public expects USFS line officers to place their safety and assets above all else when determining treatment methods … using the most effective treatment and best science.

Serving the public in this way is worth infinitely more than:

- *Salvage dead or dying trees while the value remains high in stands designated for multiple use management and are part of the suitable timber base.*
- *Regenerate treated portions of the forested acres killed by bark beetles in order to accelerate the rate of forest and ecological recovery over the long term.*
- *Treat potential hazard trees in areas of concentrated public use, along private property, roads, and other infrastructure.*
- *Reduce the accumulation of large diameter fuels in areas severely impacted by the spruce beetle, especially those adjacent to private land.*
- *Utilize the existing transportation network as much as possible to minimize both resource impacts and road construction costs.*
- *Provide forest and wood products, such as fuelwood, sawtimber or house logs, to the people of the San Luis Valley and/or other areas.*

This week the University of Wyoming released the results of a study showing that logging to reduce fuels is an ineffective way to prevent the intensity and rate of spread of wildfires. Please see below:

Study challenges views about Western forest fires

By Scott Sonner AP
Published in the *Daily World*, July 23, 2012
Link: http://www.thedailyworld.com/sections/newswire/northwest/study-challenges-views-about-western-forest-fires.html

RENO, Nev. — Scientists using field notes from surveys first conducted by the government before the Civil War believe they've gained a better understanding of how Western wildfires behaved historically.

Researchers at the University of Wyoming studied historical fire patterns across millions of acres of dry Western forests. Their findings challenge the current operating protocol of the U.S. Forest Service and other agencies that today's fires are burning hotter and more frequently than in the past.

Combing through 13,000 firsthand descriptions of forests and retracing steps covering more than 250 miles in three states, where teams of government land surveyors first set out in the mid-1800s to map the nation's wild lands, the researchers said they found evidence forests then were much denser than previously believed.

"More highly intense fire is not occurring now than historically in dry forests," said William Baker, who teaches fire ecology and landscape ecology in Laramie, Wyo., where he's been doing research more than 20 years. "These forests were much more diverse and experienced a much wider mixture of fire than we thought in the past, including substantial amounts of high-severity fire."

If he's right, he and others say it means fuel-reduction programs aimed at removing trees and shrubs in the name of easing fire threats are creating artificial conditions that likely make dry forests less resilient.

"It means we need to rethink our management of Western dry forests," said Baker, a member of a U.S. Fish and Wildlife Service working group that is developing plans to help bolster northern spotted owl populations in dry forests.

Baker's conclusions have drawn sharp criticism from other longtime researchers who believe that decades of fire suppression have led to more densely tangled forests and more intense fires, the position advanced by the Forest Service.

"I have yet to hear any knowledgeable forest or fire ecologist or forest manager say they are convinced by the main interpretations in that (Wyoming) paper," said Thomas Swetnam, a professor of dendrochronology and director of the Laboratory of Tree Ring Research at the University of Arizona. "I doubt it will gain much traction in the scientific or management communities."

The Forest Service did not immediately respond to a request for comment.

Baker said the historic government land surveys provided researchers with a surprisingly detailed and precise record.

The studies conducted by Baker and others over the past two years focused on parts of Colorado, Oregon and Arizona, but were indicative of dry forest types stretching from the Rockies to the Sierra Nevada previously thought to be "open and park-like" and typically enduring only cycles of frequent, low-severity fire.

"The major surprising finding was … areas of high density of forest and higher severity fires in really all dry forests across the West," said Mark Williams, who co-authored two of the three studies with Baker.

"The notes are pretty descriptive," said Williams. "You can look for where the fire started and ended. We were actually walking the same lines, collecting fire scars from trees."

Wallace Covington, the director of the Ecological Restoration Institute at Northern Arizona University, takes no issue with the Wyoming duo's data collection or statistical analysis but said some of Baker's conclusions don't follow from his data. Covington first testified before Congress in 2002 about the urgent need to thin forests to guard against catastrophic wildfires and insists it's still necessary.

Others say the Wyoming studies are important new information in an emerging field of research.

Jennifer Marlon, a Yale University paleoecologist, said a study she recently led on the impact of climate change on forests over thousands of years appeared to be largely consistent "with Baker's idea that there were large, severe fires even in dry forests historically."

The fire record her team built for the Western U.S. for the past 3,000 years shows "that fires during the 20th century generally are actually fewer and smaller than ever before given current climate conditions," said Marlon, who emphasized the role of climate on wildfire.

"The general trend from high fire in the 1800s to very low fire in the 1900s is strong and clear from three independent datasets," she said. "Open park-like conditions may have indeed occurred after the 'peak' in burning during the mid-1800s."

Baker and Williams contend that past studies of forest structure and fires were not so much wrong as "incomplete" because that they placed too much emphasis on anecdotal references, sampled too small of areas and often concentrated on old-growth stands more resistant to fire.

One of the earliest references to the open nature of the forests is found in a 1943 study by Harold Weaver, a forester from Oregon State who characterized forests in Oregon's eastern Cascades as "like a park, with clean-boled trees and grassy forest floor."

An updated view was summarized in the 2012 spring edition of California Forests: "Human fire suppression activity during the past 100 years have created dense, more crowded forests and shifted the fire regime in Sierran mixed conifer forests from one of frequent, low-level fire to one where high intensity wildfires are more common," wrote John Battles, chairman of ecosystem sciences in Department of Environmental Science, Policy and Management at the University of California, Berkeley.

Williams said the Wyoming studies have significant implications for wildlife that depends on post-fire habitat, such as the black-backed woodpecker, which has survived for millions of years by eating beetle larvae in burned trees.

Four conservation groups filed a petition with the U.S. Interior Department in May seeking Endangered Species Act protection for the bird in the Sierra Nevada, Oregon's Eastern Cascades and the Black Hills of eastern Wyoming and western South Dakota.

The new studies provide the first "real, direct data'" showing that more forests burned historically, creating more post-fire forest habitat, said Chad Hanson, a forest ecologist and director of the John Muir Project who is helping lead the listing effort and suing the Forest Service to block post-fire logging in woodpecker habitat near Lake Tahoe.

"It indicates the woodpeckers had more habitat historically than they do now,'" Hanson said.

Williams said when he started the study he had "the same general ideas most people have — that the forests were less dense and there were frequent, less severe fires to maintain that structure."

Now, he believes thinning and post-fire salvage operations should be re-examined and emphasis placed on maintaining high-density stands in certain circumstances that would not threaten people or homes.

"We shouldn't be managing just for low-density forests," he said. "We should not be unhappy with — or perhaps even manage for — higher severity fires in the forests."

I will expect all reference to fuels to be taken out of the final EA.

We all know that timber lobbyist Mark Rey conjured up another reason for logging public lands as a result of the fires of 2000 and 2002.

I will also expect a Dr. Cohen fire risk reduction methods alternative to be analyzed in detail.

A Cohen alternative would:

- ☐ educate the public with written material that summarizes Dr. Cohen's findings and public meetings to answer questions.
- ☐ educate the public using USFS-organized public meetings to answer questions and distribute information.
- ☐ offer USFS labor to help elderly and disabled people living in the WUI (with their written permission) to remove the fine fuels near their home as Dr. Cohen suggests.

Recreation Revenues

Any poll that calculates whether the public approves of timber sales will show that Americans who do not derive profit from tree extraction abhor commercial timber sales in the public land they own.

Comment #2: I will expect to see an economic analysis of the revenues lost to local community businesses (motels, restaurants etc.) compared to the revenue gained by the local community because of this specific timber sale. This will include the current volume under contract held by the local mill(s).

Sincerely,

Dick Artley's scanned signature is contained in the "signature" attachment.

Dick Artley (retired forest planner, NEPA legal compliance reviewer, forest NEPA coordinator, and forest appeals/litigation coordinator --- Nez Perce National Forest, Idaho)
415 NE 2nd Street
Grangeville, Idaho 83530
208-983-0181
Da99333@gmail.com

To verify that the information above please call the SO at (208)-983-1950.

WILDEARTH GUARDIANS
A FORCE FOR NATURE

Letter 4
Comments EA4-1 through EA4-45

July 25, 2012

Cumbres Salvage Scoping Comments
Conejos Peak Ranger District
15571 County Road T.5 La Jara,
CO 81140
Via email: comments-rocky-mountain-rio-grande-conejos-peak@fs.fed.us

RE : Cumbres Vegetation Management Project Draft EA Comments

Dear Ms. Jones

On behalf of WildEarth Guardians, Carson Forest Watch and our 12,500 members and supporters, please accept these comments on the Cumbres Vegetation Management Project (Cumbres Salvage Project) draft environmental assessment.

Carson Forest Watch and Joanie Berde as an individual have been involved in monitoring logging projects in the Rio Grande National Forest for nearly 15 years. CFW is a volunteer conservation group that works to monitor projects on National Forests in northern New Mexico and southern Colorado, and works for protection of wildlife and forest biodiversity in this bio-region.

WildEarth Guardians submitted comments on the proposed action on April 22, 2011 and requested and EIS because of the scope and scale of the possible impacts on soils and watershed conditions. We still believe strongly that an EIS is necessary and that this project is misdirected. The planning area supports important fisheries, threatened species habitat connectivity (Canada lynx) and is a highly valued recreation area for residents of both New Mexico, Colorado and even our neighbors to the east: Oklahoma and Texas.

The proposed action is salvage logging of merchantable, dead and dying trees 8 inches diameter breast height (dbh) and larger on up to 2,498 acres resulting in approximately 20 to 30 MMBF of timber. It is estimated that about 22 acres of landings would be needed across the project area. The proposed action would require construction of 0.8 miles of new temporary road segments; maintenance and use of about 7.5 miles of old, non-system roads from previous harvests; maintenance and reconstruction of about 5.8 miles of decommissioned NFS roads; maintenance and use of 5.0 miles of NFS roads currently closed to public travel; and maintenance and use of 12.5 miles of NFS roads currently open to public travel.

516 Alto Street Santa Fe, NM 87501 505-988-9126 505-213-1895 (f) www.wildearthguardians.org
SANTA FE DENVER TUCSON

With the National Environmental Policy Act ("NEPA"), Congress intended that requiring agencies to prepare EIS's would help "'prevent or eliminate damage to the environment and biosphere' by focusing government and public attention on the environmental effects of proposed agency action." Marsh v. Oregon Natural Res. Council, 490 U.S. 360, 371 & n.

14, 109 S. Ct. 1851, 1858 & n. 14, 104 L.Ed.2d 377 (1989) (quoting 42 U.S.C. § 4321); see also Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349, 109 S.Ct. 1835, 1845, 104 L.Ed.2d 351 (1989). "NEPA represents a firm Congressional mandate that environmental factors be considered on an equal basis with other, more traditional, concerns." Foundation for North American Wild Sheep v. U.S. Dept. of Agriculture, 681 F.2d

1172, 1177 (9th Cir. 1982). To this end, NEPA requires agencies to take a "hard look" at all potential project impacts when preparing EISs. See, e.g., Kleppe v. Sierra Club, 427 U.S. 390,

410 n. 21, 96 S.Ct. 2718, 2730 n. 21 (1976); Robertson v. Methow Valley Citizens Council, at

374.

Meanwhile, NEPA statutory standards found in Council on Environmental Quality ("CEQ") regulations recognize that intelligent decision-making can only derive from high quality information. See 40 C.F.R. §§ 1500 et seq. Of primary import to this project, § 1502.24 of these regulations provides that "[a]gencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in [EISs]." Information included in NEPA documents "must be of high quality." Accurate scientific analysis…[is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Where an agency has outdated, insufficient, or no information on potential impacts, it must develop information as part of the NEPA process.

We also believe the draft EA may violate the National Forest management Act's requirements for adequate regeneration. NFMA

§(6)(g)(3)(E)(i).

I. Purpose and Need

The Forest Service cannot support the suggestion that salvaging beetle affected trees will decrease the risk of fire ("reduction of heavy fuels") in the project area. Nor can the agency demonstrate that providing wood products outweighs other contributions to the local economy from the project area ("opportunity costs" outweigh any trivial economic benefit from salvage logging the area).

The scoping notice indicates that the need of the project is:

- Maximize economic recovery from dead and dying spruce Provision of wood products to benefit the local economy
- Implement reforestation treatments to facilitate spruce and aspen regeneration

We disagree with the need statement, especially that heavy fuels require reduction in the project area. Spruce beetles are natural components of spruce-fir forests, and those forests have evolved with periodic beetle infestations and further, there is simply no evidence that

1) dead trees increase the risk of fire or 2) large-scale, stand-replacing fire is unnatural in

Colorado's spruce-fir forests. If the RGNF believes otherwise, then the forest should provide scientific information justifying its purpose and need

statement.

As experience with the 1940s beetle mortality on the Flattops on the White River National Forest has shown, fire risk is actually lowered after beetle infestations. In addition, the Colorado State Forest Service and Department of Forestry at Colorado State University conclude:

"Although it is widely believed that insect outbreaks set the stage for severe forest fires,

the few scientific studies that support this idea report a very small effect, and other studies have found no relationship between insect outbreaks and subsequent fire activity."[1]

Finally, the reforestation of forest stands lost to beetle infestations is an inappropriate purpose because it is likely to occur without timber harvest, and is more likely to be complicated by than assisted by the proposed action. The use of heavy equipment will compact soil, making any sprouting of seeds more difficult, at least in the short term. Given that spruce requires shade to regenerate, and the project proposes to remove most of the standing overstory of trees, the RGNF must provide scientific information to substantiate claims that spruce (not other species) reforestation efforts on the Forest have in fact resulted in more rapid reforestation of beetle killed stands than what would occur naturally. If artificial reforestation (planting) is proposed, as is suggested by the scoping letter, the RGNF must show from its experience in spruce-fir forests, how the high cost of such action is sufficiently justified, rather than allowing the area to reforest naturally.

II. The Rio Grande NF Must Prepare an EIS for this Large of a Project

Given that the proposed project contemplates 2,488 acres of salvage logging and road maintenance and reconstruction of 30.2 miles of roads and reopening 7.3 miles of closed roads, we expect that the RGNF will prepare an EIS for this project.

NEPA requires that federal agencies complete a detailed Environmental Impact Statement (EIS) when planning a major federal action which may significantly affect the quality of the human environment. 42 U.S.C. § 4332. Council on Environmental Quality (CEQ) regulations define "major federal action" to include "actions with effects which may be major and which are potentially subject to Federal control. C.F.R. § 1508.18 (emphasis added); Forest Service 1909.15 Ch. 43.1 (EIS required where proposed action may have a significant

effect). Regulations further define "significantly" in terms of context and intensity. 40 C.F.R.
§ 1508.27.

As the Second Circuit recently stated:

"when it is a close call whether there will be a significant environmental impact from a proposed action, an EIS should be prepared. This view is reinforced by the CEQ Guideline's direction to agencies to consider "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial" when determining significance. 40 C.F.R. § 1508.27(b)(4). Moreover, we think NEPA's policy goals require agencies to err in favor of preparation of an EIS when the proposed action is likely to have a significant environmental impact. Consequently, we agree with the

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[1] See http://www.cfri.colostate.edu/docs/cfri_insect.pdf question number six on page 8.

district court that a party challenging the agency's decision not to prepare an EIS must show only that there is a substantial possibility that the action may have a significant impact on the environment, not that it clearly will have such an impact. See Foundation for N. Am. Wild Sheep, 681 F.2d at 1177-78; Save Our Ten Acres, 472 F.2d at 467. The Forest Service's determination that preparation of an EIS was not necessary, based on the record before it, was therefore arbitrary and capricious." National Audubon Society v. Hoffman, 132 F.2d 7, 18 (2nd Cir. 1997).

EIS's must analyze the "environmental impacts" of proposed actions with not only direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions." 40 C.F.R. 1508.7. See also 40 C.F.R. 1508.8 (effects include ecological, aesthetic, historical, cultural, economic, social, or health impacts, whether direct, indirect or cumulative); 40 C.F.R. 1508.25(c) (EIS shall consider three types of impacts, including cumulative effects); 40 C.F.R. 1508.25(a)(2) (EISs shall analyze the effects of actions "which when viewed with other proposed actions have cumulatively significant impacts.") See Shoshone-Paiute Tribe v. U.S., 889 F.Supp. 1297, 1310 (D. Idaho
1994).

Given that the Cumbres Salvage project proposes to log up to 2,488 acres of spruce-fir with:

- potential for windthrow and subsequently exacerbated spruce-beetle
infestations;
- likely negative impacts to lynx habitat and connectivity;
- no scientifically supportable need for forest health treatments, fuels reduction,

or insect and disease prevention within the spruce-fir ecotype (which is within the historic range of variability for fire, insects, and disease);

- logging proposed within watersheds of concern or sensitive watersheds;
- the presence of sensitive species such as Rio Grande Cutthroat trout; and,
- possible impacts to the Continental Divide Trail, Cumbres (10,570 acres) and
Chama Basin (21,645 acres) Inventoried Roadless Areas as well as the South San
Juan Wilderness.

The RGNF clearly must prepare an EIS for this large project.

III. Alternatives

Thorough analysis of a range of reasonable alternatives is a critical part of the NEPA process. Agencies cannot consider only economic and technical aspects of proposed actions, but must instead "identify and develop methods and procedures . . . which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making…." 42 U.S.C.A. §4332(2)(B). NEPA thus requires that agencies consider, evaluate and disclose to the public "alternatives" to the proposed action. 42 U.S.C. §§ 4332(2)(C)(iii) & (E). The range of alternatives should be developed "fully and impartially," and should not "prematurely foreclose options that might protect, restore, and enhance the environment." Forest Service Handbook 1909.15,
§14.2.

The RGNF should consider a full range of alternatives with the proposal, including but not limited to:

- A genuine forest health proposal that would close roads and promote natural regeneration; and,
- An alternative that requires no road reopening or road reconstruction.

In particular, such analyses should consider the likely implications of each alternative on the spread of spruce beetles, the rate and likelihood of regeneration, and effects on other resources such as water quality and wildlife habitat.

IV. Inventoried Roadless Areas

It appears from the map included with the scoping notice that portions of the project overlap or are directly adjacent to the Cumbres (10,570 acres) and Chama Basin (21,645 acres) Inventoried Roadless Areas. Due to a recent ninth Circuit court decision[2], the 2001 Roadless Area Conservation Rule, 36 CFR 294 (2001), has been reinstated. Under this rule, logging in inventoried roadless areas is generally prohibited and any impacts on these IRA from logging nearby should be considered in an EIS.

V. The Action Alternatives Would Treat Areas Already Having a High Degree of Soil and Watershed Disturbance.

A. Requirements For Soil Management. The Forest Service's Soil Management Handbook, R-2 Supplement, states the following:

2.03 - POLICY.
1. Management activities will be conducted in such a way as to not exceed the Soil Quality Standards. The emphasis is on protecting the soil resource before excessive damage occurs.
2. Where excessive soil impacts already exist from prior activity, the emphasis shall be on preventing any additional detrimental impact, and on reclamation where feasible. …

2.2 – Soil Quality Standards

3. Detrimental Compaction, Displacement, Puddling, Severe Burning and Erosion. No more than 15 percent of an activity area will be left in a detrimentally compacted, displaced, puddled, severely burned, and/or eroded condition. This does not include the permanent transportation system. …

4. Effective Ground Cover …

Standards for Detrimental Compaction, Displacement, Severe Burning, and Erosion apply to the cumulative effects of management practices over time. If a

[2] State of California v. U.S. Forest Service, No. CO5 -03508; and The Wilderness Society v. U.S. Forest Service, No. CO5-04038; consolidated decision of September 19, 2006, N. D. California

standard is exceeded in an initial entry, future entries must have no additional detrimental effect unless mitigative measures have been applied or natural recovery has taken place between entries.

FSH 2509.18, R2 Supplement 2509.18-92-1; emphasis added. It is very clear that no additional management having detrimental effects can be allowed in areas where standards are already exceeded, until mitigative measures have been applied or natural recovery has occurred.

The 15 percent standard was adopted in the Rio Grande Forest Plan:

Manage land treatments to limit the sum of severely burned and detrimentally compacted, eroded, and displaced land to no more than 15% of any land unit (FSH 2509.18).

Forest Plan at III-10, Soil Productivity Standard 1.

B. The proposed action alternative would authorize detrimental activity in areas already exceeding standards.

Detrimental soil disturbance already exceeds 15 percent in three units. EA at 55. If alternative 2 was implemented, disturbance in 7th-level watersheds of concern would increase. Three other units are just below the 15 percent threshold. Note that the detrimental soil disturbance estimates assume that BMPs would be implemented and that soil recovery would occur over time.

Implementing the project would increase the area of detrimental disturbance, violating the Soil Quality Handbook and the Forest Plan. The EA states that the project would comply with soil standards because project design criteria would be followed. But there is no analysis of the effectiveness of these criteria, only conclusive statements that they will be effective. Rocky Mtn. Wild v. Vilsack, 2012 WL 41520 (D. Colo.).

The areas and watersheds with a high level of disturbance should be avoided. This would reduce the potential for additional detrimental disturbance and reduce the cost of restoration of disturbed areas.

C. Connected disturbed area must be calculated, displayed, and minimized. The Watershed Conservation Practices Handbook, FSH 2509.25

section 05, defines"connected disturbed areas" as follows:

High runoff areas like roads and other disturbed sites that have a continuous surface flow path into a stream or lake…. Hydrologic connection exists where overland flow, sediment or pollutants have a direct route to the channel network. CDAs include roads, ditches, compacted soils, bare soils, and areas of high burn severity that are directly connected to the channel system. Ground disturbing activities located within the water influence zone should be considered connected unless site-specific actions are taken to disconnect them from streams. (Citations omitted.)

The WCPH has the following design criterion concerning CDA:

In each watershed containing a 3-rd (sic) order and larger stream, limit connected disturbed areas so the total stream network is not expanded by more than 10%. Progress toward zero connected disturbed area as much as practicable. Where it is impossible or impracticable to disconnect a particular connected disturbed area, minimize the areal extent of the individual connected disturbed area as much as practicable. In watersheds that contain stream reaches in diminished stream health class, allow only those actions that will maintain or reduce watershed-scale Connected Disturbed Area.

Id. at section 11.1, design criterion 1.

However, we do not find a discussion of connected disturbed area (CDA) in the EA. It is not listed as one of the indicators for watershed condition and effects of action, but should be. The WCPH, section 11.1, states that "[c]onnected disturbed areas are the main source of damage in all regions". (Citations omitted, emphasis added.) The need for disconnecting drainage from roads includes closed roads with some recovery that would be bladed and used for the project. See ibid. The final EA must show current CDA, and what it would be after implementation of each action alternative. The latter must not be more than the 10 percent limit imposed by the WCPH.

VI. The Draft EA Fails to Assess Whether Regeneration Standards Can Be Met Given That Advanced Regeneration may Already be Dead or Dying Due to Spruce Budworm.

Salvage logging or in USFS terms, regeneration harvest[3], because most trees over 8 inches dbh would be removed, does invoke the Forest Plan's 5-year regeneration requirement Thus, the proposed actions describe the need for regeneration surveys to determine whether regeneration will be sufficient to meet Forest Plan Standards.

Although there has been significant advanced regeneration in many of the previously harvested stands in question since earlier harvest activities, a recent and ongoing spruce-budworm infestation has resulted in extensive mortality in young spruce and other species that have regenerated.

Although the EA claims that past clearcuts in the Analysis Area from logging in the 1960s have regenerated sufficiently to meet Forest Plan Standards, many of these areas required decades and repeated planting efforts to do so. Unlike shelterwood harvest units, where regeneration appears to have been moderately successful, the RGNF has had a historically difficult time achieving successful spruce regeneration in clearcuts. Although it may have been the original intention of the project to take advantage of existing advanced

[3] FSM 2470 – Silvicultural Practices, Section 2471.3.

regeneration to improve regeneration success, the recent mortality of understory trees throughout many of the harvest units complicates this proposition.

The EA contains no assessment of the degree to which budworm impacts have resulted in mortality of advanced regeneration. By overlooking this widespread natural event in the project area, the RGNF fails to critically consider whether its assumptions in the EA at 24 that regeneration will meet Forest Plan regeneration requirements is realistic. Rocky Mtn. Wild v. Vilsack, 2012 WL 41520 (D. Colo.).

Based upon our review of the project area, we believe that budworm-induced understory mortality is so severe that little or no advanced regeneration remains in many stands. Regeneration harvest in these areas will remove the necessary partial shade and moisture trapping conditions that new spruce seedlings require for growth, and are likely to lead to new regeneration problems that mirror the problems encountered following the large

clearcuts of the 1960s in the project area, which remain visible 50 years later. Also, remaining live advance regeneration would be susceptible to mortality from felling and yarding.

The proposed timber management activities may constitute an irreversible and irretrievable commitment of resources, in contrast to the EAs conclusion at 24.

The EA's failure to consider the likelihood of successful regeneration - and therefore Forest Plan and NFMA compliance - in the wake of current and expected budworm mortality is a significant oversight, and fails to meet NEPA's hard look standard. The project could also violate NFMA, requiring that the Forest Service:

Insure that timber will be harvested from National Forest System lands only where soil, slope or other watershed conditions will not be irreversibly damaged [and where] there is assurance that such lands can be adequately restocked within five years after harvest.[4]

The EA nearly fails entirely to consider spruce budworm impacts on regeneration standards, where in fact significant impacts may be likely, and should have been disclosed.

VII. Landslide Risk

The analysis must disclose soil types in the project area, and provide an assessment of landslide risks throughout the project area. The analysis must identify potential landslide risk areas by determining, at a minimum, the following: pre- and post-proposed harvest canopy cover, increase in ground water saturation, slope, and soil type. The analysis must also identify the construction of any new roads and reconstruction of skid trails or previously obliterated roads, and identify the level of reconstruction necessary. Road construction and reconstruction should not be permitted in areas of landslide-prone soils.

VIII. Grazing

[4] NFMA §(6)(g)(3)(E)(i).

The analysis should include a discussion of allotments in each unit and the analysis area; historic grazing levels permitted by the RGNF and on adjacent public or private lands, and an analysis of the quality of rangelands in the area. Possible impacts of grazing on forest regeneration should be considered.

IX. Travel System

The RGNF should disclose the extent of the travel system, both system and non-system roads and trails, and determine whether this meets Forest Plan standards and/or guidelines. Further, the RGNF should disclose how and when an inventory of the travel system was performed, and whether it may overlook any non-system roads. The impact of this travel system on watershed condition, water quality, and aquatic species must similarly be fully assessed and disclosed. Any changes in the travel system necessary to implement the project and the possible effects therefore must be thoroughly analyzed and disclosed.

X. Old Growth

The RGNF should disclose the method used to determine old growth (stage 5) and mature successional stages (4A, 4B, and 4C). Any approved action should include concrete provisions to protect remnant large trees in the area. Any stands that escaped past logging should be left as a control or baseline. This should include restrictions on logging of any living trees over a specified diameter breast height limit, such as 12" or 14".

XI. Noxious Weeds, Insects and Disease

36 CFR 219.12(k)(5)(iv) requires the RGNF to "Ensure that destructive insects and disease organisms do not increase to potentially damaging levels following management activities." Logging in high elevation spruce-fir ecotypes can often exacerbate windthrow potential. As windthrow increases the potential for spruce bark beetle outbreaks, the proposed logging may accomplish the exact opposite.

The RGNF must disclose and assess windthrow potential both pre- and post-proposed alternatives, and subsequently spruce bark beetle risk, with a complete description of the prevailing wind patterns, topography, and thus the likelihood for increased windthrow. Further, slash from live trees can host various insects. This potential to increase insects should also be disclosed in the analysis.

Meanwhile, the analysis should include discussion of increased spread of root disease due to creation of more stumps and tree wounds. This includes, but is not limited to Armillaria root disease for instance. The RGNF Land and Resource Management Plan notes the following:

"Aerial spread of the disease occurs from airborne spores, which infect surfaces of freshly cut stumps and wounds…the fungus has been found in uncut stands where natural wounds may have provided infection "courts"; however mortality is more extensive in stands that have been partially cut." (3-218).

This implies that that logging can actually increase the rate at which Armillaria spreads. The scale of the proposed logging here would leave plenty of stumps and wounds for Armillaria to spread. It provides yet another reason to not log the few areas that have not been logged yet, if they exist, as they most likely have the lowest prevalence of Armillaria. The RGNF should disclose whether the proposed logging might hasten the spread of Armillaria.

Finally, as discussed in the recently approved and nearby County Line Vegetation Management Project, the presence of Armillaria may increase the susceptibility of spruce to beetles. Accordingly, any actions that increase the spread of Armillaria may undermine efforts in the County Line area to reduce spruce susceptibility to beetles. Extensive surveys for Armillaria root disease should be conducted to understand the impacts of this pathogen on the proposed action and the likelihood of achieving the stated objectives.

Musk thistle, Canada thistle, and whitetop, and other noxious weeds can be considered disease organisms. As such, the RGNF must ensure that logging, grazing, or other activities proposed do not increase noxious weeds to potentially damaging levels.
Impacts to Recreation and Scenic Resources

In order to adhere to NEPA's high quality information and hard look tests, the Forest

Service must carefully assess the scenery impacts from concretely identified vantage points
or "viewing angles", acknowledge the major impacts on scenery from past and proposed logging on both public and private lands, and permit the public an opportunity to comment on the impacts. The RGNF LRMP requires that the next lowest Scenery Integrity Objective below "High or Moderate" must be met following project implementation. Is the SIO for the area High, or is it Moderate? Thus, is the next lowest SIO moderate or low? Based on the impacts from past logging in the area, and the major extent of the logging proposed, the analysis must honestly assess and disclose whether the next lowest SIO will even be met.

XII. Lynx

Given the project's high altitude and location in the spruce-fir ecotype, the area likely constitutes lynx habitat – either denning, foraging, or "other", or a combination. Thus, the RGNF will be required to undergo formal Section 7 Endangered Species Act consultation, and obtain a Biological Opinion (BO), from the Fish and Wildlife Service. The Biological Assessment performed by the RGNF, as well as the BO, must consider the Lynx Conservation and Assessment Strategy (LCAS) conservation measures.[5]

Meanwhile, the NFMA requires that habitat "must be well distributed so that reproductive individuals can interact with others in the planning area"

36 C.F.R. 219.19.

[5] Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger, and Al Williamson. 2000b. Canada lynx conservation assessment and strategy [LCAS]. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, Montana. 124 pp.

The courts have found that the Forest Service must analyze the impacts of timber sales on wildlife corridors. See Marble Mountain Audubon Society v. Rice, 914 F.2d 179 (9th Cir.

1990). All these concerns must be addressed in the analysis.

The RGNF should pay particular attention to the impacts of this project in combination with the nearby and recently approved County Line Vegetation Management Project on habitat connectivity and fragmentation. The Colorado Division of Wildlife has identified this particular area of Colorado, including the planning area, as high density occupied habitat by lynx and likely a movement corridor to and from New Mexico for this animal.[6] Because of the Lynx's status under the ESA and the critical role the planning area plays in this animal's recovery, the USFWS will have to provide formal consultation on the project.

XIII. Other Wildlife

The EIS prepared for this project must consider in a Biological Evaluation the revised Region 2 sensitive species list. These include but are not limited to boreal toad, boreal owl, pine marten, snag dependent species, and Rio Grande Cut-throat trout. Other sensitive, endangered, threatened, and species proposed for listing under the ESA must also be considered.

The analysis should also assess and disclose the adequacy of the RGNF's Forest Plan mitigation measures for goshawk, their scientific justification, and adequacy.
Finally, National Forests must gather MIS population and trend data before taking action that may affect habitat. Despite the RGNF's 2003 MIS

Amendment, the regulations governing implementation of the National Forest Management Act (NFMA) create a general obligation that the Forest Service gather and keep data to ensure species diversity in the planning area.

XIV. Osha

The analysis area contains a population of the medicinal plant Osha (*Ligusticum porteri*), a plant used historically and today by Native Americans, Hispanic communities, and by the herbal industry. The plant's cultural and traditional uses raise the analysis of this resource in the heritage section. However, this section in the draft EA appears weak and perhaps not in compliance with the requirements of NEPA and NFMA.

The draft EA notes the plant may be declining nationwide and may warrant listing according to research. EA at 79. More information is needed on the impacts to this plant species. The draft EA makes speculative conclusions about both potential negative and positive affects of the proposed alternatives on the local population of Osha. Without better scientific information, it is prudent for the project to mitigate any impacts through

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6 Colorado Division of Wildlife, 2007. Post-Release Monitoring of Lynx Reintroduced to Colorado. Wildlife Report. T.M. Shenk author. Wildlife Research Report 2007.

avoidance. Where local populations are identified in the planning area, the project should prescribe a buffer zone.

XV. Other Analysis Documentation

The RGNF should include a full set of color fold out, large scale maps with the DEIS, including but not limited to the following:

- All alternatives, including slopes and access for each,
- Travelways, both system and non-system,
- Vegetation (i.e. Cover Type),
- Wildlife Habitat Structural stage, including stage 5 old growth,
- Lynx occupancy and travel corridors,
- Past timber harvest, including type, year, and mitigation measures required and their effectiveness,
- Riparian and wetland areas, including fens
- Landslide Risk,
- Windthrow risk areas from high to low, and
- Roadless areas, both inventoried (i.e. RARE II) and current.

XVI. Cumulative Effects

The analysis must consider cumulative impacts of other past, present, and reasonably foreseeable future actions. Cumulative impacts should be analyzed without regard to land ownership boundaries and should take into account actions of other agencies and individuals. See 40 CFR 1508.7 and Forest Service Handbook 1909.15, §15. Among the actions that should be taken into consideration as part of the cumulative impact analysis are past logging and regeneration within and near the analysis area, livestock grazing and the current condition of range in the analysis area (including specifically potential effects on regeneration), and road construction and reconstruction. Past, present, and future projects must be assessed and disclosed in the analysis and should be considered at least at the level of the larger watershed(s). The planning area and surrounding areas have been heavily logged over recent decades, very little of this landscape remains unlogged. This fact should be disclosed and the effect on forests structural stages in the area disclosed.

Sincerely,

Bryan Bird
Wild Places Program Director

/S/
Joanie Berde
Carson Forest Watch
505-587-2848

Letter 5
Comments EA5-1 through EA5-36

Diana McGinn
Rio Grande National Forest
1803 W. Highway 160
Monte Vista, CO 81144

Via e-mail: comments-rocky-mountain-rio-grande-conejos-peak@fs.fed.us

July 26, 2012

Dear Ms McGinn,

The following are the comments of Rocky Smith, the San Luis Valley Ecosystem Council, Rocky Mountain Recreation Initiative, Great Old Broads for Wilderness, Rocky Mountain Wild, and Quiet Use Coalition on the proposed Cumbres Vegetation Management Project, as described in the environmental assessment (EA). We incorporate by reference our scoping comments of April 11, 2011.

I. **INTRODUCTION**. The undersigned believe that, while some removal of dead and dying trees from the project area would be appropriate, the proposed action, as described in EA alternative 2, is much too large. With removal of most dead and dying Englemann spruce trees over eight inches in diameter, many cut areas would resemble clearcuts. Removal of much of the existing timber would cause impacts to lynx and other wildlife. Implementing the proposed action would necessitate the reopening of closed roads, some of them previously decommissioned. This would cause impacts to soils and watershed.

Cumulative impacts to lynx must be disclosed and analyzed. Because such impacts may be significant, an environmental impact statement (EIS) should be prepared.

The proposed action would approve offering far more wood than current or foreseeable industry could handle. It would be much more appropriate to concentrate on removing hazard trees from areas adjacent to open roads and private land, and manage most of the reminder of the area to protect wildlife habitat, watershed, recreational opportunity, and scenery.

II. **THE EMPHASIS IN THE PROPOSED ACTION IS INAPPROPRIATE, AND A NEW ALTERNATIVE NEEDS TO BE CONSIDERED**. The proposed action seems to place the greatest emphasis on treating a large number of acres and supplying commercial wood. The first point under Purpose and Need states:

> Salvage dead or dying trees while the value remains high in stands designated for multiple use management and are part of the suitable timber base.

EA at 2.

Key Issue 1 is:

> Spruce beetle populations have exceeded endemic levels and may have moved forest stands away from Forest Plan Desired Conditions of protecting and promoting forest products, while perpetuating landscape diversity.

EA at 5. Two indicators under this issue are "acres salvaged" and "volume of commercial forest products recovered". Ibid. In other words, the more acres treated and wood produced, the better.

While we do not necessarily oppose sale of some commercial products from the area, the emphasis would more appropriately be placed on removing hazard trees and retaining watershed, wildlife habitat, recreational, and scenic values. As the quote from EA p. 2 (coopied above) states, the area is for multiple uses. And under management prescription 5.11 which governs about 90 percent of the project area (see EA at 4), "[m]anagement emphasis is on a balance of resources uses". Forest Plan at IV-28. But the proposed action seems designed to primarily provide wood. Application of this emphasis would diminish other multiple use values.

Removing all or a large portion of the dead and dying trees would create what are essentially large clearcuts. Note that all of the stands in the proposed project are more than half spruce. EA at 23. Furthermore, mortality of spruce trees eight inches in diameter and up is 70 percent or greater in most stands. Ibid. Spruce bark beetle (SBB) has steadily spread across the area since first discovered in 2003. EA at 1. It is reasonable to assume that most spruce trees eight inches or greater in diameter will be attacked and killed by SBB. See EA at 21.

While removal of all, or of any defined amount, of the dead and dying trees isn't mandated, the only requirements for leaving trees under the project design criteria are 4 snags per acre and enough trees, along with existing down dead wood, to provide 10-15 tons per acre of large woody debris. EA at 13. And Table 2-3 on page 14 shows that only 51 forested acres would not be treated under alternative 2. Thus nearly all dead and dying spruce could be cut under the proposed action.

Much of the area has been previously harvested (EA at 23 and Appendix C), so most of the existing stands are probably not very dense, and thus there is no need to cut every stand that has dead and/or dying spruce.

Logging is likely to kill or damage a considerable portion of the existing (advance) regeneration. It would also increase the potential for windthrow of remaining stands. EA at 22.

A much healthier project would emphasize removing hazard trees from areas along roads, adjacent to private property, and near the campground. In other areas, stands should remain mostly uncut, especially those that have a sizable component of fir. There are several such stands, as only two stands are 100 percent spruce, with the remainder having 8-42 percent fir. See EA at 23. Leaving these stands alone would allow some of the area to retain a forested appearance. It would also help provide habitat for lynx. See further discussion in section below.

Implementing such a project would mean that much of the future forest would be dominated by subalpine fir (SAF). The EA at 24 describes why SAF is considered inferior to Englemann spruce. Omitted from this discussion is the fact that SAF is much less susceptible to aggressive bark beetle attacks. While various insects do attack SAF, mortality is much lower than when Englemann spruce is attacked by SBB. Protection of any spruce regeneration and some planting would assure that some spruce was present in the future stands in the project area. The fact that some of them would be dominated by SAF is not a reason to refuse to consider and implement the alternative we describe above.

We believe the alternative described above meets much of the purpose and need for the Cumbres Project. It would "treat potential hazard trees in areas of concentrated public use". It would reduce the concentration of fuels in areas adjacent to private land. It would better "utilize the existing transportation network" than would the proposed action because it would not require the reopening of closed and previously decommissioned roads. (See discussion in section IV below.) And it might provide more opportunities for firewood gathering than the action alternatives. See EA at 63.[14]

As for providing wood products, spruce snags remain standing for many years after attack by SBB if sound when killed. See EA at 60. If a house log industry develops in the area in the future, standing dead trees could be cut then. Thus this alternative would not have a negative impact on the local timber industry, as the no action alternative is said to do.[15]

At a minimum, the alternative described above should be an alternative in the EIS or final EA.

III. **PROTECT LYNX AND FULLY DISCLOSE POTENTIAL IMPACTS**.

A. THE FOREST SERVICE MUST PERFORM A FULL CUMULATIVE IMPACTS ANALYSIS AND MAKE IT READILY AVAILABLE TO THE PUBLIC. Amazingly, the EA does not consider the possible effects on Canada lynx to be a key issue. See EA at 6. Even more disturbingly, the EA declines to consider cumulative impacts involving other federal actions, stating that the Fish and Wildlife Service will address such actions separately. EA at 29. This is not permissible under NEPA. The Forest Service, as the lead agency, must disclose all potential impacts from the proposal(s) being analyzed (40 CFR 1502.16), including cumulative impacts (id. at 1508.25(a)(2)). The Forest Service absolutely cannot shirk its duty to disclose all potential impacts from the Cumbres Project.

This omission is in violation of the CEQ Regulations, and is very significant because there is a major project immediately adjacent to Cumbres, County Line, which has been at least partially implemented. Both are in the same Lynx Analysis Unit – Rito Archuleta. See EA at 29 and County Line FEIS at 3-40.[16] As the Forest Service well knows, analysis of effects on lynx from proposed projects and activities is conducted primarily at the LAU scale, though they also need to be addressed at the landscape scale, especially when a large area of logging is proposed in suitable habitat.

The EA states that the Biological Assessment (BA) and consultation have been completed:

> Based on discussions in chapter 3 concerning threatened and endangered wildlife species; consultation with the US Fish and Wildlfe Service; and analysis contained in the Biological Assessment located in the project file, it has been determined that the effects of the action alternatives would be minimal with the determination of "may affect, but not likely to adversely affect" for Canada lynx.

EA at 76. However, when commenters asked for the BA, we were told that it was "considered draft". E-mails between Rocky Smith and Diana McGinn, July 13, 16, 2012. If the BA has already been used as the basis for consultation, it is more than "draft" and should be readily available to requestors, to be able to use in

[14] Under the no action alternative, an "abundance of firewood…could be made available to the public", though some action might be needed to provide additional access.
[15] This assertion on p. 64 is likely wrong, as other projects such as County Line can provide wood to any local timber industry for many years. .
[16] Acreages of this LAU vary slightly – 94,118 in the County Line FEIS (ibid.) and 87,002 in the Cumbres EA (p. 29).

comments on the draft EA. The Forest Service cannot, on the one hand, state that the BA has been used for a determination and then say on the other hand that this information is unavailable to the public because it is incomplete. In any case, the BA must be made available for comment.

B. THE CUMULATIVE IMPACTS ON LYNX COULD BE SIGNIFICANT. Any logging would destroy some advance regeneration, i. e., the small trees that exist in the area. Removing standing dead reduces future denning habitat. If the project lasts 10 years, disturbance could occur during most or all of that time during the operating season (April 1 until December 15). Reopening closed roads would allow more recreational use year-round. This could cause lynx to flee the area, even if there was enough habitat left for them to use. Increased snowmobile use would compact snow, and increase access for wildlife species that compete with lynx for prey, especially coyotes. Snowmobile use could also damage existing and future conifer regeneration, which is needed for the project area to eventually become lynx habitat again after any major logging. See EA at 28.

The combined effects on lynx from proposed and approved activity in the area, including Cumbres and County Line, may be significant, given the large areas of removal of dead and dying spruce from suitable habitat, and the slow growth of any new trees planted or naturally regenerated. At a minimum, connectivity of lynx habitat between the area around Cumbres Pass and other areas would be reduced for many years. Given the large area that may be cut in Cumbres and County Line, maintaining riparian corridors, aspen, SAF, and any live spruce would likely not be sufficient to maintain connectivity, contrary to what is stated at EA p. 28..

The action alternatives would likely violate the Southern Rockies Lynx Amendment. Standard Veg S6 does not permit reduction of snowshoe hare habitat in multi-story mature or late successional conifer forests, with four exceptions. Only one of these exceptions applies to Cumbres, "incidental removal during salvage harvest (e.g., removal due to location
of skid trails)". Southern Rockies Lynx Management Direction, Record of Decision at Attachment 1-5. This would only allow construction of skid trails and landings for treatment that was outside snowshoe hare habitat.

With the large amount of activity proposed and already occurring in lynx habitat on the Rio Grande National Forest, adding Cumbres to the list of projects could also violate Standard Veg S2, which limits the amount of lynx habitat converted to unsuitable to 15 percent of a national forest in any 10-year period. Id at 1-3. Logging the beetle-killed spruce would convert habitat to unsuitable because of removal of overhead cover and destruction of at least some of the understory hare habitat.

C. A SMALLER PROJECT COULD MEET SOME OF THE PURPOSE AND NEED AND PROVIDE MUCH BETTER PROTECTION FOR LYNX AND OTHER WILDLIFE. As discussed above in section II, a smaller project would meet much of the project's stated purpose and need. Retaining stands with a good mix of dead and dying spruce and mostly live SAF would conserve lynx habitat. As noted above, there are many such stands in the project area. See EA at 23. Such stands would provide sizable areas of habitat in a landscape where many stands (such as in the County Line Project and whatever is cut in Cumbres) have been, or will be, clearcut or nearly so. Stands dominated by fir often have some small conifers, which would help provide winter foraging habitat, but such trees are often damaged or destroyed in logging operations. The standing dead would eventually fall down and create denning habitat.

Even with a much smaller project, the risk of a major fire in the area would remain low. The high elevation and high annual precipitation of the area make it unlikely that a major wildfire would occur. Also, with a majority of the overstory trees being dead before long (if not already), it would be difficult for a fire to jump from snag to snag, with no crown to help ignite each tree. To reduce this already small risk even further, concentrations of fuel could be removed from areas along roads and adjacent to private land. This is part of the proposed action and can be retained. But stands away from these areas do not need to be cut. They are better left alone to provide lynx habitat and protect watersheds.

Note that the no action alternative would be much better for lynx:

> Overall, this alternative would allow natural disturbances such as spruce beetles to slowly re-shape the forest; providing the best opportunity for a continued and naturally created mosaic pattern across the landscape that would continue to provide suitable habitat for lynx.

EA at 27. The smaller alternative would also protect habitat for other species which prefer older forests, notably marten, boreal owl, brown creeper, and hermit thrush.

Removal of hazard trees and fuel reduction adjacent to private land would not create significant gaps in lynx habitat.

IV. **WATERSHEDS WOULD NOT BE SUFFICIENTLY PROTECTED**.

A. THE DISCUSSION OF EFFECTS ON WATER SHED IS CONFUSING. The discussion of impacts to watersheds from implementation of the action alternatives is difficult to follow. For example, the second paragraph under **Alternative 2 – Proposed Action** at EA p. 50 mixes connected disturbed area, road equivalent disturbance, and disturbance in the water influence zone. These are all important and different concepts that should be discussed separately and distinctly.

Is "road equivalent disturbance" discussed at ibid. the same as "watershed disturbance" discussed at id. p. 46? It appears to be, but it is not clear. These terms are not defined in the EA (see "Terms and Definitions", EA section A.1), and except for connected disturbed area, are not even found in the Watershed Conservation Practices Handbook (WCPH), FSH 2509.25, section 05. The analysis of impacts should clearly define terms, and use them consistently throughout the analysis.

B. THE CONNECTED DISTURBED AREA WOULD BE TOO HIGH. Under the proposed action, connected disturbed area (CDA) in the Headwaters Rio de los Pinos watershed would increase 13 percent. EA at 50. Notably, "[t]he increase in CDA would occur on currently closed or decommissioned roads". Ibid.

The WCPH has the following direction:

> In each watershed containing a 3-rd (sic) order and larger stream, limit connected disturbed areas so the total stream network is not expanded by more than 10%. Progress toward zero connected disturbed area as much as practicable. Where it is impossible or impracticable to disconnect a particular connected disturbed area, minimize the areal extent of the individual connected disturbed area as much as practicable. In watersheds that contain stream reaches in diminished stream health class, allow only those actions that will maintain or reduce watershed-scale Connected Disturbed Area.

FSH 2509.25, section 11.1, design criterion 1a. The extent of CDA could easily be minimized by reducing the area that was to be cut, and thus reduce the road access needed. This could: eliminate the need to reopen closed roads, ensure that Forest Plan standards and guidelines would be met, and allow impacts from past activity to continue recovering. Notably, alternative 3 would not cut units that would require the reopening of road 118.1A. Id. at 42.

C. THERE WOULD BE TOO MUCH SOIL DISTURBANCE IN AREAS PREVIOUSLY DISTURBED. Under the proposed action, an additional 124 acres would be disturbed in the seventh level watershed of concern (EA at 51), out of a total of 1066 acres (ibid). With 302 acres already disturbed by activities since 1980 (EA Table 3-15, at p. 49), the disturbance level would be just under 40 percent if there had been no recovery. The EA states that the disturbance level in this watershed would be 16-17 percent. Id. at 54.

The maximum detrimental disturbance allowed is 15 percent. See WCPH at FSH 2509.25, section 14.1, and Soils Management Handbook, FSH 2509.18, R-2 Supplement No. 2509.18-92-1, section 2.2 (3). Detrimental soil disturbance is as high as 23 percent (EA at 54), with three units exceeding the 15 percent standard. Id. at 55. Disturbing these areas even more would violate the Soils Management Handbook, R-2 Supplement, id.:

> 2.03 - POLICY.
>
> 1. Management activities will be conducted in such a way as to not exceed the Soil Quality Standards. The emphasis is on protecting the soil resource before excessive damage occurs.
>
> 2. Where excessive soil impacts already exist from prior activity, the emphasis shall be on preventing any additional detrimental impact, and on reclamation where feasible.

Several units would need rehabilitation after logging to stay within the 15 percent limit – units 1, 2, 6, 7, 11, and 20 (id. at 54). All of these units except 20 would be accessed by reopening closed or previously decommissioned roads. See EA Proposed Action Map B-1, Figure 2-2, p. 9. (We do not find unit 20 on the proposed action map.)

D. REOPENING DECOMMISSIONED ROADS WOULD CAUSE PROBLEMS. To implement the proposed action, considerable road access would be required. This includes

> Maintenance and reconstruction of about 5.8 miles of decommissioned NFS (National Forest System) roads; [and]
>
> Maintenance and use of 5.0 miles of NFS roads currently closed to public travel…

EA at 7.

Reopening of these roads would cause further disturbance in units already over, or close to, the 15 percent limit, as discussed in subsection C above. Reopening one of these roads could be particularly problematic:

> [R]eopening the decommissioned road that parallels Rio de los Pinos (FSR 118.1A), poses serious concern with potential impacts to the stream. This road crosses several small tributaries and numerous seeps/springs that flow directly into Rio de los Pinos; it was previously closed and decommissioned due to impacts to the stream. The old roadbed has re-vegetated and the impacts to Rio de los Pinos have been minimal since the closure. The proposed re-opening of this road is a major concern to the health of Rio de los Pinos and would require careful design and monitoring to ensure impacts to stream habitat are minimized.

EA at 42.

In other words, the area affected by road 118.1A is healing up quite well, helping the streams and riparian areas achieve a "generally…good condition" and meet Forest Plan standards and guidelines (id at 41; see also id. at 53), but the Forest Service wants to undertake activity that would set back this recovery. Sources of fine sediment from past activity are relatively minor (id. at 47), but reopening closed and decommissioned roads would create new sources of sediment for deposition into streams. See EA at 53. This is one more argument for a smaller project, one that stays out of treatment areas requiring closed or decommissioned roads to be reopened to access them.

The Project Design Criteria for soil and water protection (EA at 12-13) are good; they would likely reduce some impacts. However, "[t]here is a hazard of increased erosion created when old non-system timber roads, decommissioned roads, and new roads are reconstructed or constructed". EA at 56; see also id. at 57. Effects, at least short-term ones, are likely to occur with the reopening of these roads. For example, subsoiling would alleviate soil compaction, but would form loose soil that could easily be deposited into creeks during a rainstorm or snowmelt.

The soils and watersheds would be able to recover from past activity much sooner and not incur as much new impact if the Cumbres Project was designed to use existing, open roads only. Also, any and all non-system roads should be fully obliterated.

V. **THE PROPOSED PROJECT IS UNREALISTICALLY LARGE**. Even if the proposed action was appropriate for the Cumbres area, it is much too large to implement, as proposed, in 10 years (EA at 4) or five years (id at 25.) Under this proposed action, 2498 acres would be salvaged logged (id. at 4), producing an estimated 20-30 million board feet (MMBF) (id. at 14). Currently, industry that could handle this amount of wood, even over 10 years, likely does not exist. The one large mill in Colorado, run by Intermountain Resources in Montrose, is in receivership. Its continued existence is uncertain. If it does stay in business, it will first finish work on previously signed contracts.

The Rio Grande has offered, or will likely soon offer, wood for sale from many other areas, some of them large. These include County Line (at least partially implemented), Big Moose, and Black Mesa. It is unrealistic to think that even a moderate portion of this large amount of timber could be harvested in a reasonable amount of time, given the state of the industry.

Even if the wood that would be offered for sale from the Cumbres area could be logged in the 10-year life of the project, it would deteriorate well before the end of that period to the point that it could not be made into dimension lumber. It could be made into house logs, probably for a least a few decades; however, there is no facility in the project area to make this product. Given the state of the economy, and the fact that house logs are usually used for second homes, which are a luxury, development of such a facility does not seem likely in the near future.

Given the above, the Forest Service should offer a much smaller amount of wood from the Cumbres area.

VI. **SCENIC INTEGRITY WOULD NOT BE PROTECTED UNDER THE PROPOSED ACTION**.

The scenic integrity level for the area is moderate. EA at 70. This is defined as:

> Landscape appears slightly altered. Human activities are evident, but are visually subordinate to the attributes of the existing landscape character. They may repeat form, line, color or texture common to these characters, but changes in quality, size, number, intensity remain visually subordinate to the attributes, qualities or traits of a landscape that give it an image and make it identifiable or unique.

Ibid.

Under Forest Plan FEIS alternative G (selected in the Record of Decision), "[m]apped Scenic Integrity Levels will become Scenic Integrity Objectives". Plan FEIS at IV-429. Under management area 5.11, which covers most of the project area, "[a]ctivities meet the adopted Scenic Integrity Objective". Forest Plan at IV-29.

With alternative 2, units 5, 6, 8-11 and Trujillo Meadows Campground will be visible from concern areas. EA at 71. These units are 58-92 percent spruce (EA at 23), meaning that they could be clearcut, or nearly so. If that occurred, the scenic integrity would surely drop to low or even very low, in violation of the Forest Plan. It is thus necessary to limit the portion of dead and dying spruce trees that can be removed from proposed treatment units to ensure the moderate scenic integrity level is met.

OTHER ISSUES.

Distance for hazard tree removal. Under the action alternatives, hazard trees could be cut "1.1 to 2.0 tree heights from open roads, fences, private land, or recreation facilities". EA at 4. This distance is excessive. Removal for a distance of the height of the tallest tree plus 10 percent should be sufficient to properly protect resources and people.

Coverage and depth of chunks and chips. Chips (from chipping or grinding) and chunks (from mastication) would be allowed to cover up to 50 percent of an area to a depth of four inches in WUI areas. EA at 12. This is too great a coverage and depth. Chips and chunks decay slowly and may use most of the available nitrogen. This would prohibit or retard growth of ground vegetation and regeneration of trees.

Noxious weeds. The EA contains some good measures for fighting weeds, notably the requirement to treat any weeds on haul routes and other "highly disturbed" areas for five years as needed. EA at 11. However, there is no requirement to pre-survey any part of the project area prior to the commencement of ground-

disturbing activities, and to eradicate any populations discovered. Such a measure should be added to the Project Design Criteria. “Highly disturbed” areas to be treated (if needed) should include any areas burned.

Costs for roadwork. The EA uses figures for the costs of roadwork that seems very low: $3615-$3810 per mile for reconstruction/maintenance and $3000 per mile for construction/reconstruction. Calculated from Tables 3-24 and 3-25 at EA p. 68. The Forest Service should state where these cost figures were obtained and why they are much lower than costs for similar roadwork elsewhere.

CONCLUSION. The proposed action would treat much too large of an area and inappropriately places emphasis on acres treated and wood produced, rather than on protecting wildlife habitat, watersheds, recreational opportunity, and scenic resources. A much smaller project, one that considerably limits the cutting of dead and dying spruce and protects resources must be considered, and should be approved if any action will be taken in the project area.

An EIS should be prepared, especially to examine the cumulative impacts to lynx, watershed, and scenery from Cumbres and other projects such as County Line. The BA, describing possible effects to lynx, must be available for comment.

Sincerely,

Rocky Smith, Forest Policy Analyst
1030 Pearl #9
Denver, CO 80203
303 839-5900
2rockwsmith@gmail.com (note - this is a new e-mail address)

Christine Canaly, Director
San Luis Valley Ecosystem Council
P.O. Box 223
Alamosa, CO 81101
(719) 589-1518
slvwater@fairpoint.net, info@slvec.org, www.slvec.org

Roz McClellan, Director
Rocky Mountain Recretion Initiative
1567 Twin Sisters Rd.
Nederland, CO 80466
303 447-9409
mccmlelr@colorado.edu

Veronica Egan, Executive Director
Great Old Broads for Wilderness
P O Box 2924
Durango, CO 81302
970-385-9577
ronni@greatoldbroads.org

Josh Pollock, Executive Director
Rocky Mountain Wild
1536 Wynkoop Street, Suite 303
Denver, CO 80202
303 546-0214 x2
josh@rockymountainwild.org

Tom Sobal, Director
Quiet Use Coalition
P. O. Box 154
Buena Vista, CO 81211
719 207-4130
quietuse@gmail.com

D.5. Review of References Cited in Comments on the DEIS or EA for Comment

Attachment #1 - Dick Artley
"Respected Scientists Reveal the Certainty that Natural Resources in the Forest are Harmed (and some destroyed) by Timber Harvest Activities"

Author/Date/Title	Response to literature referenced in opposing views
Al-jabber, Jabber M. 2003. Habitat Fragmentation: Effects and Implications. Unpublished paper. http://faculty.ksu.edu.sa/a/Documents/Habitat%20Fragmentation%20Effects%20and%20Implication.pdf	Opposing View #1: *"The following document contains pertinent color pictures showing logging damage…"* **FS Response:** The photograph in the referenced article shows a distant view of clearcuts in a forested landscape in Oregon. The cited reference is not peer reviewed and is primarily a general overview of fragmentation as it pertains to wildlife habitat. Fire history studies indicate that spruce-fir forests typically experience large stand-replacing fires (see section 3.12 of the FEIS). These fires produce a variety of habitats and naturally fragmented forest cover. Proposed timber harvest in the Cumbres analysis area will not alter the landscape outside the range of conditions that would likely occur naturally over time. The wildlife effects analysis adequately addresses the issue of fragmentation by assessing habitat impacts and species viability for Threatened & Endangered Species, Sensitive Species, Management Indicator Species, and Migratory Birds. The EIS demonstrates that impacts to wildlife habitat will be kept within acceptable thresholds for species conservation.
Anderson, P.G. 1996. Sediment generation from forestry operations and associated effects on aquatic ecosystems. Proceedings of the Forest-Fish Conference: Land Management Practices Affecting Aquatic Ecosystems, May 1-4, 1996, Calgary, Alberta. http://www.alliance-pipeline.com/contentfiles/45_Sediment_generation.pdf [Note: link does not go to article referenced]	Opposing View #2: *"Timber harvest operations have been shown to have many effects on adjacent watercourses and on the aquatic ecosystems they support. This may occur from introductions or loss of woody debris, loss of riparian vegetation, accelerated stream bank and bed erosion, the alteration of natural channel form and process, and the reduction of stream habitat diversity. However, the existing literature indicates one of the most insidious effects of logging is the elevation of sediment loads and increased sedimentation within the drainage basin.* *Sediment generation from various forestry practices has been studied extensively in the past. Forestry practices which generate suspended sediments include all operations that disturb soil surfaces such as site preparations, clear-cutting, log skidding, yarding, slash burns, heavy equipment operation and road construction and maintenance."* **FS Response:** The above cited article summarized the effects of increased sediments on fish and their habitats, other aquatic organisms, as well as stream morphology. The article acknowledges (p. 14) that the delivery of sediment to streams resulting from ground disturbances can be largely avoided by proper design and planning, The Cumbres project addresses sediment concerns through the project design and Best Management Practices. Effects on the fisheries resource as discussed in section 3.5. Vegetation management activities in the Cumbres project will not measurably affect water quality because no mechanized activities will occur within stream buffers (WIZs), which are designed to eliminate and/or reduce the potential for sediment delivery to water bodies. Also because of applied stream buffers, vegetation treatment activities will have no effect on the amount of instream woody debris or riparian vegetation. In addition, salvage of dead and dying trees will have no measurable effect on water yield though there is a potential that water yield could increase, since so many of the trees are dead. However, as described in section 3.9, streambanks are stable with healthy riparian conditions that will help ensure watershed health and stream stability.
Aber John, Norman Christensen, Ivan Fernandez, Jerry Franklin, Lori Hidinger, Malcolm Hunter, James MacMahon, David Mladenoff, John Pastor, David Perry, Ron Slangen, Helga van Miegroet. 2000. Applying Ecological Principles to Management of the U.S. National Forests. Issues in Ecology 2000. No. 6 http://www.esa.org/science_resources/issues/FileEnglish/issue6.pdf	Opposing View #3: *"Timber harvest will remove dead and dying material from the site and inhibit the recruitment of downed woody material as time progresses. Timber harvest and associated reduced structural complexity and reduced age and size class diversity are all known to reduce population abundance and diversity of ants and a number of birds. For instance, ants are documented to require downed woody material in a variety of sizes and in all stages of decomposition (Torgersen and Bull, 1995). This is an attribute that is negatively correlated with harvest of the dead and dying trees and positively correlated with natural succession, especially after disturbance. Ants and birds are known to predate on insect species which cause mortality to trees, serving as a potentially important population control in the case of epidemics or before they occur (Campbell, Torgersen and Srivastava, 1983). Structural and functional characteristics associated with unlogged forests are also important for canopy arthropods, which play an important role in regulating pest outbreaks (Schowalter, 1989).* *Structural complexity, functional diversity, diversity of ecological process and diversity of structure in roadless areas are all expected to be less susceptible to the outbreak of pests and regulate insect activity in surrounding homogenized forests (Schowalter and Means, 1989; Franklin, Perry, Schowalter, Harmon, McKee and Spies, 1989).*

Author/Date/Title	Response to literature referenced in opposing views
	A large body of scientific evidence also indicates that increased edge effect and increased sunlight into stands, resulting from reduced canopy cover associated with timber harvest, can directly promote the population abundance, productivity and persistence of insects which cause mortality to trees of (Roland, 1993; Rothman and Roland, 1998; Kouki, McCullough and Marshall, 1997; Bellinger, Ravlin and McManus, 1989)." **FS Response:** The above cited article does not include the quotes supplied by the commenter. The quotes are instead from a document entitled "Can Logging Restore Our Forests – What Does the Science Say?" (http://okanogan1.com/community/unnatural/logging/Peterson-restoration-science.html) compiled by Mike Peterson of the Inland Empire Lands Council. The Forest Service response will address both the cited reference and the supplied quotes. The paper by Peterson is a "list of reasons why logging may not restore our forests" with a variety of papers cited. Torgersen and Bull (1995) concerns research in northeastern Oregon that studied the relationship between downed logs, ants, and pileated woodpeckers and suggests that practices that result in inadequate down wood could affect pileated woodpecker populations and the beneficial role that foliage-foraging ants have in maintaining forest health. The Cumbres Vegetation Management Project is proposed due to a landscape-scale disturbance event that has already occurred as a result of an insect epidemic which was not controlled by ecological processes. Although a natural disturbance process, this event has resulted in an overabundance of standing dead trees and down log recruitment across the larger landscape and into the future. The Cumbres project design criteria ensure adequate and long-term retention of this ecosystem component through 1) retention of a minimum of 4 spruce snags/acre in various stages of decay across the harvest units; 2) retention of all snags within no-cut streamside management zones; 3) retention of live fir trees for future snag recruitment; and 4) a minimum retention of 10-15 tons/acre of existing large woody debris within the harvest unit (EIS, Section 2.3). As a result, "Habitat effectiveness may be impacted but overall the analysis area would continue to provide adequate habitat for many avian species" (EIS, Section 3.4). Other quotations the author extracted from Peterson apply to ecosystems not found in the project area (i.e. maritime climate areas, northern Michigan jack pine, balsam poplar in Alberta, gypsy moths in Virginia). Authors of these papers caution against generalizing their results beyond the areas studied and stress that further research is needed before management recommendations are developed. The premise of the Aber, et al. article is that sustainable forest management of National Forests should be based on an understanding of how natural forest ecosystems work. The authors acknowledge that timber harvest is a tool that can be used to selectively restore early successional habitat, reduce fuel loads, and contain pest and pathogen outbreaks in some forests. They identify what they believe to be major ecological considerations that should be incorporated in sound forest management policy: 1. Maintenance of soil quality and nutrient stocks may necessitate adjusting timber harvest rates and leaving more large woody debris on cutover areas. 2. Protection of water quality and yield and prevention of flooding and landslides call for greater attention to the effects of logging roads and the value of buffer zones along streams and rivers. 3. Conservation of forest biodiversity will often require reducing forest fragmentation, avoiding harvest in vulnerable areas such as old growth stands and riparian areas, and restoring natural structural complexity to cutover sites. 4. Planning at the landscape level is needed to address ecological concerns such as biodiversity, water flows, and forest fragmentation. 5. Land managers should be alert for climate-related stresses as well as damage from ground-level ozone, acid rain, and acidification of soils and watersheds. The Cumbres project is consistent with these principles: 1. The project will maintain soil productivity and comply with Forest Plan (and thus Region 2) soil quality standards (EIS, Section 3.10). Several project design criteria (EIS, Section 2.3) are identified to protect soil resources including a provision to leave coarse woody material. Adequate amounts of large woody debris will be left on site. 2. Water quality will be protected through no-cut buffers (EIS, Section 3.9). 3. No old growth stands will be entered and riparian areas are conserved by adherence to project design criteria and Forest Plan Standards & Guidelines. 4. Planning and analysis was done at a landscape level, and included consideration of biodiversity, water flows, and forest fragmentation. 5. The vegetation treatments will maintain vegetative conditions that are resilient in response to natural disturbances and responsive to fundamental environmental shifts, so that ecological processes can sustain composition, structure, species, and genetic diversity into the future. 6. Stressors and damage/disturbance agents have been taken into consideration in the analysis.

Author/Date/Title	Response to literature referenced in opposing views
Barry, Glen. 2002. Commercial Logging Caused Wildfires. Portland Independent Media Center, August 2002. http://portland.indymedia.org/en/2002/08/17464.shtml	Opposing View #4: *"The biggest ecological con job in years is being waged by the U.S. Republican party and their timber industry cronies. They are blaming the recent Western wildfires on environmentalists, and assuring the public that commercial logging will reduce the risk of catastrophic wildfires."* **FS Response:** The cited article is 10-year old commentary opposed to the then Bush administration's support for fuels reduction under the National Fire Plan. As described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments adjacent to private land would change fire behavior enough to allow fire suppression crews opportunities to protect private homes.
Barry, John Byrne. 1999. Stop the Logging, Start the Restoration. Online commentary in Sierra Club's Planet Newsletter June 1999, Vol 6, No. 5. http://www.sierraclub.org/planet/199905/ecl1.asp	Opposing View #5: *"According to a 1998 poll by a firm that has worked for several Republican House members and two presidents, 69 percent of Americans oppose commercial logging on federally owned land. The Forests Service's own poll showed that 59 percent of Americans who expressed an opinion oppose timber sales and other commodity production in national forests."* *"Many Americans are surprised to learn that logging is even allowed on public lands. Alas, it has been since the Organic Act of 1897 first authorized logging in America's new forest reserves. That legislation called for watershed protection and a steady supply of timber - what the Forest Service calls 'multiple use.' "* *"But the agency has been unable to balance those goals. More often than not, the integrity of the forest ecosystem has been sacrificed to maximize timber and other commodities. And at taxpayer expense, notes Bernie Zaleha, chair of the End Commercial Logging on Federal Lands (ECL) campaign. The Forest Service lost $2 billion on its logging program from 1992 to 1997, according to the General Accounting Office. It spends more on building roads and preparing sales than it gets back in timber receipts."* **FS Response:** This is a 14-year old opinion commentary published in a 1999 Sierra Club newsletter, advocating an end to commercial timber harvest on Federal lands. The Sierra Club supported the National Forest Protection and Restoration Act (H.R. 1396) that would eliminate commercial logging on Federal public lands. This bill did not become law. This article does not provide specific information related to the Cumbres project; nor does the commenter demonstrate a specific connection to this project. However, an alternative proposing no logging has been considered. See EIS, chapter 2, alternative 1 No Action, which proposes no logging and chapter 3, which analyzes the effects of No Action.
Cushman, John H. Jr. Audit Faults Forest Service on Logging Damage in U.S. Forests. New York Times, February 5, 1999 http://query.nytimes.com/gst/fullpage.html?res=9B00E2DF163BF936A35751C0A96F958260&sec=&spon=&pagewanted=print	Opposing View #6: *"Federal auditors have found that the Forest Service frequently fails to assess, prevent or correct environmental damage from logging on the national forests.* *After inspecting 12 timber projects in the field from 1995 to 1998, the Agriculture Department's inspector general found that all were deficient and that 'immediate corrective action is needed.'* *A new report on the audits found that the environmental studies required before logging was approved were poorly done, the rules to protect streams and wildlife habitat from undue damage during logging were not followed, and the steps planned to repair some of the harm after logging were not carried out.* *The inspector general, Roger C. Viadero, reported on Jan. 15 to Mike Dombeck, chief of the Forest Service, that the review had found ''numerous serious deficiencies.'' Agency officials generally agreed with the report's conclusions and recommendations."* **FS Response:** The referenced audit report was published over 14 years ago on reviews that were conducted 1 to 4 years prior to that in Wisconsin, California, Georgia, Virginia, West Virginia, Mississippi, and Minnesota. The NEPA documents reviewed were completed from 1992 to 1996 (17-21 years ago). Then Forest Service Chief Michael Dombeck used this report to implement improved NEPA practices at all levels of the Forest Service. The Cumbres EIS and ROD is a result of implementing those and other improved practices. The cited audit is not specific to the Cumbres Vegetation Management Project EIS.
Dombeck, Mike Ph.D. "Through the Woods" The News Hour with Jim Lehrer. 19 June 1998. http://www.pbs.org/newshour/bb/fedagencies/jan-june98/road_6-19.html	Opposing View #7: *"The timber harvest shouldn't be dominant. It should be on an equal plane with recreation concerns, with wildlife concerns, hunting, fishing, protecting our cultural heritage. That's what the American public is asking us to do."* **FS Response:** The quotation is a portion of a statement made by Mike Dombeck in his capacity as chief of the Forest Service. He made this statement during a discussion about a proposed moratorium on road building within Inventoried Roadless Areas and the resulting impacts on the logging industry in Idaho.

Author/Date/Title	Response to literature referenced in opposing views
	The statement in its entirety reads as follows: *"The timber harvest shouldn't be dominant. It should be on an equal plane with recreation concerns, with wildlife concerns, hunting, fishing, protecting our cultural heritage. And if we work within that philosophical framework of working within the limits of the land, everybody benefits. And that's what the American public is asking us to do. The reason that we've been involved in some of the level of controversy that we have is because that shift is occurring and change is occurring. And change is always difficult to deal with."* Chief Dombeck's statement points out that timber harvest needs to be considered along with the many other uses on the National Forest. The Cumbres project proposes treatments within Forest Plan Management Areas that were designated for providing timber products, while other areas on the Forest are set aside for differing, but equally-important values. The analysis further addresses the needs of wildlife, aquatics, vegetation, the local economy, soils, invasive species management, air quality, and recreation within the project and provides project design criteria and mitigation measures to minimize impacts to those values. There are no Inventoried Roadless Areas in the project area and no new system roads are proposed under either alternative.
Dombeck, Mike. A message on "Conservation Leadership" sent to all USFS employees on July 1, 1998 http://www.wvhighlands.org/VoicePast/VoiceAug98/Dombeck.Aug98.html	Opposing View #8: *"I recently read a letter from a line officer who chided local managers for being behind schedule relative to meeting the region's 'timber targets.' My expectation is that line officers will demand similar accountability for meeting watershed restoration, fish and wildlife habitat, riparian, recreation, cultural resource, and wilderness management goals."* *"We need to do a better job talking about, and managing for, the values that are so important to so many people. Values such as wilderness and roadless areas, clean water, protection of rare species, old growth forests, naturalness -- these are the reasons most Americans cherish their public lands."* *"Fifty years ago, Aldo Leopold wrote his seminal work, A Sand County Almanac. In it, Leopold spoke of his personal land ethic and the need for land managers to extend their own ecological conscience to resource decisions. The Forest Service natural resource agenda is an expression of our agency's land ethic. If we are to redeem our role as conservation leaders, it is not enough to be loyal to the Forest Service organization. First and foremost, we must be loyal to our land ethic. In fifty years, we will not be remembered for the resources we developed; we will be thanked for those we maintained and restored for future generations."* **FS Response:** This is an extract of a letter from Mike Dombeck,, then Chief of the Forest Service, on the 100th anniversary of Gifford Pinchot's first day as a Forest Service employee, sharing his view on what makes a "conservation leader" in the context of his natural resource agenda. By Federal law (NFMA), forest plans provide the framework for the management of National Forest System lands. The Cumbres Project addresses the needs of wildlife, aquatics, vegetation, the local economy, soils, invasive species management, air quality, and recreation. The project will not affect wilderness values and will meet all Forest Plan standards and guidelines.
Ehrich, Anne, Foster, David and Raven, Peter. 2002. Letter to President George W. Bush. http://www.nativeforest.org/campaigns/public_lands/stb_5_30_02.htm	Opposing View #9: *"For much of the past century the Forest Service, entrusted as the institutional steward of our National Forests, focused its management on an industrial-scale logging program. The result of the massive logging and road construction program was to damage watersheds, destroy wildlife habitat and imperil plant and animal species."* *"The continued logging of our National Forests also wastes American tax dollars and diminishes the possibilities of future economic benefits. The Forest Service lost $2 billion dollars on the commercial logging program between 1992-1997. Annually, timber produces roughly $4 billion while recreation, fish and wildlife, clean water, and unroaded areas provide a combined total of $224 billion to the American economy. Forests purify our drinking water - 60 million Americans get their drinking water from National Forests. When the dramatic values of ecological goods and services are taken into account, it is clear that protecting National Forests creates more economic benefits than continued logging."* **FS Response:** The citation is an 11-year old letter written in 2002 to then President Bush calling for an end to commercial logging on the National Forests and encouraging the development of a policy to restore forests. The Forest Service has since established a policy for using ecological restoration to manage National Forest System lands in a sustainable manner (Forest Service Manual 2020). Ecological restoration focuses on establishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystem sustainability, resilience, and health under current and future conditions. Timber harvest is one of the tools that will be used to achieve the vegetation and fuels objectives. The EIS and supporting documentation in the Project Record demonstrate that the project would improve forest conditions to meet the Management Area Prescription and appropriate to the circumstances for which it

Author/Date/Title	Response to literature referenced in opposing views
	was developed.
"Bush Fire Policy: Clearing Forests So They Do Not Burn." Forest Conservation News Today, August 27, 2002. http://forests.org/archived_site/today/recent/2002/tiporefl.htm	Opposing View #10: *"The Bush administration has announced plans to greatly increase logging on federal lands in order to reduce the risk of wildfires. The Forest Service is using the fear of wildfires to allow logging companies to remove medium-and large-diameter trees that they can sell, rather than just the small trees and brush that can make fires more severe. There is little evidence to show that such logging will prevent catastrophic fires; on the contrary, logging roads and industrial logging cause wildfires. Bush is a well known supporter of the timber industry and has accepted huge sums of money from wealthy timber company leaders. He is promoting misinformation about forest fires in order to benefit timber industry campaign contributors."* **FS Response:** The cited article is opinion commentary written in 2002 criticizing then President Bush and his administration's support for fuels reduction (Healthy Forests Initiative). This is dated opinion not applicable to the current administration or the Cumbres project.
Franklin, Jerry Ph.D., David Perry Ph.D., Reed Noss Ph.D., David Montgomery Ph.D. and Christopher Frissell Ph.D. 2000. Simplified Forest Management to Achieve Watershed and Forest Health: A Critique. National Wildlife Federation Report. http://www.coastrange.org/documents/forestreport.pdf	Opposing View #11: *"The proposition that forest values are protected with more, rather than less logging, and that forest reserves are not only unnecessary, but undesirable, has great appeal to many with a vested interest in maximizing timber harvest. These ideas are particularly attractive to institutions and individuals whose incomes depend upon a forest land base. (page 2)"* *"On the other hand, approaches that involve reserving of a portion of the land base, or harvest practices that leave commercially valuable trees uncut to achieve ecological goals, are often considered much less desirable as they reduce traditional sources of timber income. (page 2)"* **FS Response:** The National Wildlife Federation (NWF) commissioned this article, which is a critique of forest management plans and policies that call for active management of essentially the entire forest area, and which specifically reject the consideration of biological reserves and non-traditional harvest techniques, such as structural retention. Much of the focus of this article is on 'intensive' silvicultural management of old growth forests in the Pacific Northwest. The Cumbres project does not propose what the authors are calling Simplified Structure-Based Management. The Cumbres project proposes to salvage beetle-killed timber while maintaining important ecosystem components. Timber harvest is proposed within an area that has been actively managed in the past. The project will not affect old growth stands and any individual large, older trees not affected by beetles will be retained within treatment areas. Consistent with the recommendations in the article, the Cumbres project will retain coarse woody debris, snags, and other forest structure elements within all vegetation treatment units. Portions of the land base (outside the project area) are maintained as biological reserves through Wilderness, Backcountry, and Roadless areas and some commercially-valuable tree (including dead) would be left uncut within the project area to achieve ecological goals.
Franklin, Jerry F. Ph.D. and James K. Agee Ph.D. 2007. "Forging a Science-Based National Forest Fire Policy." Issues in Science and Technology. A National Wildlife Federation publication sponsored by the Bullitt Foundation. http://www.coastrange.org/documents/forestreport.pdf	Opposing View #12: *"Consequently, we specifically criticize the "simplified structure-based management" approaches derived from simple structural models and traditional silvicultural systems such as clearcutting. In our view, the assumptions underpinning simplified structure-based management (SSBM) are not supported by the published scientific literature on structural development of natural forests, disturbance ecology, landscape ecology and conservation biology, or by the relationships between ecosystem structures and processes. In this report, we review scientific findings associated with each of these areas with particular attention to the over-simplified structural models associated with SSBM and the importance and viability of forest reserves to achieve various ecological goals. (page 2)* *"We do not believe, however, that scientific literature or forestry experience supports the notions that intensively managed forests can duplicate the role of natural forests, or that sufficient knowledge and ability exist to create even an approximation of a natural old-growth forest stand." (page 3)* **FS Response:** The above quotes provided by the commenter are not contained within the reference provided. These quotes are contained within the article cited in #11 above (Franklin, Jerry Ph.D., David Perry Ph.D., Reed Noss Ph.D., David Montgomery Ph.D. and Christopher Frissell Ph.D. 2000. Simplified Forest Management to Achieve Watershed and Forest Health: A Critique. National Wildlife Federation Report). Please see FS response to #11. The Cumbres project does not include timber harvest in old growth stands. The article cited here in #12, "Forging a Science-Based National Forest Fire Policy", provides considerations for the development of a national forest fire policy, which is not relevant to the Cumbres Vegetation Management Project.
Giuliano, Jackie Alan, Ph.D. "Fire Suppression Bush Style: Cut Down the Trees!" Environmental News	Opposing View #13: *"But the majority of the protesters were angry about Bush's plans to implement rules that would thin our national forests to reduce fire risk. Cascadia Forest Alliance volunteer Carrie Taylor said Bush's plan to log mature and old forests "will only increase fire risks while providing taxpayer*

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Service, 2002. http://www.ens-newswire.com/ens/aug2002/2002-08-23g.asp	*subsidized logs to the timber industry."* *"According to the Cascadia Forest Alliance, under the Bush proposal, 'environmental laws and citizen involvement will be undermined or suspended so that federal land management agencies can increase logging and road building on public lands, one of the timber industry's highest priorities.'"* **FS Response:** This article is opinion commentary written over 12 years ago in opposition to the former Bush administration's Healthy Forests Initiative and is not relevant to the Cumbres project. This project is not proposed under the authority of the Healthy Forests Restoration Act, which stemmed from the Healthy Forests Initiative. The Cumbres project is consistent with applicable laws and public involvement has been ongoing since the project's initiation.
GAO. 1999. Western National Forests: A cohesive strategy is needed to address catastrophic wildfire threats. Report to the subcommittee on Forests and Forest Health, Committee on Resources, House of Representatives. April. Cited in attachment as: Government Accounting Office "Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats" GAO/RCED-99-65 http://www.gao.gov/archive/1999/rc99065.pdf	Opposing View #14: *"Most of the trees that need to be removed to reduce accumulated fuels are small in diameter and have little or no commercial value."* *"Mechanically removing fuels (through commercial timber harvesting and other means) can also have adverse effects on wildlife habitat and water quality in many areas. Officials told GAO that, because of these effects, a large-scale expansion of commercial timber harvesting alone for removing materials would not be feasible. However, because the Forest Service relies on the timber program for funding many of its activities, including reducing fuels, it has often used this program to address the wildfire problem. The difficulty with such an approach, however, is that the lands with commercially valuable timber are often not those with the greatest wildfire hazards."* **FS Response:** The literature citation is a report to Congress from the Government Accounting Office that recommends the development of a cohesive strategy for reducing and maintaining accumulated fuels on national forests of the interior West at acceptable levels. The quotes provided by the commenter are describing what the GAO identifies as some of the barriers to the effective action of addressing catastrophic wildfire (page 7). This literature reference is not relevant to the Cumbres project because it recommends a National policy for addressing wildfire and fuel conditions across the interior West, which is not within the scope of this project. The Cumbres project proposes various site-specific vegetation treatments including timber harvest and fuels treatments adjacent to private ownership.
Gorte, Ross W. Ph.D. "Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems." A Congressional Research Service (CRS) report, October 30, 1995. http://www.ncseonline.org/NLE/CRS/abstract.cfm?NLEid=215	Opposing View #15: *"The recent concern over the poor health of western pine ecosystems has been attributed at least partly to inappropriate silvicultural practices, both before and since the national forests were established. (4) Because of the timber industry's needs, logging in mixed conifer stands has emphasized cutting the large pines and leaving the true firs and Douglas-fir to dominate the remaining stands. (5) However, true firs and Douglas-fir are more susceptible to the damage (including insect and disease attacks as well as direct damage) that has occurred during the decade-long drought in the interior West, and thus may contribute to the risk of catastrophic wildfires. Salvage sales are one tool that can be used to improve forest health, (6) but critics object to granting the agency the discretion to use timber sales to correct problems partially created by past timber sales."* *"A more general concern in some quarters is over Forest Service "bias" toward timber outputs, at the expense of ecosystem conditions and other resource values. While timber harvests are important, other important values are not measured, and managers are not rewarded for achieving these other values. (7) Some have attributed this "bias" to inappropriate incentives, particularly related to the agency's numerous trust funds and special accounts. (8) The Forest Service has several trust funds and special accounts that are either funded by timber revenues or provide funds for timber management (or both). (9)"* *"One trust fund often cited by critics is the Knutson-Vandenberg (K-V) Fund. This account receives an unlimited portion of timber sale receipts, to be used for reforestation, timber stand improvements, and other resource mitigation and enhancement activities in timber sale areas. Forest Service managers can, therefore, fund their programs from timber sales; in the words of one critic, wildlife managers have an incentive to support timber sales that damage wildlife habitat, because they can use the revenues to mitigate that damage and to keep themselves and their staffs employed. (10)"* **FS Response:** This 18-year old cited literature reference provides an overview of the Forest Service timber sale system (i.e. timber sale contract process) and examines possible changes to the system. The quotes provided by the commenter are listed within the article as concerns that some "interest groups and members of Congress" have expressed about the Forest Service timber sale program in the 15 or more years preceding the publication of the article in 1995. The Cumbres project is a salvage project, which, as noted above, can be used as a tool to improve forest health in some situations. However, since over 95 percent of the spruce is currently dead in most units (section 3.3, EIS) the management opportunities are limited. Staffing on the Rio Grande National Forest is not heavily reliant upon K-V funding and the availability of K-V funding for work other than reforestation

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	is never assured, especially from salvage projects.
Hanson, Chad, "Commercial Logging Doesn't Prevent Catastrophic Fires, It Causes Them." Published in the New York Times, May 19, 2000 http://www.commondreams.org/views/051900-101.htm	Opposing View #16: *"In April 1999, the General Accounting Office issued a report that raised serious questions about the use of timber sales as a tool of fire management. It noted that "most of the trees that need to be removed to reduce accumulated fuels are small in diameter" -- the very trees that have 'little or no commercial value.' "* *"As it offers timber for sale to loggers, the Forest Service tends to 'focus on areas with high-value commercial timber rather than on areas with high fire hazards,' the report said. Its sales include 'more large, commercially valuable trees' than are necessary to reduce the so-called accumulated fuels (in other words, the trees that are most likely to burn in a forest fire)."* *"The truth is that timber sales are causing catastrophic wildfires on national forests, not alleviating them. The Sierra Nevada Ecosystem Project Report, issued in 1996 by the federal government, found that 'timber harvest, through its effects on forest structure, local microclimate and fuel accumulation, has increased fire severity more than any other recent human activity.' The reason goes back to the same conflict that the G.A.O. found: loggers want the big trees, not the little ones that act as fuel in forest fires."* *"After a 'thinning' timber sale, a forest has far fewer of the large trees, which are naturally fire-resistant because of their thick bark; indeed, many of these trees are centuries old and have already survived many fires. Without them, there is less shade. The forest is drier and hotter, making the remaining, smaller trees more susceptible to burning. After logging, forests also have accumulations of flammable debris known as "slash piles" -- unsalable branches and limbs left by logging crews."* **FS Response**: The Sierra Nevada Framework is specific to more dry (xeric) forest communities in California and not the Southern Rockies and the high elevation spruce-fir ecosystem, which tends to have either very small fires under average conditions or under extended droughts, very large, infrequent fires are possible. Since this ecosystem is not a frequent fire regime, trees have not developed survival strategies. Section 3.12 of the EIS describes the current understanding of the effects of bark beetles on fire behavior and the changes to forest structure and composition; there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments adjacent to private land would change fire behavior enough to allow fire suppression crews opportunities to help protect private homes.
Hanson, Chad. "Logging for Dollars in National Forests" Special to The Sacramento Bee - November 14, 2001 http://www.johnmuirproject.org/news-logging-for-dollars.html	Opposing View #17: *"The Forest Service keeps the vast majority of timber sale revenues, which gives it a perverse incentive to do more cutting. It has developed a huge bureaucracy around the selling of timber from national forest land."* **FS Response:** The article is opinion commentary written over 12 years ago by a national director of the Sierra Club opposing a post-fire salvage project in California. The author says that the project will log old growth forests on thousands of acres. At the end of the article, the author expresses support for ending timber sales on federal lands. This article is not relevant to the Cumbres project. It does not propose activities within old growth stands, nor does it direct national policy on timber harvesting. Any revenue generated from any volume sold may be collected to partially fund reforestation activities, invasive weed treatments, or other approved activity.
Hanson, Chad Ph.D., "Logging Industry Misleads on Climate and Forest Fires." Guest Commentary in New West, July 11, 2008 http://www.newwest.net/topic/article/logging_industry_misleads_on_climate_and_forest_fires/C41/L41/	Opposing View #18: *"Recent editorials by timber industry spokespersons are a wildly misleading attempt to promote increased logging of western U.S. forests under the guise of reducing wildland fires …"* **FS Response:** The cited article is opinion commentary written in response to previous editorials. The author criticizes an unnamed timber industry spokespersons for making what he claims are false statements regarding wildland fires and climate change. It is simply an opinion made by the author of other unknown material.
Harvey, A. E., M. J. Larsen, and M. F. Jurgensen. 1976. Distribution of Ectomycorrhizae in a Mature Douglas-fir/larch Forest Soil in Western Montana. Forest Science, Volume 22, Number 4, 1 December 1976 , pp. 393-398(6) http://www.ingentaconnect.com/content/saf/fs/1976/00000022/00000004/art00007;jsessionid=l2sdf2hphia2.alexandra	Opposing View #19: *"Logging reduces the organic parent material (duff and woody residues) available for soil-formation processes."* **FS Response:** This paper describes the mineral and organic composition of soils developed from limestone parent material at a location 10 miles south of Glacier National Park in Montana. The cited reference actually says, *"Increased tree utilization potentially reduces the organic parent materials (litter and woody residues) available for soil-formation processes."* The authors conclude, *"the parent materials (leaves, litter, and woody residues) for soil organic reserves may require management during timber harvesting and prescribed burning to prevent a subsequent loss in the capacity of soils of this type (limestone base) to support ectomycorrihizal associations in mature Douglas-fir/larch forests."* The authors measured active ectomycorrhizae associated with the various organic and mineral components of the soil, and found that 5 percent of the active ectomycorrhizae occurred in the mineral fraction, 66 percent in the humus, 21 percent in the decayed wood, and 8 percent in the charcoal. From this information, they conclude that soil organic

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	matter is important in the formation and activity of ectomycorrhizae in Douglas fir/larch timber types found in Western Montana. They emphasize that their results should only be applied to mature forests and are not applicable to young or regenerating forests. The need to provide for soil organic matter is addressed in the EIS in section in 3.10 and under Project Design Criteria (table 2-1) which would require that disturbance be minimized, tops or other material be returned to a unit if more than 15% has exposed mineral soil, plus the need to retain sufficient snags and large woody debris..
Houston, Alan Ph.D., "Why Forestry is in Trouble with the Public." Evergreen magazine, October 1997. http://evergreenmagazine.com/web/Why_forestry_is_in_trouble_with_the_public-v2.html	Opposing View #20: *"For too long, we foresters took the public for granted, assuming unwavering support for those who grow the nation's wood fiber. Few noticed when the public's mood changed, and those who did were often ridiculed by disbelieving colleagues. Now we come to a day of reckoning: the public believes forests are too important to be entrusted to foresters. To restore lost confidence, foresters must first come out of hiding. We have a lot of explaining to do because, where forests are concerned, the public will no longer support what it cannot see and understand. Regaining the public's trust will take time. We must be prepared to answer hard questions about what we are doing and how our actions are impacting the environment. We must also help the public think through its forest management options. When we lay out these options, we must speak of much more than trees. Only then will our critics know we love forests as much as they do."* **FS Response:** The cited opinion is listed by itself as a "quotable quote" in Evergreen magazine from 1997 and is not tied to a specific reference. The quote is an opinion that provides nothing substantive to respond to. The Cumbres project was developed through a lengthy scoping process, with some people supporting the project and others opposing it as documented in the EIS response to comments.
H. R. 1494 text. April 4, 2001 http://www.agriculturelaw.com/legis/bills107/hr1494.htm	Opposing View #21 *"SEC. 3. FINDINGS. Congress finds the following:* *Commercial logging has many indirect costs which are very significant, but not easily measured, such as flooding damage and relief of flooding damage through Federal funds, damage to the salmon fishing industry; and harm to the recreation and tourism industries."* **FS Response:** H.R. 1494 was a bill submitted to Congress over 12 years ago to prohibit commercial logging on federal lands and restore native biodiversity and natural ecological complexes and processes. This bill did not become law. The Cumbres project is unlikely to increase water yields, though the bark beetle induced mortality could result in some increase in water yield as the mature trees continue to die (EIS, section 3.9). Increases in flooding are not expected. Salmon are not native to this area and thus the project won't affect the salmon fishing industry. BMPs and project design criteria would be in place to maintain water quality and fisheries habitat.
Hudak, Mike Ph.D. "From Prairie Dogs to Oysters: How Biodiversity Sustains Us" from his book review of The Work of Nature: How the Diversity of Life Sustains Us by Yvonne Baskin, 1997. Newsletter of Earth Day Southern Tier, February/March 1999, p. 2 http://www.mikehudak.com/Articles/FromPrairieDogs9902.html	Opposing View #22: *"Human tampering with nature has not been without costs. Human manipulation of existing ecosystems has also sometimes had unfortunate consequences."* **FS Response:** The citation is a review of the book "The Work of Nature: How the Diversity of Life Sustains Us" by Yvonne Baskin. We agree human beings have manipulated the environment across the millennia, sometimes with unintended consequences. The Cumbres project does not propose any of the actions identified in the book review article which included draining of wetlands, introduction of non-native species, or establishing monocultures.
Huff, Mark H.; Ottmar, Roger D.; Alvarado, Ernesto; Vihnanek, Robert E.; Lehmkuhl, John F.; Hessburg, Paul F.; Everett, Richard L. 1995. Historical and current forest landscapes in eastern Oregon and Washington. Part II: Linking vegetation characteristics to potential fire behavior and related smoke production Gen. Tech. Rep. PNW-GTR-355. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 43 p. (Everett, Richard L.,	Opposing View #23: "*In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. Correlation coefficients of area logged with rate of spread were > 0.57 for five of the six river basins (table 5). Rate of spread for the Pend Oreille and Wenatchee River basins was strongly associated (r-0.89) with area logged. Correlation of area logged with flame length were > 0.42 for four of six river basins (table 5). The Deschutes and Methow River basins showed the strongest relations. All harvest techniques were associated with increasing rate of spread and flame length, but strength of the associations differed greatly among river basins and harvesting methods." (pg.9)* *"As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree. Even though these hazards diminish, their influence on fire behavior can linger for*

Author/Date/Title	Response to literature referenced in opposing views
team leader; Eastside forest ecosystem health assessment; Hessburg, Paul F., science team leader and tech. ed., Volume III: assessment.). https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/4706/PB96155213.pdf;jsessionid=C8DDB611DB29D3716BBF313AADBA2E70?sequence=1	*up to 30 years in the dry forest ecosystems of eastern Washington and Oregon."* **FS Response:** The paper referenced (Huff et al. 1995) above was an attempt to compare the potential fire behavior and smoke production of historical and current time periods for forty-nine 5,100 to 13,500 hectare (12, 602 to 33,359 acre) watersheds. It was a landscape-level modeling exercise based upon vegetation type and timber harvest type classification from aerial photo interpretation of historic (1938-1959) and current (1985-1992) aerial photos. The authors used fuel behavior photo series to assign fuel loading by vegetation type for non-harvested areas and by harvest-type in harvested areas. Due to lack of site-specific information, they assigned a fire behavior photo series that matched older logging slash to the harvests, assuming in the process that no post-treatment fuels reduction treatments had ever taken place. They also only modeled surface and moderate- to low-intensity understory fires and constant weather and topographic conditions. This study has little relevance to the small-scale Cumbres Vegetation Management Project. The study defined fuel loading only as the volume of down woody material, litter, and duff. Mature spruce-fir forests generally have a high fuel loading and it is desirable to retain high levels of coarse woody debris in most areas for ecological reasons (see Project Design Criteria in table 2-1). Depending on the logging system used, there can be an increase in fine fuels less than 3 inches diameter (10 hour and 100 hour fuels) that could contribute to fire intensity should a fire occur before these fuels decay (see section 3.12). Recent timber sales have primarily used whole-tree skidding which removes most of the tree to the landing area, so there is not extensive buildup of fuels. Except in the WUI fuel treatment areas where understory trees and shrubs would be thinned, as needed to modify fire behavior, and minor amounts of aspen maintenance treatments, salvage of dead and dying trees is the only vegetative treatment proposed in this project.
Ingalsbee, Timothy. 1997. Logging for Firefighting: A Critical Analysis of the Quincy Library Group Fire Protection Plan. Unpublished research paper for the Western Ancient Forest Campaign. 1997. http://www.fire-ecology.org/research/logging-for-firefighting_2.htm	Opposing View #24: *"The Quincy Library Group's (QLG's) fuelbreak strategy represents a giant step backwards from the progressive development of rational fire policies established by the 1995 Federal Wildland Fire Management Policy and Program Review."* *"The fact that the QLG admits that its Plan is inconsistent with these new policies (indeed, is almost gleefully defiant of them) says a lot about the credibility of the QLG's self-purported fire management expertise."* *"In spite of (or more likely because of) the intensive 'fuels reduction' activities associated with commercial logging, the Fountain Fire was truly catastrophic in its effects."* *"Even 'kinder, gentler' commercial logging still inflicts environmental impacts such as eroded topsoil, degraded water quality, destroyed wildlife habitat, and extirpated species that are every bit as much symptoms of forest health problems as large-scale, severe wildfires."* *"And after spending millions of dollars creating the SNEP Report, it seems wise to use its information, not ignore it or opportunistically select out statements clearly worded as assumptions, values, or goals which run contrary to factual research findings. The QLG Plan has much more to do with timber extraction than with genuine fire protection, and in that respect, it constitutes more of a forest health threat than a real solution."* *"The QLG Bill resembles similar 'panic legislation' that was passed during the early 1970s in which, following some large-scale wildfires in California, Congress allowed the Forest Service to access emergency firefighting funds to conduct 'presuppression' timber sales. Many fuelbreaks were cut in the Sierras during this period, and while costs rapidly rose into tens of millions of dollars, most of these fuelbreaks failed to perform adequately during wildfire suppression incidents. Congress quickly had to take away this funding source from the Forest Service. What has become of these old fuelbreaks? Almost without exception, the agency failed to monitor or maintain them, and in a modern-day version of 'cut and run' logging, many of these old fuelbreaks have converted to chaparral brush and 'dog-hair' thickets … a much more flammable vegetation type than the original forest cover. The QLG Bill appears to be 'deja vu' without evidence of Congress or the QLG being aware of this history of previous fuelbreak programs."* **FS Response:** The cited article is opinion commentary that criticizes H.R. 858, the Quincy Library Group Forest Recovery and Economic Stability Act of 1997, which has no relevance to the Cumbres project. H.R. 858 directed the Secretary of Agriculture to conduct a pilot project on Federal lands on the Plumas, Lassen, and Tahoe National Forests in California to demonstrate the effectiveness of specified fire resiliency resource management activities recommended by the Quincy Library Group. The bill did not pass into law.
Ingalsbee, Timothy. 2000. Commercial Logging for Wildfire Prevention: Facts Vs. Fantasies. Unpublished paper Western Fire Ecology Center.	Opposing View #25: *"The notion that commercial logging can prevent wildfires has its believers and loud proponents, but this belief does not match up with the scientific evidence or history of federal management practices. In fact, it is widely recognized that past commercial logging, road-building, livestock grazing and aggressive firefighting are the sources for "forest health" problems such as increased insect*

Author/Date/Title	Response to literature referenced in opposing views
http://www.fire-ecology.org/citizen/logging_and_wildfires.htm	*infestations, disease outbreaks, and severe wildfires."* *"How can the sources of these problems also be their solution? This internal contradiction needs more than propaganda to be resolved. It is time for the timber industry and their supporters to heed the facts, not fantasies, and develop forest management policies based on science, not politics."* **FS Response:** The cited article is opinion commentary. "Commercial logging" cannot prevent wildfires which the Forest Service has never said it would. To "prevent" wildfires, one would have to stop all human and natural (i.e. lightning) ignition sources. As described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments adjacent to private land would modify fire behavior enough to allow fire suppression crews opportunities to protect private homes. Over the long-term, removal of a portion of the dead stems could help reduce fire severity and allow more suppression options, should a fire occur.
Ingalsbee, Timothy Ph.D. "Logging without Limits isn't a Solution to Wildfires" published in the Portland Oregonian, August 6, 2002 http://www.klamathforestalliance.org/Documents/loggingwithoutlimits.html	Opposing View #26: "*Since the 'New Perspectives' program of the early 1990s, the agency has tried to dodge public opposition to commercial logging by using various euphemisms, such as this gem from the Siskiyou National Forest: Clearcuts are called 'minimum green tree retention units.' Accordingly, Forest Service managers have believed that if they simply refer to logging as 'thinning,' or add the phrases 'fuels reduction' or 'forest restoration' to the title of their timber sale plans, then the public will accept these projects at face value, and business-as-usual commercial logging can proceed. In the face of multiple scandals and widespread public skepticism of the Forest Service's credibility, it seems that only Congress is buying the agency's labeling scheme."* **FS Response:** The cited article is opinion commentary, written over 11 years ago. In the paragraph following the one the commenter cites, the author writes, *"There does appear to be growing consensus among forest managers, fire scientists, and environmentalists, too, on the need for some kind of carefully targeted tree thinning as one tool for reducing wildfire hazards. But the consensus centers on the need to thin the 'thin stuff' – brush and understory trees – not the 'thick stuff' – large diameter mature and old growth trees."* As described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments adjacent to private land would change fire behavior enough to allow fire suppression crews opportunities to protect private homes.
Ingalsbee, Timothy Ph.D. "The wildland fires of 2002 illuminate fundamental questions about our relationship to fire." The Oregon Quarterly, Winter 2002 http://fireecology.org/research/wildfire_paradox.pdf	Opposing View #27: *"Thus, the use of commercial logging for fire hazard reduction poses yet another paradox: Logging removes the trees that normally survive fires, leaves behind the trees that are most often killed by fire, increases flammable fuel loads, and worsens fire weather conditions." (pg. 5)* **FS Response:** In the article, immediately following the quote above, the author comments: *"There is a role for strategic thinning of small-diameter understory trees and brush, but thinning should focus on genuinely thin trees, not the thick, tall, mature, and old trees most valuable to wildlife and watersheds. Moreover, thinning proposals should not be falsely advertised as a means of preventing wildfires, but rather, as a means of preparing forests for prescribed and wildland fires."* The article is an opinion piece in which the author provides no supporting material for his conclusions. In the article, he assumes that all "commercial logging for fire hazard" would be "from above" and would leave small trees and slash, increasing fuel loads. The author supports strategic thinning of small-diameter trees as a preparation for prescribed burning See FS response to #26.
Ingalsbee, Timothy Ph.D. "Fanning the Flames! The U.S. Forest Service: A Fire-Dependent Bureaucracy." Missoula Independent. Vol. 14 No. 24, June 2003 http://www.fire-ecology.org/research/USFS_fire_dependent.html	Opposing View #28: *"In the face of growing public scrutiny and criticism of the agency's logging policies and practices, the Forest Service and their enablers in Congress have learned to mask timber sales as so-called 'fuels reduction' and 'forest restoration' projects. Yet, the net effect of these logging projects is to actually increase fire risks and fuel hazards."* *"Decades of encouraging private logging companies to take the biggest, oldest, most fire-resistant trees from public lands, while leaving behind a volatile fuel load of small trees, brush, weeds, stumps and slash has vastly increased the flammability of forestlands."* *"In addition to post-fire salvage logging, the Forest Service and timber industry advocates in Congress have been pushing pre-fire timber sales, often falsely billed as hazardous fuels reduction or 'thinning' projects, to lower the risk or hazard of future wildfires. In too many cases, these so-called thinning projects are logging thick-diameter fire-resistant overstory trees instead of or in addition to cutting thin-sized fire-susceptible understory trees. The resulting logging slash and the increased solar and wind exposure can paradoxically increase the fuel hazards and fire risks."*

Author/Date/Title	Response to literature referenced in opposing views
	FS Response: This article is opinion commentary and the points made are essentially the same as those in the above cited articles written by the same author. Please see the responses to #26.
Ingalsbee, Timothy Ph.D. 2005. "A Reporter's Guide to Wildland Fire." Published by the Firefighters United for Safety, Ethics, and Ecology (FUSE), January 2005 http://www.commondreams.org/news2005/0111-14.htm	Opposing View #29: *"More than any other recent human activity, the legacy of commercial timber extraction has made public forests more flammable and less resilient to fire. Firstly, clearcut and high-grade logging have historically taken the largest, most fire-resilient, most commercially-valuable trees, and left behind dead needles and limbs (logging debris called "slash"), along with smaller trees and brush that are less commercially valuable but more flammable than mature and old-growth trees. The net effect is to increase the amount of available hazardous fuel."* *"Secondly, the removal of large overstory trees also changes the microclimate of logged sites, making them hotter, drier, and windier, which increases the intensity and rate of spread of wildfires. Third, the creation of densely-stocked even-aged plantations of young conifers made sites even more flammable since this produced a solid mass of highly combustible conifer needles within easy reach of surface flames. These changes in the fuel load, fuel profile, and microclimate make logged sites more prone to high-intensity and high-severity wildfires."* **FS Response:** The first part of this opposing view is not applicable to the Cumbres project as tree harvest will be focused on the salvage of dead and dying spruce. Depending on the type of harvest, logging slash will be present to some extent though much of the slash would be piled and burned and not add to fuel buildup in the stand. Understory trees and brush are important components of the next forest and will not be treated, except adjacent to private land, where the desire is to reduce fire behavior enough to allow fire suppression crews opportunities to protect private homes. Over the long-term, removal of a portion of the dead stems could help reduce fire severity. As disclosed in the EIS, microclimates would change following tree removal though, since wildfires in spruce-fir ecosystems will still be controlled mostly by climatic factors, this is not expected change wildfire risk. Fire severity could be reduced in the long term my removal of a portion of the future down woody debris (EIS section 3.12).
Jalkotzy, M. G., Ross, P. I., and Nasserden, M. D. The effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature. Report: 1-354. 1997. Calgary, Prep. For Canadian Association of Petroleum Producers. Arc Wildlife Services Ltd. http://www.capp.ca/getdoc.aspx?DocId=24902&DT=PDF	Opposing View #30: *"Linear developments may result in habitat avoidance for grizzly bears. Logging-truck traffic in the Kimsquit Valley in British Columbia resulted in a 78% reduction in use of the "Zone of Hauling Activity" by radio collared bears compared to non-hauling periods (16). For 14 hours/day, 3%-23% of each bear's home range was unavailable to them because of disturbance."* *"The impacts of land-use activities on wolverines are likely similar to those on grizzly bears. Wolverines seem to have been most affected by activities that fragment and supplant habitat, such as human settlement, extensive logging, oil and gas development, mining, recreational developments, and the accompanying access. Wolverine populations that are now at the edge of extirpation have been relegated to the last available habitat that has not been developed, extensively modified, or accessed by humans."* **FS Response:** This document is a review of the scientific literature on the effects of linear developments on wildlife, especially the types created by the oil and pipeline industries in western Canada. This study is not relevant to the Cumbres project, since grizzly bears are not known to occur in the southern Rockies. Wolverines were addressed in the Biological Assessment for the project, which is summarized in section 3.4 of the EIS. Since there are no known wolverine populations in the area at this time, there are no effects.
Keene, Roy "Logging does not prevent wildfires" Guest Viewpoint, the Eugene Register Guard January 11, 2009 http://www.highbeam.com/doc/1G1-192070397.html	Opposing View #31: *"History, not science, refutes the claim that logging helps to prevent forest fires.* *The forests of the West are far more vulnerable to fire due to a century of industrial logging and fire suppression. Logging has removed most of the older, fire-resistant trees from the forests.* *Fire suppression has encouraged many smaller and more flammable trees, brush and dense plantations to fill the holes. Logging has set the forests of the West up to burn big and hot.* *More logging will not fix this."* **FS Response:** The article is opinion commentary that was written in response to a guest viewpoint published in an Oregon newspaper. See FS response to #16.
Keene, Roy Restorative Logging? "More rarity than reality" Guest Viewpoint, the Eugene Register Guard March 10, 2011 http://eugeneweekly.com/2011/03/03/views3.html	Opposing View #32: *"Fear of wildfire is heavily used to sell these forest "restoration" schemes. Logging has not been proven, in practice, to reduce fire frequency or intensity. Historically, the largest, most destructive blazes, like the Tillamook conflagration, were caused from logging or fueled by slash. Unlogged forests, cool and shaded, are typically more fire resistant than cut over, dried-up stands choked with slash and weeds.* *Large-scale logging (by any name) has devalued our forests, degraded our waters, damaged soils, and endangered a wide variety of plants and animals. How will the current round of politically and*

Author/Date/Title	Response to literature referenced in opposing views
	environmentally propelled 'restorative' logging proposals differ, in practice, from past logging regimes?" **FS Response:** The article is opinion commentary that was printed in an Oregon newspaper. The Tillamook Burn that the author refers to was a series of large forest fires in the northern Oregon Coast Range mountains 50 miles west of Portland. It began in 1933 and struck at six-year intervals through 1951, burning a combined total of 355,000 acres. The largest of the four fires started in August 1933 within a logging operation. Near record weather conditions with a 104º temperature and relative humidity of about 20 percent combined with dry fuel conditions contributed to the rapid growth and high intensity and severity of the fire. The subsequent fires in 1939, 1945, and 1951 primarily reburned the area affected by the first fire. See FS response to #16.
Keppeler, Elizabeth T. Robert R. Ziemer Ph.D., and Peter H. Cafferata. Effects of Human-Induced Changes on Hydrologic Systems. An American Water Resources Association publication, June 1994 http://www.fs.fed.us/psw/publications/ziemer/Ziemer94a.PDF	Opposing View #33: *"Timber harvesting operations affect hydrologic processes by reducing canopy interception and evapotranspiration. Many studies have documented changes in soil properties following tractor yarding (Stone, 1977; Cafferata, l983), and low-ground-pressure skidding (Sidle and Drlica, 1981). More recently, researchers have evaluated cable yarding (Miller and Sirois, 1986; Purser and Cundy, 1992). In general, these studies report decreased hydraulic conductivity and increased bulk density in forest soils after harvest."* **FS Response:** This literature is an excellent source of data for analyzing effects of timber harvest on soils in the Pacific Northwest. Although the terrain and climate are different that of the Cumbres project area, the general concepts of effects on soils from timber harvest activities are applicable and well understood by the IDT soil scientist and the Responsible Official. There is adequate disclosure in the EIS, in both the soils section and the water resources section, which discuss the effects the proposed activities would have on hydrologic systems. Increased bulk density and decreased hydraulic conductivity could occur with the ground-based harvest planned for the project; however, project design features would minimize these potential effects. All harvest units would comply with the R2 Soil Quality Standards. A comprehensive, site-specific analysis of potential impacts to water and soil resources is included in the EIS in sections 3.9 and 3.10.
Klein, Al. 2004. Logging Effects on Amphibian Larvae Populations in Ottawa National Forest. University of Notre Dame post-graduate thesis July, 2004. http://www.nd.edu/~underc/east/education/documents/AKlein2004Pre-loggingsurveyofamphibianlarvaeinvernalpools.pdf	Opposing View #34: *"Among these four species of amphibians, the spotted salamander is most likely to be affected adversely by the logging as this species of salamander relies on dense forests with full canopies (Harding, 1997)."* *"Looking at the study on a larger scale, the potential for changes caused by logging is great. Absence of trees could influence water temperature by altering available sunlight, conductivity by changing the amount of organic matter that collects in the vernal ponds, or pH if the logging process deposits foreign residues to the area. Also heavy equipment used to harvest the timber has the potential to alter the terrain."* *"Modifications to the landscape could change how water flows and collects at the surface and change the size, shape, and location of the vernal ponds. Loss or alteration to small temporary water sources less than four hectares can be extremely detrimental to amphibians water (Semlitsch, 2000). Without vernal ponds amphibians would have difficulty inhabiting forested areas because they rely on the ponds as breeding grounds. If logging disturbs the ponds, amphibian populations could diminish in the areas that surround these vernal pools."* **FS Response:** Although the title of the cited article infers that the effects of logging were studied, only 'pre-logging' data was collected in seven vernal ponds in Michigan's Upper Peninsula. No post-logging data was collected; therefore, no conclusions regarding the effects of logging on amphibians can be drawn from this article that was written by a college student attending the University of Notre Dame. The second quote provided by the commenter is an unsupported assumption by the author. In his assumptions, the author also fails to define the harvest type and logging method(s) to be used. Silvicultural practices vary depending on the objectives to be achieved. The spotted salamander is found in the eastern United States and Canada; thus the Cumbres project area in southern Colorado is far outside its range. Resource protection measures for the Cumbres project include the prohibition of timber harvest activities within streamside management zones; thus there will be no disturbance to riparian areas or change in stream shade, and any discovered wetlands would be protected with the same project design criteria as streams. Effects of the alternatives upon hydrology and aquatic habitats are addressed in Sections 3.5 and 3.9.
Laverty, Lyle, USDA Forest Service and Tim Hartzell U.S. Department of the Interior "A Report to the President in Response to the Wildfires of 2000", September 8, 2000. http://frames.nacse.org/6000/6269.html	Opposing View #35: *"The Congressional Research Service (CRS) recently addressed the effect of logging on wildfires in an August 2000 report and found that the current wave of forest fires is not related to a decline in timber harvest on Federal lands. From a quantitative perspective, the CRS study indicates a very weak relationship between acres logged and the extent and severity of forest fires. To the contrary, in the most recent period (1980 through 1999) the data indicate that fewer acres burned in areas where logging activity was limited."* *"Qualitative analysis by CRS supports the same conclusion. The CRS stated: "[T]imber harvesting*

Author/Date/Title	Response to literature referenced in opposing views
	removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these fine fuels on the forest floor increases the rate of spread of wildfires." Similarly, the National Research Council found that logging and clearcutting can cause rapid regeneration of shrubs and trees that can create highly flammable fuel conditions within a few years of cutting" **FS Response:** The cited paper is a report prepared in response to then President Clinton's request for recommendations on how to best respond to the 2000 wildfires, reduce the impacts of the wildland fires on rural communities, and ensure sufficient firefighting resources in the future. The quotes provided by the commenter were made in response to critics of the President's proposal to protect roadless areas. These critics expressed concern that the roadless policy could increase wildfire risks. The effects of Roadless Areas on wildfires are outside the scope of this analysis. As described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments adjacent to private land would change fire behavior enough to allow fire suppression crews opportunities to protect private homes.
Lawrence, Nathaniel, NRDC senior attorney "Gridlock on the National Forests" Testimony before the U.S. House of Representatives Subcommittee on Forests and Forest Health (Committee on Resources) December 4, 2001. http://www.nrdc.org/land/forests/tnl1201.asp	Opposing View #36: *"I will turn first to forest thinning aimed at reducing fire risks. There is surprisingly little scientific information about how thinning actually affects overall fire risk in national forests."* *"How can it be that thinning could increase fire risks? First, thinning lets in sunlight and wind, both of which dry out the forest interior and increase flammability. Second, the most flammable material - brush, limbs, twigs, needles, and saplings - is difficult to remove and often left behind. Third, opening up forests promotes brushy, flammable undergrowth. Fourth, logging equipment compacts soil so that water runs off instead of filtering in to keep soils moist and trees healthy. Fifth, thinning introduces diseases and pests, wounds the trees left behind, and generally disrupts natural processes, including some that regulate forest health, all the more so if road construction is involved."* **FS Response:** The first statement may have been incorrect in 2001 when it was made, and is certainly incorrect now. A number of studies and reports have been made over the years investigating the effect of thinning on fire behavior and effects. However, as described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments (understory thinning) adjacent to private land would change fire behavior enough to allow fire suppression crews opportunities to protect private homes. The expected changes in microclimates are discussed in the EIS. The effects of ground-based logging equipment are discussed in several sections in the EIS, but especially in sections 3.9 and 3.10 (Hydrology and Soils). Project Design Criteria listed in table 2-1 in section 2.3 of the EIS are designed to minimize adverse impacts and rehabilitate areas, as needed. The Cumbres project would meet Forest Plan Standards for detrimental soil disturbance following project completion.
Leitner, Brian. "Logging Companies are Responsible for the California Wildfires." the Democratic Underground, October 30, 2003. http://www.democraticunderground.com/articles/03/10/30_logging.html	Opposing View #37: *"Those who would argue that this form of logging has any positive effects on an ecosystem are clearly misinformed. This type of logging has side effects related to wildfires, first and foremost being that the lumber companies aren't interested in hauling out all the smaller trees, branches, leaves, pine needles, sawdust, and other debris generated by cutting all these trees. All this debris is left on site, quickly dries out, and is far more flammable sitting dead on the ground than it was living in the trees. Smaller, non-commercially viable trees are left behind (dead) as well - creating even more highly flammable fuel on the ground."* **FS Response:** This article is a general opinion piece contrasting the benefits of natural wildfires compared to the disadvantages of commercial logging. The above quote follows the broad statement that there are "two main types of commercial logging practiced in America's forests, clearcutting and thinning", which is incorrect and does not apply to the Cumbres project, except to the extent that the forest is changing rapidly from one dominated by mature trees to one consisting of younger seedlings and saplings, due to spruce beetle activity. Recently, whole tree yarding has been the most commonly used logging method. This greatly reduces the amount of extra slash left on-site.
Long, Richard D., U.S. Department of Agriculture Office of Inspector General. Western Region Audit Report: Forest Service National Fire Plan Implementation. Report No. 08601-26-SF, November 2001. http://maps.wildrockies.org/ecosystem_defense/Resources_Species_Topics/Fire/Misuse%20of%20Fire%20Plan%20funds.pdf	Opposing View #38: *"We concluded that commercial timber sales do not meet the criteria for forest restoration." (Pg. 11)* **FS Response:** The citation pertains to the use of National Fire Plan funds to restore and rehabilitate watersheds that were severely burned by wildfires in 2000. This has no relevance to the Cumbres project.

Author/Date/Title	Response to literature referenced in opposing views
Mann, Charles C. Ph.D. and Mark L. Plummer Ph.D. "Call for 'Sustainability' in Forests Sparks a Fire" Science 26 March 1999: Vol. 283. no. 5410, pp. 1996 – 1998 http://www.sciencemag.org/content/283/5410/1996.summary	Opposing View #39: *"In hopes of ending conflicts over "multiple use," an independent scientific committee has proposed that "ecological sustainability" should become the principal goal in managing the U.S. national forests and grasslands, which since 1960 have been under a congressional mandate to serve industry, recreation, and conservation all at once."* **FS Response:** The cited article highlights the debate over National Forest management. In 1997, the Clinton administration assembled a scientific advisory panel to provide scientific and technical advice on revising National Forest Management Act (NFMA) forest planning regulations. According to the article, the panel's recommendation was that ecological sustainability should be the principal goal in managing the national forests. The Cumbres project is designed to protect ecological sustainability (EIS, Section 2.3), the very emphasis of the panel's recommendations.
Maser, C. Ph.D., and J. M. Trappe. 1984. The Seen and Unseen World of the Fallen Tree. USDA Forest Service 1984, GTR-PNW-164 http://www.fs.fed.us/pnw/publications/pnw_gtr164/	Opposing View #40: *"Logging removes a mass that harbor a myriad of organisms, from bacteria and actinomycetes to higher fungi. The smaller organisms, not visible to the unaided eye, are still important components of the system."* **FS Response:** The quotation from the cited article actually says, *"**Fallen trees*** [emphasis added] *harbor a myriad of organisms, from bacteria and actinomycetes to higher fungi"* (page 16). The authors describe the various ecological benefits of decomposing wood of fallen trees in the Pacific Northwest. The role of coarse woody debris plays in the ecosystem is understood and has been implemented in the retention of slash material left on the ground under current Best Management Practices. The Cumbres project will not remove any decomposing, downed wood. Coarse woody debris (standing and downed) will be maintained within treatment units in accordance with the standards described in Forest Plan.
Maser, C. Ph.D., R. F. Tarrant, J. M. Trappe Ph.D., and J. F. Franklin Ph.D. 1988. The Forest to the Sea: A Story of Fallen Trees. USDA Forest Service, GTR-PNW-GTR-229 http://www.fs.fed.us/pnw/publications/pnw_gtr229/	Opposing View #41: *"Logging removes mature and maturing trees which conserve essential elements, whereas the area containing new very young planted trees following logging are susceptible to erosion and essential element loss." (pg.5)* *"Logging removes tree parts that would have created and maintained diversity in forest communities." (pg. 44)* **FS Response:** The first quotation provided by the commenter is not a direct quote from the article. On page 5, the authors write, "*The forest's character changes with succession. Net primary productivity is greater in young forests than in old ones. Old forests conserve nutrients, whereas very young forests are susceptible to erosion and nutrient loss (Franklin and others 1981).*" Logging is not mentioned. This statement is made in Chapter 1, which is entitled "Coarse Woody Debris in Forests and Plantations of Coastal Oregon". The second "quotation" provided by the commenter is also not a direct quote from the cited article. On page 44, the authors write, "*Fallen trees also create and maintain diversity in forest communities.*" Logging is not mentioned. This statement is made in Chapter 2 entitled, "What We Know About Large Trees that Fall to the Forest Floor," which is written about Pacific Northwest forests. In the Cumbres project, coarse woody debris (standing and downed) will be maintained within treatment units in accordance with the standards described in the Forest Plan. See also FS response #3.The age of the forest will be altered no matter what alternative is chosen in this area due to heavy impacts caused by spruce beetle. If the area is harvested Project Design Criteria and BMPs would be included to limit the potential impacts of erosion and nutrient loss.
McIntosh, B.A., J.R. Sedell, J.E. Smith, R.C. Wissmar S.E. Clarke, G.H. Reeves, and L.A. Brown "Management history of eastside ecosystems: changes in fish habitat over 50 years, 1935-1992." 1994. GTR-321 93-181 http://www.fs.fed.us/pnw/publications/pnw_gtr321/	Opposing View #42: *"In addition to the direct effects of habitat loss and fragmentation, logging typically reduces ecosystem health by:* *a) damaging aquatic habitats through siltation, reduction in stream complexity and increased water temperatures."* **FS Response:** The cited literature discusses how fish habitat has changed in select river basins of eastern Washington and Oregon from 1935 to 1992. In reviewing changes in stream habitat, the authors also reviewed changing patterns in land use, streamflow, and climate regimes over time. The land use history of these river basins includes mining, livestock grazing, road construction, irrigation diversions and other agricultural practices, and timber harvest and associated activities. The authors conclude that a combination of these land-use practices has 'simplified' fish habitat, resulting in a loss in the frequency and diversity of habitat types (pools, riffles, side-channels), reduced large woody debris and other structural elements, and declining water quality (temperature). They suggest that to restore fish habitat to a state that will support self-sustaining fish populations, these streams are in need of less fine sediment, more shade, and increased habitat complexity. <u>The quotation provided by the commenter was not found within the cited article.</u> The Cumbres project is consistent with the restoration recommendations provided in the article. Harvest

Author/Date/Title	Response to literature referenced in opposing views
	activities would occur outside of stream/drainage buffers used to protect streams from non-channelized sediment inputs. Because no vegetation removal will occur within riparian buffer areas, existing shade and woody debris recruitment potential will not be affected. Thus, harvest activities will not affect stream temperature. As described in section 3.9, the project could have short-term increases in sediment from road maintenance, road reconstruction, and use during implementation of project activities. However, once the project is completed and temporary roads are closed and rehabilitate fine sediment will be reduced below existing levels.
Moring, John R. Ph.D. 1975. "The Alsea Watershed Study: Effects of Logging on the Aquatic Resources of Three Headwater Streams of the Alsea River, Oregon – Part III." Fishery Report Number 9. Oregon Department of Fish and Wildlife. http://www.for.gov.bc.ca/hfd/library/ffip/Moring_JR1975b.pdf	Opposing View #43: *"Logging practices can indirectly result in changes in the biological components of a stream, and can have direct and indirect on the physical environment in streams.* *The primary environmental changes of concern are the effects of siltation, logging debris, gravel scouring, destruction of developing embryos and alevins, blockage of streamflow, decrease in surface and intragravel dissolved oxygen, increase in maximum and diel water temperatures, changes in pool/riffle ratios and cover, redistribution of fishes, reduction in fish numbers, and reduction in total biomass."* **FS Response:** This article was written in 1975, prior to the advent of Best Management Practices. The study reviewed clearcut logging conducted in the mid-1960s in coastal Oregon. The article makes the following recommendations: 1. The preservation of buffer strips is essential for the prevention of direct physical changes and indirect biological changes in the stream environment. 2. Roads should be designed and constructed so as to minimize their function as a source of excess sediment and mass transport of material in subsequent years. Roads should be designed to utilize natural benches and saddles; sidecast material should be as far away from the stream as possible; unstable soils should be avoided; fish passage should be considered in culvert design. 3. No felling should occur into or across the stream or on to the immediate bank 4. No logs should be yarded through streams. 5. Excess logging debris should be removed from a stream as soon as possible after felling. The Cumbres project complies with all the recommendations listed above. No timber harvest activities would occur within stream buffers except at designated stream crossings. No fish passage barriers have been identified within the project. Road maintenance and construction of temporary roads would apply Best Management Practices. Temporary road construction would only occur on stable soils in mid to upper slope locations.
Naeem, Shahid, F.S. Chapin III, Robert Costanza, Paul R. Ehrlich, Frank B. Golley, David U. Hooper. J.H. Lawton, Robert V. O'Neill, Harold A. Mooney, Osvaldo E. Sala, Amy J. Symstad, and David Tilman. Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes. Issues in Ecology No. 4. Fall 1999. http://www.esa.org/science_resources/issues/TextIssues/issue4.php	Opposing View #44: *"Biodiversity in managed ecosystems is poor. Less biodiverse communities and ecosystems are more susceptible to adverse weather (such as drought) and exotic invaders, and have greatly reduced rates of biomass production and nutrient cycling."* *"All of these studies show that ecosystem functioning is decreased as the number of species in a community decreases. Declines in functioning can be particularly acute when the number of species is low, such as in most managed ecosystems including croplands or timber plantations."* *"Recent evidence demonstrates that both the magnitude and stability of ecosystem functioning are likely to be significantly altered by declines in local diversity, especially when diversity reaches the low levels typical of managed ecosystems."* **FS Response:** The first quoted paragraph not found in referenced document, which is a report on a "*consensus reached by a panel of twelve scientists chosen to include a broad array of expertise*." The report suggests that "*reductions in biodiversity can alter both the magnitude and the stability of ecosystem processes, especially when biodiversity is reduced to the low levels typical of many managed systems*." The introduction of the document states, "*On local and regional scales, biodiversity declines are already pronounced in many areas, especially where natural ecosystems have been converted to croplands, timber plantations, aquaculture and other managed ecosystems. The diversity of these managed ecosystems is often low, and species composition very different, compared with those of the natural systems they have replaced*." The cited article is not specific to forest management. It generally discusses the effects of local and global biodiversity on ecosystem processes. The Cumbres project does not propose to establish pure timber plantations and will not reduce biodiversity or ecosystem functions. The project would protect ecosystem components through project design criteria (EIS, Section 2.3), maintain soil productivity (EIS, Section 3.10), and sustain species viability (EIS, Section 3.2).
Nappier, Sharon. Lost in the Forest: How the Forest Service's Misdirection, Mismanagement, and Mischief Squanders Your Tax Dollars.	Opposing View #45: *"As a result of the Forest Service's well-documented mismanagement over many years of the timber sale program, taxpayers also have been stuck with the tab for hundreds of millions of dollars worth of subsidies to a profitable timber industry."* **FS Response:** This 11 year old article is an opinion paper offering review and comment regarding the

Author/Date/Title	Response to literature referenced in opposing views
Taxpayers for Common Sense, 2002. http://www.ourforests.org/fact/lostintheforest.pdf	road maintenance backlog on National Forest System lands, the costs associated with the construction of new logging roads, the taxpayer's subsidies for road construction and the Forest Service inability to provide data that displays the cost of its timber sale program. The author describes as "chronicled waste, fraud, and fiscal abuse at the agency." The citation from the commenter is taken from the executive summary of the document and refers to the Bush administration's failure to address road maintenance while advancing an agenda that promotes new road construction. The article also cites a 2001 GAO report associated with the cost of the timber sales program. In the article, the Forest Service commented that they will be implementing a new accounting system to track and evaluate the timber sale program. In the article, five recommendations were made to the Forest Service: 1. That the Forest Service release financial records for the timber program on an annual basis. 2. That the Forest Service reform its budget priorities 3. That the Forest Service focus on road maintenance 4. That the Forest Service institute a sealed bid process for timber sales and 5. That the Forest Service Support the Roadless Area Conservation Rule This article is not relevant to the project as the above recommendations are National in scale and deal with Forest Service policy at the Washington Office level.
Noble, Ian R. and Rodolfo Dirzo Ph.D. "Forests as Human-Dominated Ecosystems." Science Vol. 277. No. 5325, pp. 522 - 525. 25 July 1997. http://www.sciencemag.org/content/277/5325/522.abstract?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=logging&searchid=1136659907310_5043&FIRSTINDEX=0&journalcode=sci	Opposing View #46: *"Agroforestry does reduce biodiversity. In forests used for logging, whole-landscape management is crucial. Here, emphasis is placed on areas of intensive use interspersed with areas for conservation and catchment purposes. Management strategies for sustainable forestry are being developed, but there is a need for further interaction among foresters, ecologists, community representatives, social scientists, and economists."* **FS Response:** This article discusses the world-wide uses of forests by human populations. The quote is cited is from the abstract. The article is a scholarly discussion of how human populations use forests as part of an agro systems, use slash and burn as part of a shifting agriculture system, up through more intensive forestry to obtain forest products. It also touches on how forest management had been shifting to address maintaining ecosystem functions as well as ecosystem services. Maintaining ecosystem functions as well as the role of the forest for providing ecosystem services is addressed at the Forest Planning level. Standards, Guidelines, and Project Design Criteria are included to protect resources as well as to maintain biodiversity.
Northup, Jim. 1999. "Public Wants More Wilderness, Less Logging on Green Mountain NF". Press Release by Forest Watch, a Vermont-based environmental organization. http://www.forestwatch.org/content.php?id=10	Opposing View #47: *"The U.S. Forest Service has been sitting on a public opinion survey it commissioned, not knowing what to do with the results. The problem is that most people surveyed want more wilderness and less logging on the Green Mountain National Forest (GMNF), while the federal agency seems to want to build more roads and cut more trees."* *"The survey conducted by Dr. Robert Manning of the School of Natural Resources at the University of Vermont, polled 1,500 Vermont households in the spring of 1995. A survey with similar results was completed last fall for the White Mountain National Forest in New Hampshire. 'It is clear that New England residents value the national forest for many reasons, but non-material values, such as aesthetics and ecological protection, are more important than material values, such as economic development,' said Dr. Manning."* *"The responses to several survey questions indicate a strong public desire for more areas of wild, untouched nature on the GMNF and less roadbuilding and logging. Very few people supported clearcutting and other types of industrial logging, especially if natural beauty or wildlife habitat were harmed."* *"For example:* • *82 percent wanted to ban clearcutting,* • *82 percent said logging should not hurt scenic beauty,* • *80 percent of the respondents wanted to protect remaining undisturbed forest; and* • *72 percent urged prohibition of logging if bear or other wildlife habitat would be harmed."* *"Only 36 percent felt that management of the GMNF should emphasize timber and lumber products; and only 15 percent felt that jobs are more important than protection of endangered species."* *"'The results of this survey and a similar one on the White Mountain National Forest in Vermont should serve as loud wake-up calls to the U.S. Forest Service,' said Northup. 'Forest Service officials have two choices: either begin a major overhaul of the agency's management programs or ignore the wishes of the people they are supposed to serve'."* **FS Response:** The cited article is opinion commentary regarding a public opinion survey conducted in 1995 (over 18 years ago) about the management of the Green Mountain National Forest in Vermont. This

Author/Date/Title	Response to literature referenced in opposing views
	article is not relevant to the Cumbres Vegetation Management Project in Colorado (which has extensive acres of federal lands and wilderness). Vegetation management activities would occur within an area that has been previously managed and is within an active management area prescription defined by the Forest Plan. Analysis of the alternatives takes into consideration effects on wildlife populations and habitats (EIS, sections 3.5 & 3.8).
Okoand Ilan Kayatsky, Dan. "Fight Fire with Logging?" Mother Jones, August 1, 2002 http://motherjones.com/politics/2002/08/fight-fire-logging	Opposing View #48: *"Still, forestry experts warned in the 2000 plan that logging should be used carefully and rarely; in fact, the original draft states plainly that the "removal of large merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk."* *"Now, critics charge that the Bush administration is ignoring that warning. Neil Lawrence, a policy analyst with the Natural Resource Defense Council, claims that Washington has taken a far more aggressive approach to incorporating commercial logging in its wildfire prevention plans. As a result, Lawrence and other critics say, the National Fire Plan is becoming a feeding ground for logging companies. Moreover, critics claim the administration's strategy, far from protecting the lives and homes of those most at risk, could actually increase the likelihood of wildfires."* **FS Response:** The cited article is opinion commentary written 12 years ago about the implementation of the National Fire Plan, which has little relevance to the Cumbres project. Please see responses to #25 to #27 above.
Platt, Rutherford V., Thomas T. Veblen, and Rosemary L. Sherriff. Are Wildfire Mitigation and Restoration of Historic Forest Structure Compatible? A Spatial Modeling Assessment. Annals of the Association of American Geographers, 96(3), 2006, pp. 455–470 http://www.ingentaconnect.com/content/routledg/anna/2006/00000096/00000003/art00001	Opposing View #49: *"In response to catastrophic wildfires, wide-reaching forest management policies have been enacted in recent years, most notably the Healthy Forests Restoration Act of 2003. A key premise underlying these policies is that fire suppression has resulted in denser forests than were present historically in some western forest types. Therefore, although reducing the threat of wildfire is the primary goal, forest managers commonly view fuel treatments as a means to restore historic forest structure in those forest types that are outside of their historic range of variation. This study evaluates where both wildfire mitigation and restoration of historic forest structure are potentially needed in the ponderosa pine–dominated montane forest zone of Boulder County, Colorado. Two spatial models were overlain: a model of potential fireline intensity and a model of historic fire frequency. The overlay was then aggregated by land management classes.* *Contrary to current assumptions, results of this study indicate that both wildfire mitigation and restoration of historic forest structure are needed in only a small part of the study area, primarily at low elevations.* *Furthermore, little of this land is located on Forest Service land where most of the current thinning projects are taking place. We question the validity of thinning as a means both to reduce the threat of wildfire and to restore historic forest structure in the absence of site-specific data collection on past and present landscape conditions."* **FS Response:** The paper discusses the historical role of fire in the ponderosa pine ecosystems of the Colorado front range. The authors describe the fire regime as "mixed," a designation that includes stand-replacing fire. They conclude that not all ponderosa pine forests should be returned to a "nonlethal" state if the goal is to create historical conditions. This, therefore, was the basis for the conclusion in paragraph 2. Unlike the study area, no claims have been made in the Cumbres project that the treatment area is outside the Historic Range of Variability. Thus restoration is not a driver of the project. The project area is located in a spruce-fir ecosystem which is classified as a Fire Regime V, or stand replacement system (EIS section 3.12). In relation to fire, the project only proposes to improve defensible space around Wildland-Urban Interface, facilitate fire suppression by reducing snags, and reduce future potential burn severity as dead trees fall over time.
Powell, Douglas S., Joanne L. Faulkner, David R. Darr, Zhiliang Zhu, and Douglas W. MacCleery. 1992. Forest Resources of the United States. USDA Forest Service. Rocky Mt. Forest and Range Experiment Station. Gen. Tech. Rep. RM-234. http://www.fs.fed.us/rm/pubs_rm/rm_gtr234.html	Opposing View #50: *"Private lands are more suitable for timber production. National Forest land is on average of lower productivity and on steeper, higher elevation terrain than are private forestlands."* **FS Response:** The cited reference is a compilation of information for the 1992 Resources Planning Act Assessment Update showing the status of the Nation's forest resource, particularly the timber resource. The second sentence in the provided quotation was stated by the authors (page 8), but not the first. The first sentence is a conclusion drawn by the commenter. The authors' statement is a partial quote that simply gives a relative comparison between private land and public lands across the United States and does not disparage timber management on National Forests. The quote above is followed three sentences later by this statement: "*The National Forests in the Pacific Northwest contain some exceedingly productive forest lands. For example, about 22% of forest lands in site productivity classes of 85 and greater are on the National Forests*". The area proposed for timber harvest in the Cumbres project is designated suitable for timber production in the Rio Grande National Forest Plan.

Author/Date/Title	Response to literature referenced in opposing views
Raven, Peter, Ph.D., Jane Goodall, C.B.E., Ph.D., Edward O. Wilson, Ph. D. and over 600 other leading biologists, ecologists, foresters, and scientists from other forest specialties. From a 1998 letter to congress. http://www.saveamericasforests.org/resources/Scientists.htm	Opposing View #52: *"Less than 5% of America's original forests remain, and these forests are found primarily on federal lands. Logging in the last core areas of biodiversity is destroying the remaining intact forest ecosystems in the United States. At the current rate of logging, these forests and their priceless biological assets will be destroyed within a few decades.* *We urge Congress to pass the Act to Save America's Forests. It is the first nationwide legislation that would halt and reverse deforestation on all our federal lands. By implementing protective measures based on principles of conservation biology, the bill provides a scientifically sound legislative solution for halting the rapid decline of our nation's forest ecosystems.* *The Act to Save America's Forests will:* • *Make the preservation and restoration of native biodiversity the central mission of Federal forest management agencies.* • *Ban extractive logging in core areas of biodiversity and the last remnant original forest ecosystems: roadless areas, ancient forests and special areas of outstanding biological value.* • *Protect sensitive riparian areas and watershed values by banning extractive logging in streamside buffer zones.* • *End clearcutting and other even age logging practices on federal land.* • *Establish a panel of scientists to provide guidance to federal forest management.* *We believe it is our professional responsibility to ask Congress to align Federal forest management with modern scientific understandings of forest ecosystems. Passage of the Act to Save America's Forests will give our nation's precious forest ecosystems the best chance of survival and recovery into the 21st century and beyond."* **FS Response:** The *Act to Save America's Forests* was introduced but not passed into law. The Cumbres project will not harvest timber or construct roads in "ancient "forests, roadless areas, riparian areas, or in special areas that contain outstanding biological values." Timber harvest activity will occur within and adjacent to areas that have been previously managed.
Raven, Peter. February 9, 2001 letter to Senator Jean Carnahan. http://www.saveamericasforests.org/Raven.htm	Opposing View #53: *"The Act to Save America's Forests is based on the principles of conservation biology. It would make the protection native biodiversity the primary goal of federal forest management agencies. The bill would protect over 20 million acres of core forest areas throughout the nation, including ancient forests, roadless areas, key watershed, and other special areas. It is a comprehensive, sustainable, and ecologically-sound plan for protecting and restoring the entire federal forest system.* *If the current pace of logging planned by the Forest Service continues, nearly all of America's ancient and roadless wild forests will soon be lost forever. According to a recent report by the World Resources Institute, only one percent of the original forest cover remains in large blocks within the lower 48 states. The Act to Save America's Forests incorporates the solution recommended by the report, namely to protect core forest areas from any logging and to allow sustainable forest practices around these protected forests. Endorsed by over 600 leading scientists, this bill may be the last hope for America's forests."* **FS Response:** See FS Response to #52.
Roberson, Emily B. Ph.D., Senior Policy Analyst, California Native Plant Society. August 12, 2002 letter to Chief Dale Bosworth. http://www.plantsocieties.org/PDFs/Fire%20letter%20CNPS%208.02%20letterhead.pdf	Opposing View #54: *"It is well established that logging and roadbuilding often increase both fuel loading and fire risk. For example, the Sierra Nevada Ecosystem Project (SNEP) Science Team (1996) concluded that "timber harvest…. has increased fire severity more than any other recent human activity" in the Sierra Nevada. Timber harvest may increase fire hazard by drying of microclimate associated with canopy opening and with roads, by increases in fuel loading by generation of activity fuels, by increases in ignition sources associated with machinery and roads, by changes in species composition due to opening of stands, by the spread of highly flammable non native weeds, insects and disease, and by decreases in forest health associated with damage to soil and residual trees (DellaSala and Frost, 2001; Graham et al., 2001; Weatherspoon et al., 1992; SNEP Science Team, 1996). Indeed a recent literature review reported that some studies have found a positive correlation between the occurrence of past logging and present fire hazard in some forest types in the Interior Columbia Basin (DellaSala and Frost, 2001)."* **FS Response:** See FS response to #21. The Cumbres project will maintain sustainable, productive forest ecosystems, conserve rare plants, protect water quality and supply, soils, and other forest resources.
Roelofs, Terry D. Ph.D. Testimony for the California State Water Board and Regional Water Quality Control Boards Regarding Waivers of Waste Discharge Requirements on Timber Harvest Plans. August 2003.	Opposing View #55: *"I will discuss my views on how activities related to timber harvest adversely affect coastal salmonids in California by destroying, altering, or otherwise disturbing the freshwater habitats upon which these fish depend during crucial phases of their life cycle. I base these opinions on my research and observations in the field, as well as my review of and familiarity with the scientific literature and publications of government agencies, commissions, and scientific review panels. Below I discuss in some detail the life history and habitat needs of coho salmon to illustrate how timber harvest and related*

Author/Date/Title	Response to literature referenced in opposing views
http://webcache.googleusercontent.com/search?q=cache:QNy_aih1RxEJ:edennapa.org/thp/roelofstestimony.doc+%22timber+harvest%22+ph.d.+adverse&hl=en&ct=clnk&cd=5&gl=us	*roads affect this threatened species. Although Chinook salmon and steelhead trout have similar life histories and habitat needs, and also are negatively affected by timber harvest, I will use coho salmon in my discussion."* *"Loss or degradation of stream habitat has been and remains the single most significant cause of the decline of anadromous salmonids in general in the Pacific Northwest. In my experience the most pervasive and severe impacts to coastal watersheds in California inhabited by coho salmon result from logging and associated activities. These activities cause significant alteration and degradation to coho salmon habitat by 1) increasing sediment input to salmon bearing streams and their tributaries: 2) by decreasing input of LWD into waterways; 3) by altering streamflow regimes, increasing the likelihood of scouring flows and flooding; and 4) by increasing water temperatures. These pervasive changes due to timber harvest decrease the complexity and suitability of coho salmon habitat, including adversely affecting insects and other organisms that provide food for fish."* **FS Response:** The cited testimony is in support of the issuance of waste discharge permits on timber harvest plans in the north coast region of California, which has no relevance to the Cumbres project in Colorado. The author also says that his statements are confined to the geographic region covered by the North Coast Regional Water Quality Control Board in California. The Cumbres EIS discusses the potential short-term and long-term effects to fish and their habitat (EIS, Section 3.5). Project design criteria will minimize the potential for sediment delivery. Reduced sediment delivery, protection of riparian plant communities, and maintenance of in-stream woody debris recruitment will maintain stream health over time.
Rudzitis, Gundars. 1999. Amenities Increasingly Draw People to the Rural West. Rural Development Perspectives, vol. 14, no. 2 http://www.ers.usda.gov/publications/rdp/rdpsept99/rdpsept99b.pdf	Opposing View #56: *"People moving to the region may do so for reasons related to the social environment and the physical landscape but not care about specific Federal land management practices. We found this not to be true, since 92 percent were concerned with how Federal lands were managed. The most frequent preferences for managing Federal lands were water/watershed and ecosystem protection (table 3). Timber harvesting was cited by 16 percent, grazing and ranching by 6 percent, and mineral exploration/mining by less than 1 percent. Overall, protective strategies made up 76 percent of the preferred management strategies and commodity-based strategies 23 percent. This same trend is evident for the second and third most stated preferences. These findings also contradict the longstanding view of the Federal lands as a public warehouse of commodities to be harvested and jobs to be filled. For newcomers in the rural West, the value of these public lands is related to protecting and preserving them."* **FS Response:** In the late 1980s, the author of the cited article conducted a study of why 1800 people migrated into a sample of 15 western counties with high levels of physical amenities. In 1995, the author conducted another survey with a sample of 571 residents in a 100-county area in the interior Columbia River basin. Table 3 referenced in the quotation lists the most important public land uses cited by newcomers to the rural West. The preferences given were protect water/watershed 20.2%; protect ecosystems 18.3%; recreational uses 16.9%; timber harvesting 16.3%; preserve wilderness values 9.6%; protect fish/wildlife habitat 9.1%; grazing and ranching 5.9%; mineral exploration/ extraction 0.5%; and other 1.7%. The difference between the highest preference and timber harvest was slightly less than 4 percent. The article also states that 71 percent of rural persons favored some timber harvesting, compared with 62 percent of urbanites. The author suggests that the emphasis of survey respondents appeared to be on good stewardship, with commodity production allowed only if the ecosystems of the Federal lands are not degraded. It is uncertain if these 20-year old opinion survey results are valid today particularly after the recent economic downturn, a decade of large wildfires across the West, and insect induced tree mortality that has occurred across large expanses of forestland in places like Colorado.
Scott, Mark G. Forest Clearing in the Gray's River Watershed 1905-1996. A research paper submitted in partial fulfillment of the requirements for the degree of Master Of Science In Geography Portland State University, 2001 http://www.markscott.biz/papers/grays/chapter1.htm	Opposing View #57: *"Once clear-cutting has occurred, regulation and human silvicultural practices become responsible for the revegetation that follows. The creation of new forest succession patterns are the result of human control over the growing environment. Rather than proceeding at a natural pace, humans attempt to speed up the forest succession process to quickly return to a situation where harvesting is again possible. Reforestation of the disturbed area after clear-cutting also emphasizes maintaining control over the distribution and quality of forest species.* *Simplification is a state that results from the forest being harvested before it reaches maturity. Logging simplifies forest ecosystems (Dudley et al 1995) by narrowing the age range of the stand and suppressing diversification through repeated harvesting, burning to remove slash, and replanting with hybrid seedlings. Simplification affects the health and productivity of the forest because simplified forests lack the variety found in older stands, including species diversity, vertical structure, and microhabitat. From an ecological standpoint, a simplified forest of a particular age has less overall bio-mass per acre than a natural forest of the same age, but a simplified forest produces a higher volume of merchantable timber.* **FS Response:** The cited paper is a review of timber harvest activities over 90 years within the Gray's

Author/Date/Title	Response to literature referenced in opposing views
	River watershed located in coastal southwest Washington. Nearly all the land within the Gray River watershed is owned by private timber companies. The paper discusses the use of clearcutting and loss of old growth forests within the watershed. This article has no relevance to the Cumbres project because1) the forest types, climate, and past harvest history are very different from that of the Gray's watershed and 2) the project focuses on protecting important ecosystem components to maintain complexity on the landscape, 3) it does not propose harvest of old-growth stands, and 4) replanting would be done from native seed, collected from the same National Forest and seed zone.
Short, Brant and Dayle C. Hardy-Short. "Physicians of the Forest": A Rhetorical Critique of the Bush Healthy Forest Initiative. Electronic Green Journal Volume 1, Issue 19, 2003. http://escholarship.org/uc/item/4288f8j5	Opposing View #58: *"Within this volatile atmosphere the Bush Administration presented a new proposal for fire prevention called the "Healthy Forest Initiative." The plan received wide coverage in the national media in August and September 2002 and continues to be at the center of an attempt to significantly shift public land management in the United States. At the core of the plan is an effort to create private sector incentives to promote logging/thinning projects in the national forests."* **FS Response:** The article is opinion commentary written in 2003 about the debate over federal fire policy following the 2002 fire season and issuance of the Bush Administration's Healthy Forest Initiative. The Cumbres project is not being proposed under the authority of the Healthy Forests Restoration Act (HFRA) that stemmed from the Healthy Forest Initiative and therefore the opposing view has no relevance.
Sierra Club. 2005 "Ending Commercial Logging on Public Lands" http://northcarolina.sierraclub.org/pisgah/conservation/ecl.html	Opposing View #59: *"Logging on the National Forests provides less than 5% of the nation's timber supply, but costs the taxpayers more than 1 billion dollars in subsidies every year. Nor is logging a good job provider compared to recreation, which by Forest Service estimates provides over 30 times the economic benefits of logging. These forests are the last remnants of the virgin forests that covered the country, and now have far more value as forest ecosystems, watershed/water supply protection, and recreational assets than for logging. In fact, the justification for the Weeks Act in 1911 which established national forests in the east, was watershed protection.* *(A major barrier to the Forest Service changing its ways is that these increased recreational economic benefits flow into the local economy, not to the Forest Service itself, whereas extractive uses of the national forests contribute directly to Forest Service budgets.)* *"Our nation is engaged in a great debate over the real purpose of our national forests, with the weight of public opinion swinging more and more strongly toward preservation. Certainly this nation should not be subsidizing logging when it is clear that we understand so little about the functioning of these enormously complex and ancient forest ecosystems that provide millions of people with clean air and water, as well as homes for a myriad of plants and wildlife that can live nowhere else."* **FS Response:** The cited reference is opinion commentary supporting the end to commercial logging on National Forests. This subject has already been addressed in numerous FS responses above (#5, # 9, #52).
Slaymaker, Olav. Assessment of the Geomorphic Impacts of Forestry in British Columbia AMBIO: A Journal of the Human Environment 29(7):381-387. 2000 http://www.bioone.org/doi/abs/10.1579/0044-7447-29.7.381	Opposing View #60: *"Timber harvesting in British Columbia influences (a) forest hydrology; (b) fluvial geomorphology; (c) terrain stability; and (d) integrated watershed behavior. Impacts on forest hydrology are well understood and include increased average runoff, total water yield, increased storm runoff and advances in timing of floods. Stream channels and valley floors are impacted differently by fine sediment, coarse sediment and large woody debris transport. Terrain stability is influenced through gully and mass movement processes that are accelerated by timber harvesting. Impacts on integrated watershed behavior are assessed through disturbed sediment budgets and lake sediments."* **FS Response:** This 14 year old paper is a synthesis of forest harvesting effects of sedimentation of rivers and mass movement in British Columbia and implores for changes in policy of Forestry Practice Code in Canada. The article speaks to effects on runoff, water yield, peak flows, sediment and wood transport, and mass movement (landslides). The article suggests that following Forest Practice Act codes (in British Columbia) can significantly minimize these impacts. The referenced document is consistent with other science used and cited in the Cumbres EIS to develop design features to minimize the effects of the selected actions on water resources. The potential harvest effects mentioned in this paper are well understood and BMPs are being used to mitigate the effects and any potential changes in forestry practices of other countries is outside the scope of this project.
Stahl, Andy. Reducing the Threat of Catastrophic Wildfire to Central Oregon Communities and the Surrounding Environment. Testimony before the House Committee on	Opposing View #61*: In sum, 100 years of fire suppression and logging have created conditions that threaten central Oregon's natural resources and communities."* *"Thus it is inexplicable that the solution proposed by President Bush and some members of Congress emphasizes fire suppression and commercial logging, the very practices that created today's crisis. The federal government continues to attempt to suppress over 99% of all wildland fires. The Forest Service continues to measure its success not in terms of ecosystems restored, but in fires put out. The President's*

Author/Date/Title	Response to literature referenced in opposing views
Resources, August 25, 2003 http://www.propertyrightsresearch.org/2004/articles6/testimony_of_andy_stahl.htm	*Healthy Forest Initiative, as embodied in H.R. 1904, promotes commercial logging at the expense of citizen participation and oversight of the forests we own."* **FS Response:** The cited reference is opinion commentary written over 10 years ago during a previous presidential administration. The Cumbres project is not being proposed under the authority of the Healthy Forests Restoration Act (H.R. 1904). The emphasis of the Cumbres project is to meet the purpose and needs as described in Section 1.3 of the EIS.
Strickler, Karyn and Timothy G. Hermach, "Liar, Liar, Forests on Fire: Why Forest Management Exacerbates Loss of Lives and Property" Published by CommonDreams.org, October 31, 2003 http://www.commondreams.org/scriptfiles/views03/1031-10.htm	Opposing View #62: *"Fire, just like insects and disease, are a natural and beneficial part of forest ecosystems and watersheds. Without these natural processes the forest ecosystems quickly degrade. Excessive logging removes and reduces cooling shade adding to the hotter, drier forests along with logging debris creating a more flammable forest. Current "forest management" practices, road building and development cause forest fires to rage for hundreds of miles.* *The Sierra Nevada Ecosystem Project said in a report to the U.S. Congress that timber harvests have increased fire severity more than any other recent human activity. Logging, especially clear cutting, can change the fire climate so that fires start more easily, spread faster, further, and burn hotter causing much more devastation than a fire ignited and burned under natural conditions. If we stop the logging and stop building fire prone developments, we minimize the loss of lives and property suffered by people in fires.* *As long as the people of America let politicians, timber executives, and the Forest Service get away with it - it will not stop. Those corporations that profit will continue to lie, cheat and steal to continue to make more money from our losses. Just like big tobacco."* **FS Response:** The cited article is opinion commentary written over 10 years ago criticizing the Healthy Forest Restoration Act. The Cumbres project is not being proposed under the authority of the Healthy Forests Restoration Act (H.R. 1904). Please see FS responses to #4, #10, #16, #25, #26, #36, and #48.
Taxpayers for Common Sense. "From the Ashes: Reducing the Harmful Effects and Rising Costs of Western Wildfires. Washington DC, Dec. 2000. http://www.ourforests.org/fact/ashes.pdf [Note: provided hyperlink is no longer functional]	Opposing View #63: *"The agency's commercial timber program can contribute to the risk and severity of wildfire in the National Forests, yet Congress devotes nearly one-third of the Forest Service's entire budget to this wasteful program." (pg. 1)* *"Do not utilize the commercial timber program to reduce the risk of fire. Commercial incentives undercut forest health objectives and can actually increase the risk of fire." (pg. 9)* *"Commercial logging, especially of larger, fire-resistant trees, in the National Forests is one of several factors contributing to the risk and severity of wildfire." (pg. 19)* *"Commercial logging and logging roads open the forest canopy, which can have two effects. First, it allows direct sunlight to reach the forest floor, leading to increased evaporation and drier forests.[5] As a consequence, ground fuels (grass, leaves, needles, twigs, etc.) dry out more quickly and become susceptible to fire. Second, an open canopy allows more sunlight to reach the understory trees, increasing their growth.[6] This can lead to weaker, more densely-packed forests." (pgs. 19-20)* *"Congress and the Forest Service continue to rely on the commercial logging program to do something it will never accomplish – reduce fire risk. The commercial logging program is designed to provide trees to private timber companies, not to reduce the risk of fire." (pg. 20)* **FS Response:** This was written over 13 years ago following the high cost wildfires in 2000. The paper makes several national policy recommendations to reduce wildfire suppression costs and how Congress should better direct agency funding to reduce costs and require those that live in the wildland-urban interface to take steps to protect their properties. National policy is outside the scope of this project. The Cumbres project does address fuels reduction adjacent to private land as part of a good neighbor philosophy and also with the awareness that treatment of fuels adjacent to structures is the most critical should a wildfire start. The Colorado State Forest Service is working with private land owners to implement *Firewise* concepts and reduce fuels near structures.
Thomas, Craig. "Living with risk: Homeowners face the responsibility and challenge of developing defenses against wildfires." Sacramento Bee newspaper, July 1, 2007. http://www.sierraforestlegacy.org/NR_InTheNews/SFLIP_2007-07-01_SacramentoBee.php	Opposing View #64: *"Indiscriminate logging is not a viable solution to reducing wildfire risk. Logging can actually increase fire danger by leaving flammable debris on the forest floor. Loss of tree canopy lets the sun in, encouraging the growth of brush, increases wind speed and air temperature, and decreases the humidity in the forest, making fire conditions even worse."* **FS Response:** The cited article is opinion commentary written in the aftermath of the 2007 Angora fire that destroyed numerous homes near Lake Tahoe, California. The author suggests that a good fuels management plan focuses on reducing the fuels that ignite and spread wildfire while keeping the large, older trees that are resistant to fire. He cautions against a one-size-fits-all fuels reduction prescription.

Author/Date/Title	Response to literature referenced in opposing views
	As described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire. Fuels reduction treatments (understory thinning) adjacent to private land would change fire behavior enough to allow fire suppression crews opportunities to protect private homes. The expected changes in microclimates are discussed in the EIS.
University of California; SNEP Science Team and Special Consultants 1996 "Sierra Nevada Ecosystem Project: Final Report to Congress" Volume 1, Chapter 4 – Fire and Fuels. http://ceres.ca.gov/snep/pubs/web/PDF/v1_ch04.pdf	Opposing View #65: *"Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity."(pg.62)* **FS Response:** The quote is from the 1996 "Sierra Nevada Ecosystem Project: Final Report to Congress" Chapter 4 (Fire and Fuels) in a list of "Critical Findings". The comment was made by the authors specifically in context of the Sierra Nevada Mountain Range. They discuss the findings in the body of the chapter on page 64, describing the historic timber harvests as: *"The rapid influx of settlers into California following the discovery of gold, however, initiated more profound changes in the role of fire in Sierra Nevada ecosystems. Logging was undertaken initially to supply the mines and later to support the growing population of the new state. Timber volumes harvested in the Sierra Nevada continued to increase into the twentieth century, reaching a peak in the 1970s and 1980s. Typically, loggers harvested fire-resistant species and large trees, and these were replaced by greater numbers of much more fire-susceptible smaller trees. This pattern of biomass removal contrasted markedly with that of presettlement surface fires, which tended to kill (and later consume) small trees and leave many large trees to survive. Large quantities of debris left after logging led to severe fires, establishing vegetation patterns still evident today. A new pattern of ignitions, characterized in part by careless and indiscriminate burning, was introduced by miners, sheepherders, settlers, and loggers."* The Cumbres project area consists of an Engelmann spruce-subalpine fir ecosystem which is categorized as a Fire Regime V- infrequent, stand replacement fires. These areas are thought to be generally within the Historical Range of Variability, since widespread insect mortality is also likely part of the cycle. The effects of removing dead and dying trees are disclosed for a variety of resources throughout the EIS.
Vincent, James W. Ph.D., Daniel A. Hagen, Ph.D., Patrick G. Welle Ph.D. and Kole Swanser. 1995. Passive-Use Values of Public Forestlands: A Survey of the Literature. A study conducted on behalf of the U.S. Forest Service. http://www.icbemp.gov/science/vincent.pdf	Opposing View #67: *"The development of sound forest-management policies requires that consideration be given to the economic benefits associated with competing uses of forest resources. The benefits that may be provided under different management regimes include both use values (such as those provided by timber harvesting and recreation) and passive-use (or nonuse) values, including existence value, option value and quasi-option value. Many of these benefits are not revealed in market transactions, and thus cannot be inferred from conventional data on prices and costs."* **FS Response:** This article cited is an 18 year old paper offering review and comment regarding the state of economic research pertaining to the non-use or passive values of forests. The article addresses the implication of the many studies relating to the management of public forestlands in the Columbia River Basin in particular and forests of the Pacific Northwest. This article illustrates that timber harvesting, for example, produces economic goods primarily in the form of wood products. On the other hand, forestlands are managed for recreation opportunities, watershed protection, and biodiversity, and these goods provide a value, which can be characterized as passive-use values. The article identifies valuation methods for estimating the economic value of environmental goods. The article reviews four studies that attempt to estimate the total value derived from both use and passive-use values and identifies the strengths and weaknesses of each study. The article concludes that economic research should not ignore passive use values and by ignoring these values future studies may seriously understate the benefits associated with the preservation of wilderness areas, wildlife, old forests, and other goods associated with preservation. This type of economic analysis was completed during Forest Planning. An economic analysis, appropriate to the scope of the Cumbres project and suitable for providing a comparison between alternatives, has been conducted. A more in-depth economic analysis was completed for the FEIS for the Forest Plan, discussing trade-offs between projected revenues by Forest Plan alternative (Forest Plan FEIS, pg. 3-462). This project-level analysis seeks only to implement Forest Plan direction.
Voss, René "Getting Burned by Logging," July 2002 The Baltimore Chronicle http://www.baltimorechronicle.com/firelies_jul02.shtml	Opposing View #68: *"Unfortunately, there are number of massive logging proposals, disguised as hazardous fuels treatments, that have put environmentalists at odds with the Forest Service. Nearly all of these proposals focus primarily on the removal of mature and old-growth trees. These proposals continue even with overwhelming evidence that commercial logging is more of a problem than a solution. There's simply a cognitive disconnect between the Forest Service's scientists and its timber sale planners, whose budgets are dependent upon selling valuable mature trees.* *Ironically, this very type of logging, experts inform us, is likely to increase, not decrease, the frequency and severity of wildland fires.* *In the Forest Service's own National Fire Plan, agency scientists warned against the use of commercial logging to address fire management. The report found that 'the removal of large, merchantable trees from*

Author/Date/Title	Response to literature referenced in opposing views
	forests does not reduce fire risk and may, in fact, increase such risk." **FS Response:** The cited article is opinion commentary written over 11 years ago in support of the National Forest Protection and Restoration Act, which would eliminate commercial logging on Federal public lands. This bill did not pass into law. In the Cumbres project large, mature trees are dead or dying and the project does not meet old growth criteria. As described in section 3.12 of the EIS, there is no expectation or claim that the Cumbres project would reduce the risk of catastrophic wildfire though pre-emptive removal of large accumulations of down woody debris could reduce future fire severity.
Wuerthner, George. "Logging, thinning would not curtail wildfires" The Eugene Register-Guard, December 26, 2008 http://wuerthner.blogspot.com/2008/12/logging-thinning-would-not-curtail.html	Opposing View #69: *"Another surprising finding is that mechanical fuels treatment, commonly known as logging and thinning, typically has little effect on the spread of wildfires. In fact, in some cases, it can increase wildfires' spread and severity by increasing the fine fuels on the ground (slash) and by opening the forest to greater wind and solar penetration, drying fuels faster than in unlogged forests."* **FS Response:** The citation is opinion commentary that was written in response to another guest viewpoint printed in an Oregon newspaper. Ample evidence suggests that thinning followed by treatment of the surface fuels can be used to modify fire intensity and severity Please see FS response to #25.
Wuerthner, George "Who Will Speak For the Forests?" NewWest, January 27, 2009 http://www.newwest.net/topic/article/who_will_speak_for_the_forests/C564/L564/	Opposing View #70: *"Logging equipment compacts soils. Logging removes biomass critical to future soil productivity of the forest. Logging disturbs sensitive wildlife. Logging typically requires roads and skid trails which create chronic sources of sedimentation that degrades water quality and aquatic organism habitat. Logging roads and skid trails are also a major vector for the spread of weeds. Logging disrupts nutrient cycling and flows. Logging can alter species composition and age structure (i.e. loss of old growth). Logging can alter fire regimes. Logging can change water cycling and water balance in a drainage. The litany of negative impacts is much longer, but suffice it to say that anyone who suggests that logging is a benefit or benign is not doing a full accounting of costs."* *Those who suggest that logging "benefits" the forest ecosystem are using very narrow definitions of "benefit." Much as some might claim that smoking helps people to lose weight and is a "benefit" of smoking."* **FS Response:** The cited article is opinion commentary. The Cumbres EIS and specialists reports in the Project File describe the potential effects of proposed timber harvest on soils (EIS, section 3.10); wildlife (EIS, section 3.4); water quality, water quantity, and aquatic habitat (EIS, section 3.9 and 3.5), weed establishment and spread (EIS, section 3.7); and fire and fuels (EIS, section 3.12). Project design, best management practices, and resource protection measures will avoid or minimize potential effects. No harvest will occur within old growth and coarse woody debris will be left within treatment units to maintain soil productivity and function.
Ziemer, Robert R. Effect of logging on subsurface pipeflow and erosion: coastal northern California, USA. Proceedings of the Chengdu Symposium, July 1992. IAHS Publication. No. 209, 1992. http://www.fs.fed.us/psw/publications/ziemer/Ziemer92.PDF	Opposing View #71: *"After logging, peak pipeflow was about 3.7 times greater than before logging."* *"The use of heavy logging equipment was expected to compact the soil, reduce infiltration rates, and increase surface runoff. In addition, heavy equipment might collapse some of the subsurface pipes, increasing local pore water pressure and the chance of landslides (Sidle, 1986)."* **FS Response:** The cited article is about a study conducted in coastal northwestern California to determine changes in soil pipeflows after timber harvesting. Pipeflow is loosely defined as the flow of water within the soil profile through macropores. This study appears similar to the one referenced in #33 above. The article states further research is needed to clarify the effect of logging on peak pipeflow and pipe sediment during large storms. Soil piping is not a concern in the Cumbres project area. During field reviews, no sign of increased landslide or mass movement was observed. These soils do have a high potential for mass movement, but the gentle slopes in the Cumbres project area have greatly reduced this potential (EIS, section 3.10). There is adequate analysis in the EIS in both the Soils section and the Water Resources section, which discuss the effects the proposed activities will have on hydrologic systems. Increased bulk density and decreased hydraulic conductivity can occur with the ground-based harvest planned for the project; however, project design features will minimize these potential effects. All harvest units would comply with the Region 2 Soil Quality Standards following treatment. A comprehensive, site-specific analysis of potential impacts to water and soil resources is included in the EIS, section 3.9, 3.10, and appendix C, table C-1.
Letter to the President of the United States. April 16, 2002. 221 signatories. Subject: Letter requests	Opposing View #72: *"As conservation-minded scientists with many years of experience in biological sciences and ecology, we are writing to bring your attention to the need to protect our National Forests. Logging our National Forests has not only degraded increasingly rare and valuable habitat, but also*

Author/Date/Title	Response to literature referenced in opposing views
President Bush to end commercial logging on National Forests and begin restoration activities. http://www.forestwatch.org/content.php?id=108 [Note: link does not go to article referenced]	*numerous other services such as recreation and clean water."* *"Unfortunately, the past emphasis of management has been on logging and the original vision for our National Forests has failed to be fully realized. During the past several decades, our National Forests have suffered from intense commercial logging. Today almost all of our old growth forests are gone and the timber industry has turned our National Forests into a patchwork of clearcuts, logging roads, and devastated habitat."* *"It is now widely recognized that commercial logging has damaged ecosystem health, clean water, and recreational opportunities-- values that are highly appreciated by the American public. The continued logging of our National Forests also wastes American tax dollars and diminishes the possibilities of future economic benefits. The Forest Service and independent economists have estimated that timber accounts for only 2.7 percent of the total values of goods and services derived from the National Forests, while recreation and fish and wildlife produce 84.6 percent."* **FS Response:** This letter could not be located at the link provided. See FS responses to # 5 and #29.
Pimm, Stuart, Gary Meffe, , David Montgomery, Seth Reice, Henry Mushinsky. 1998. Scientists Support the Act to Save America's Forests (S. 977, HR 1376). Press Conference with Senator Robert Torricelli, April 28, 1998, U.S. Capitol. http://www.saveamericasforests.org/news/ScientistsStatement.htm	Opposing View #73*: "Recently, so called "salvage" logging has increased on national forests in response to a timber industry invented "forest health crisis" which points the finger at normal forest processes of fire, fungi, bacteria, insects and other diseases. In fact the crisis in the national forests is habitat destruction caused by too much clearcutting.* *My long-term studies of forest diseases in Idaho show the loss by disease and insect activity in all age classes of forests to be less than or slightly more than 1 percent per year over the past thirty-eight years. These findings are consistent with Forest Service national level data.* *Forests are structured systems of many life forms interacting in intricate ways and disturbances are essential to their functioning. It's not fire disease fungi bacteria and insects that are threatening the well being of forests. Disease, fire, windthrow, and other disturbances are a natural part of the forest ecosystem and assist in dynamic processes such as succession that are essential to long term ecosystem maintenance. The real threat facing forests are excessive logging, clearcutting and roadbuilding that homogenize and destroy soil, watersheds and biodiversity of native forests."* **FS Response:** The cited letter is statements made by the five scientists in support of the Act to Save America's Forests, which did not pass into law. Since this bill did not become law it is unknown how it may relate to the Cumbres project, but Project Design Criteria are included for all action alternatives to protect soils, water, watersheds, wildlife, and other resources.
Elliot, W.J.; Page-Dumroese, D.; Robichaud, P.R. 1999. The effects of forest management on erosion and soil productivity. In: Soil Quality and Soil Erosion. Boca Raton, FL: CRC Press. 195-208.	Opposing View #74: **"**CONCLUSIONS. *In our overview of the impacts of forest management activities on soil erosion and productivity, we show that erosion alone is seldom the cause of greatly reduced site productivity. However, erosion, in combination with other site factors, works to degrade productivity on the scale of decades and centuries. Extreme disturbances, such as wildfire or tractor logging, cause the loss of nutrients, mycorrhizae, and organic matter. These combined losses reduce long-term site productivity and may lead to sustained periods of extended erosion that could exacerbate degradation.* *Managers should be concerned with harvesting impacts, site preparation disturbances, amount of tree that is removed, and the accumulation of fuel from fire suppression. On erosion-sensitive sites, we need to carefully evaluate such management factors."* **FS Response:** This paper is a general overview of soil productivity science and generalizations regarding potential effects from common forestry practices. The potential effects to soil are disclosed in the section 3.10 of the EIS. The Cumbres project will maintain soil productivity and comply with Region 2 soil quality standards as well as other pertinent laws and regulations. Project design, resource protection measures, and best management practices (table 2-1, EIS) would minimize soil disturbance and ensure that productivity is maintained. Little new erosion is likely from harvest treatment areas because standard operating procedures and site-specific resource protection measures would help minimize operational footprints and maintain the forest floor, ground cover, and soil organic matter.

Attachment #4 - Dick Artley
"Roads Damage the Proper Ecological Functioning of the Natural Resources in a Forest"

Author/Date/Title	Response to literature cited in opposing views
Al-jabber, Jabber M. 2003. Habitat Fragmentation: Effects and Implications. Unpublished paper. http://faculty.ksu.edu.sa/a/Documents/Habitat%20Fragmentation%20Effects%20and%20Implication.pdf	Opposing view #1: *"Fragmentation has been considered as one of the most major factors that lead to the decline of many wildlife species (Brittingham and Temple 1983, Yahner 1988, Winslow et al. 2000) because fragmentation tends to decrease population productivity (Robinson et al. 1995). Therefore, Meffe states that "fragmentation has become a major subject of research and debate in conservation biology" (Meffe et al. 1997, p. 272). Forest fragmentation usually occurs when large and continuous forests are divided into smaller patches as a result of road establishment, clearing for agriculture, and human development (Robinson et al. 1995, Meffe et al. 1997)." (Pg. 1)* *"Generally, habitat fragmentation is an ecological process in which a large patch of habitat is divided into smaller patches of habitats. Usually, this process is caused by human activities (roads, agriculture, and logging). It also reduces the value of the landscape as habitat for many species (plants and animals). Fragmentation alters natural habitat in many ways, including reduction of patches' sizes, increment of distances between similar patches, and increment of edges and predation (Brittingham and Temple 1983, Robinson et al. 1995)." (Pp. 2 and 3)* **FS Response:** The cited reference is not peer reviewed and is primarily a general overview of fragmentation as it pertains to wildlife habitat. Fire history studies indicate that spruce-fir forests typically experience large stand-replacing fires (see section 3.12 of the FEIS). These fires produce a variety of habitats and naturally fragmented forest cover. Proposed timber harvest in the Cumbres analysis area will not alter the landscape outside the range of conditions that would likely occur naturally over time. The wildlife effects analysis adequately addresses the issue of fragmentation by assessing habitat impacts and species viability for Threatened & Endangered Species, Sensitive Species, Management Indicator Species, and Migratory Birds. The EIS demonstrates that impacts to wildlife habitat will be kept within acceptable thresholds for species conservation.
Amaranthus, M. P., Rice, R. M., Barr, N. R., & Ziemer, R. R. 1985. Logging and forest roads related to increased debris slides in southwestern Oregon. *Journal of Forestry*, *83*(4), 229-233. http://www.humboldt.edu/~rrz7001/pubs/Ziemer85.PDF	Opposing view #2: *"Debris slides over a 20-year period were inventoried on 137,500 acres of forested land in the Klamath Mountains of southwest Oregon. Frequency during the study period was about one slide every 4.3 years on each 1,000 acres-an erosion rate of about 1/2 yd^3 per acre per year. Erosion rates on roads and landings were 100 times those on undisturbed areas, while erosion on harvested areas was seven times that of undisturbed areas. Three-quarters of the slides were found on slopes steeper than 70 percent and half were on the lower third of slopes."* *"Soil erosion rates due to debris slides were many times higher on forests with roads, landings, and logging activity than on undisturbed forests."* **FS Response:** The findings presented in view #2 were developed from analysis of aerial photographs taken between 1956 and 1976 over a twenty year period centered on the 1950's.. The study area was the coastal mountains of southwest Oregon, with annual precipitation ranging from over 50 to 150 inches. This paper examined landslides in Oregon and found an increase in landslides in area of harvest, but it goes on to say "that modification of forest practices can substantially reduce erosion." The paper advices avoiding harvests on slopes greater than 70% and goes on to say slopes flatter than 50% have lowered erosion rates. The paper also goes on to attribute increased landslide activity caused by roads in their analysis area, but also goes on to acknowledge that "recent improvements in roading practices compared to those prevalent during the late '50s should lessen the erosion caused by road building on forestlands." The study area geomorphology and climate are completely different from that of the Cumbres project area. In contrast, the Cumbres project area receives 24 to 48 inches of annual precipitation, with much of that coming in the form of winter snowfall. Slopes in the project area are relatively gentle, but there would be no harvest activity on slopes greater than 40% and no skidding on slopes greater than 35%. No system road construction is planned with the project and, depending on the alternative selected, on short segments of temporary roads would be needed; these would be located in areas of gentle terrain and have little potential for erosion and none for landslides.
Aber, J., Christensen N., Fernandez I. et al. 2000. Applying ecological principles to management of the U.S. National Forests. Issues Ecology. No 6, 1–10. http://www.watertalk.org/wawa/ecosci.html	Opposing view #3: *"Roads may have unavoidable effects on streams, no matter how well they are located, designed or maintained. The sediment contribution to streams from roads is often much greater than that from all other land management activities combined, including log skidding and yarding.' (Gibbons and Salo 1973). Research by Megahan and Kidd in 1972 found that roads built in areas with highly erosive soils can contribute up to 220 times as much sediment to streams as intact forests."* **FS Response:** The citation is a position paper that references a number of studies to support its' position regarding active management on NFS lands. The sections in Cumbres project EIS on Hydrology, Watershed, Aquatics (section 3.9), Fisheries (section 3.5), and Soils (section 3.10) analyze and disclose the impacts of the existing road condition and the selected road reconstruction/maintenance to sediment delivery to adjacent streams.

Author/Date/Title	Response to literature cited in opposing views
Borga, M., Tonelli, F., Fontana, G. Dalla, and Cazorzi, F. 2003. Evaluating the effects of forest roads on shallow landsliding. Geophysical Research Abstracts. Vol. 5, 13312. http://www.cosis.net/abstracts/EAE03/13312/EAE03-J-13312.pdf	Opposing view #4: *"Plot-level studies have demonstrated the ability of forest roads to intercept and route both subsurface and surface overland flow more efficiently to the stream network. Significant amount of subsurface throughflow can be intercepted by the road, as a function of the road cut depth and the current saturation deficit, and then redirected, concentrating the flow in particular areas below the road. Road drainage concentration increases the effective length of the channel network and strongly influences the distribution of erosional processes. The concept of wetness index has been used in the study as a surrogate for subsurface throughflow, and the effect of forest roads on subsurface throughflow rerouting has been assessed by evaluating the changes in terms of draining upslope areas. A threshold model for shallow slope instability has been used to analyse erosional impacts of drainage modifications. In the model, the occurrence of shallow landsliding is evaluated in terms of drainage areas, ground slope and soil properties (i.e., hydraulic conductivity, bulk density, and friction angle). The model has been used to generate hypotheses about the broader geomorphic effect of roads. Modeling results have been compared with available field data collected in north-eastern Italy."* **FS Response:** This paper described the results of a conceptual model used to evaluate the influence of roads on geomorphic processes and to better understand how roads interact with hillslope flow paths and how this influences shallow landslides. The model was implemented and evaluated on four study areas in northern Italy. This study is very difficult to apply to southern Colorado as there is very little relevance of this reference to the proposed project area. The landscape, climate, soils, and geology of Italy are so different that almost no correlation could be reached. The existing roads in the project have been in place since the 1950s to 1960s (EIS, section 3.15). There have been no past landslides due to the relatively gentle terrain. In the EIS, sections 3.9 and 3.10 describe the existing watershed and soils conditions.
Bowling, L.C., Lettenmaier, D.P., Wigmosta, M.S., and Perkins, W.A. Predicting the effects of forest roads on stream flow using a distributed hydrological model. From a poster presented at the fall meeting of the American Geophysica Union. San Francisco CA, December 1996. http://www.ce.washington.edu/~lxb/poster.html [Note: link is not functional]	Opposing view #5: *"A large scale land use experiment has taken place over the last 40 years in the mountainous areas of the northwestern U.S. through timber harvesting. This land use change effects the hydrology of an area through two mechanisms:* • *Clear-cut logging which causes changes in the dynamics of Rain-On-Snow (ROS) events due to changes in the accumulation and ablation of snow caused by vegetation effects on snow interception and melt; and* • *Construction and maintenance of forest roads which channel intercepted subsurface flow and infiltration excess runoff to the stream network more quickly."* **FS Response:** The cited reference could not be located for review. The Cumbres project does not propose any clearcutting. The effects of roads, as related to hydrology, are disclosed in section 3.9 of the EIS.
Brister, Daniel. A Review and Comment on: Forest Service Roads: A Synthesis of Scientific Information, 2nd Draft, USDA Forest Service. "December 1998. Retrieved from WildlandsCPR.com	Opposing view #6: *"Many of the conclusions and assumptions contained in the Roads Report are based on analysis of the positive contributions of roads. Negative socio-economic effects of roads have been, in large part, glossed over. The general view expressed in the Roads Report is that overall, roads make a positive socio-economic contribution."* *"The Socio-Economic Effects section has been constructed to overwhelmingly support the contention that the benefits of roads outweigh the costs. In order to arrive at such a conclusion, however, certain important economic costs and concepts have been omitted."* *"A serious problem with the Roads Report is its lack of discussion concerning the economic costs arising from the negative ecological effects of roads. Despite overwhelming scientific data linking roads and sedimentation (Bennett 1991; Grayson et al. 1993; Lyon 1984; Megahan 1980; McCashion and Rice 1983; Wade 1998; Williams 1998), the socio-economic costs of mitigating the effects of this sedimentation receive no mention in the Roads Report. Such costs are central to and should be included in any socio-economic assessment of forest roads."* **FS Response:** The cited paper is commentary on a national report on scientific information regarding the state of National Forest roads. Addressing these opposing views is outside the scope of the Cumbres project, as they are general in nature and contain no specific information that can be related to the Cumbres project; nor does the commenter demonstrate a specific connection to this project. The NFS roads currently in the project area have been in place since the 1950 to 1960s, no new system roads are proposed under either action alternative. Any temporary roads would be closed and rehabilitated following use. Project Design Criteria and BMPs are used to minimize any adverse effects from road construction or maintenance. Opposing view #7*: "The present road system constitutes a legacy of current and potential sources of damage to aquatic and riparian habitats, mostly through sedimentation, and to terrestrial habitats through fragmentation and increased access" (Amaranthus et all 1985)."* *"The failure of the Report to properly address mitigation costs associated with the ecological effects is a serious problem that needs to be addressed in future drafts. Similarly, passive-use values need to be taken seriously and*

Author/Date/Title	Response to literature cited in opposing views
	considered throughout the Roads Report. In order to rectify these problems, most of the Socio-Economic Effects subsections will have to be reworked. Failing to do so, the Roads Report will paint an incomplete picture of the costs and benefits associated with the Forest Service's road program." **FS Response:** This opposing view is of the same nature and scope as previous opposing views found above. Please also see the FS response to opposing views #4 and #6.
Bunnell, Fred L. Ph.D., Kelly A. Squires and Isabelle Houde. 2004. Evaluating effects of large-scale salvage logging for mountain pine beetle on terrestrial and aquatic vertebrates. Mountain Pine Beetle Initiative Working Paper 1. Canadian Forest Service. http://warehouse.pfc.forestry.ca/pfc/25154.pdf	Opposing view #8*: "Sediment input to freshwater is due to either the slower, large-scale process of soil erosion, or to rapid, localized "mass movements," such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991)."* *"Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981)."* *"More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads."* *"In areas made highly turbid (cloudy) from sedimentation, the foraging ability of adults and juveniles may be inhibited through decreased algal production and subsequent declines in insect abundance, or, for visual-feeding taxa dependent on good light, through their inability to find and capture food. Highly silted water may damage gill tissue and cause mortality or physiological stress of adults and juveniles."* **FS Response:** This opposing view is not useful for comparison to the Cumbres project as the evaluation of the mountain pine beetle salvage logging project in Canada seems to be substantially different in both the forest management practices employed as well as the environmental conditions. The Cumbres project includes Project Design Criteria and Best Management Practice that reduce the potential for sediments to enter streams and protect riparian areas. There are no planned clearcuts and harvest activities would be on slopes less than 40 percent. Any temporary road segments needed for harvest activities will be closed and rehabilitated following use. Effects of the proposed actions are fully disclosed in the EIS in sections 3.5, 3.9, and 3.10.
Burns, James W., "Some Effects of Logging and Associated Road Construction on Northern California Streams." Transactions of the American Fisheries Society, Volume 1, Number 1, January 1972. http://www.fs.fed.us/psw/publications/4351/Burns72.pdf	Opposing view #9:*"The road construction and right-of-way logging were immediately detrimental to most aquatic invertebrates in South Fork Caspar Creek"* *"Salmonid populations decreased immediately after the road construction."* *"Sustained logging and associated road construction over a period of many years do not afford either the stream or the 'fish population a chance to recover."* **FS Response:** In the project referenced in this 40 year old article, 66 km of road were constructed, including four crossings, within 76 meters of the stream. The entire area between the road and stream was logged and dozers disturbed over 41 percent of the stream length in the stream to remove slash and skid trees. Total biomass of invertebrates did not decrease. Recolonization occurred within 2 years and total biomass increased over the control stream (N. Fk Caspar). Salmonid populations recovered to within 20 percent of preconstruction level within 2 years. The author stated that most damage was caused by dozers operating in the stream. Since the time of this publication, Best Management Practices (BMPs) have been implemented to protect stream channels and riparian areas from mechanical disturbance. Table 2-1 outlines the Project Design Criteria and BMPs requirement to minimize disturbance.
de Maynadier, P. D., & Hunter Jr, M. L. 2000. Road effects on amphibian movements in a forested landscape. *Natural Areas Journal*, *20*(1), 56-65. http://www.mendeley.com/research/road-effects-on-amphibian-movements-in-a-forested-landscape/ [Note: hyperlink provided is no longer functional]	Opposing view #11: *"Forest roads apparently can serve as a partial filter to the movements of some amphibian species"* **FS Response:** This paper, for which we could only obtain an abstract, reported on the influence of logging roads on amphibian movements and habitat use in central Maine. The effects of a wide, heavily used logging road surrounded by forest actively managed for industrial production and dominated by regenerating softwoods, were compared to those of a narrower (5 m), less-used forest track. Generally, frog habitat use and movements were unaffected even by the larger road, but the larger road appeared to inhibit movement by salamanders. This paper does not seem to be relevant to the Cumbres project since the research was conducted in very different habitats and on species that do not occur in southern Colorado. The Cumbres EIS did describe the expected effects to Boreal toad and northern leopard frog, both sensitive amphibians. Since the existing road system has been in place for many years and only new temporary roads would be needed for the action alternatives, roads were not identified as a concern in Biological Evaluation summarized in section 3.4 of the EIS.
Dombeck, Mike. 1998. US Forest Service Chief. Remarks to FS	Opposing view #12: *"Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road."*

Author/Date/Title	Response to literature cited in opposing views
employees and retirees at University of Montana, Missoula, Montana. February 20, 1998. https://www.uwsp.edu/cnr/gem/Dombeck/MDSpeeches/CD%20COPY/Chief%20Mike%20Dombeck%27s%20Remarks%20to%20Forest%20Service%20Employees%20and%20.htm	**FS Response:** This speech advocated, in part, for a more carefully managed National Forest transportation system. Specifically: 1) More carefully considered decisions to build new roads, 2) Eliminate old unneeded roads, 3) Upgrade and maintain the roads important to public access, and 4) Develop new and dependable funding for forest road management. The sentiments expressed in this speech have been incorporated as part of the Agency's ongoing Travel Management Process (36 CFR Parts 212, 251, 261, and 295; Federal Register Notice published 11/9/2005) requirements to identify a minimum road system along with unneeded roads considering management objectives in land management plans, statutory requirements, and to reflect long-term funding expectations for road maintenance, which are generally declining. No new system roads planned are planned for Cumbres project that would add to the long-term road maintenance needs. Any temporary roads needed under the Selected Alternative would be closed and rehabilitated following use as described in 3.15 Transportation.
Federal Register: March 3, 2000 Volume 65, Number 43 Page 11675, **"National Forest System Road Management."** http://www.epa.gov/fedrgstr/EPA-GENERAL/2000/March/Day-03/g5002.htm	Opposing view #13: *"Few marks on the land are more lasting than roads."* *"The negative effects on the landscape of constructing new roads, deferring maintenance, and decommissioning old roads are well documented. Unwanted or non-native plant species can be transported on vehicles and clothing by users of roads, ultimately displacing native species. Roads may fragment and degrade habitat for wildlife species and eliminate travel corridors of other species. Poorly designed or maintained roads promote erosion and landslides, degrading riparian and wetland habitat through sedimentation and changes in stream flow and water temperature, with associated reductions in fish habitat and productivity. Also, roads allow people to travel into previously difficult or impossible to access areas, resulting in indirect impacts such as ground and habitat disturbance, increased pressure on wildlife species, increased litter, sanitation needs and vandalism, and increased frequency of human-caused fires."* **FS Response:** The statement in its entirety was: *"Few marks on the land are more lasting than roads. Yet, forest roads are essential for forest use and often serve as the backbone of rural transportation networks."* The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EIS. See the FS response to #12.
Forest Service - Southern Research Station Eastern Forest Environmental Threat Assessment Center. "**Forest Fragmentation and Roads**" retrieved at http://www.forestthreats.org/products/su-srs-018/fragmentation	Opposing view #14: *"Fragmentation caused by roads is of special interest because the effects of roads extend tens to hundreds of yards from the roads themselves, altering habitats and water drainage patterns, disrupting wildlife movement, introducing exotic plant species, and increasing noise levels. The land development that follows roads out into rural areas usually leads to more roads, an expansion process that only ends at natural or legislated barriers."* **FS Response:** The provided link is to a webpage for the USDA Forest Service Eastern Forest Environmental Threat Assessment Center (EFETAC). The site is a one page abstract of an analysis completed by Forest Health Monitoring regarding the modeling of forests across the U.S and nearness of roads. It appears to consider both private forested areas as well as federally managed forests. It is broad scale and general in nature. The paper provided neither site-specific nor species-specific information relative to the Cumbres project. Please also see RS response to comment #1.
Forman, Richard T. and Lauren E. Alexander "**Roads and their Major Ecological Effects**" *Annual Review of Ecology and Systematics*, Vol. 29: 207-231, November 1998 http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.ecolsys.29.1.207?cookieSet=1&journalCode=ecolsys.1	Opposing view #15: *"A huge road network with vehicles ramifies across the land, representing a surprising frontier of ecology. Species-rich roadsides are conduits for few species. Road kills are a premier mortality source, yet except for local spots, rates rarely limit population size. Road avoidance, especially due to traffic noise, has a greater ecological impact. The still-more-important barrier effect subdivides populations, with demographic and probably genetic consequences. Road networks crossing landscapes cause local hydrologic and erosion effects, whereas stream networks and distant valleys receive major peak-flow and sediment impacts. Chemical effects mainly occur near roads. Road networks interrupt horizontal ecological flows, alter landscape spatial pattern, and therefore inhibit important interior species. Thus, road density and network structure are informative landscape ecology assays. Australia has huge road-reserve networks of native vegetation, whereas the Dutch have tunnels and overpasses perforating road barriers to enhance ecological flows. Based on road-effect zones, an estimated 15–20% of the United States is ecologically impacted by roads."* **FS Response:** The above quote is from the abstract of the cited article. The article is a summary of a variety of examples from several countries of roadside ecology and the effects of different types or classes of roads. Forest roads were discussed as a subset (pg. 16) with potential effects such as habitat loss, water routing, erosion/sedimentation, altered species patterns, and human access into remote areas. The article is general in nature. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EIS.

Author/Date/Title	Response to literature cited in opposing views
Franklin, Jerry Ph.D., David Perry Ph.D., Reed Noss Ph.D., David Montgomery Ph.D. and Christopher Frissell Ph.D. 2000. Simplified Forest Management to Achieve Watershed and Forest Health: A Critique. National Wildlife Federation Report. http://www.coastrange.org/documents/forestreport.pdf	Opposing view #16: *"Questions to consider: Roads dramatically alter forest ecosystems"* *1. Does the management prescription account for the ecological effects of the road construction and maintenance activities associated with carrying out such activities?* *2. Have alternatives to road building been considered? How does the plan attempt to address the effects of roads?" (page 37)* **FS Response:** The ecological effects of temporary road construction and the maintenance/reconstruction of system roads are thoroughly analyzed in the applicable resource sections of Chapter 3 of the EIS.
Frey, David "Logging Won't Halt Beetles, Fire, Report Says" NewWest.net, 3-03-10 http://www.newwest.net/topic/article/logging_wont_halt_beetles_fire_report_says/C41/L41/	Opposing view #17: *"The authors warned that cutting roads into current roadless areas could bring much more harm to wildlife, soil and fisheries than the beetle-killed trees pose to the forest."* **FS Response:** The link provided is to a website article regarding a report released about logging pine bark beetle-killed trees in western states. The article is not detailed. The current understanding of the effects of bark beetles on fire behavior is summarized in the Cumbres EIS in section 3.12. There are no activities proposed in roadless areas in the Cumbres project.
Furniss, Michael J., Michael Love Ph.D. and Sam A. Flanagan "Diversion Potential at Road-Stream Crossings." USDA Forest Service. 9777 1814—SDTDC. December 1997. http://www.stream.fs.fed.us/water-road/w-r-pdf/diversionpntl.pdf	Opposing view #18: *"Rarely can roads be designed and built that have no negative impacts on streams. Roads modify natural drainage patterns and can increase hillslope erosion and downstream sedimentation. Sediments from road failures at stream crossings are deposited directly into stream habitats and can have both on-site and off-site effects. These include alterations of the channel pattern or morphology, increased bank erosion and changes in channel width, substrate composition, and stability of slopes adjacent to the channels."* *"All of these changes result in important biological consequences that can affect the entire stream ecosystem. One specific example involves anadromous salmonids, such as salmon and steelhead, that have complex life histories and require suitable stream habitat to support both juvenile and adult life stages."* *"A healthy fishery requires access to suitable habitat that provides food, shelter, spawning gravel, suitable water quality, and access for upstream and downstream migration. Road-stream crossing failures have direct impacts on all of these components."* **FS Response:** Water quality and the effects of roads on sedimentation, drainage network, change in peak flows, and slope stability were analyzed and are found in section 3.9 of the Cumbres EIS. All proposed activities would follow proven Best Management Practices and Project Design Criteria. Discussion regarding effects on fisheries and aquatic habitat are described is in the EIS in sections 3.5 and 3.9. There are no anadromous fisheries in the Cumbres project area.
Gable, Eryn. Battling Beetles may not Reduce Forests Risks. Land Letter, March 4, 2010. http://www.xerces.org/2010/03/04/battling-beetles-may-not-reduce-fire-risks-report/	Opposing view #19: *"Barry Noon, a professor of wildlife ecology at Colorado State University, noted that scientific research has consistently shown the adverse effects of roads on hydrologic processes and fish and wildlife populations.* *"One of the key things to recognize is the effects of the roads extend far beyond their immediate footprint," Noon said. For example, "in terms of hydrology, the roads are leading to faster runoff of water, often with great increases in sedimentation, particularly following storm events, and roads in watersheds often lead to increases in the intensity of floods." "* *These changes degrade fish habitat because of the increased sedimentation that leads to decreases in water quality, Noon said. And roads fragment wildlife habitat and create areas that animals avoid, often as result of increased hunting, he said."* **FS Response:** The cited article discusses a recent report addressing the mountain pine beetle epidemic in Colorado and how best to manage forests in the context of limited funding and roadless area designations. Please see response to opposing views #8, #11 and #12 for information on how transportation and road management was considered in the Cumbres project area for affecting wildlife and wildlife habitat and opposing views #2, #3, #6, and #18 for affecting water quality and aquatic organisms.
Grace, Johnny M. III Ph.D. 2003. "Minimizing the impacts of the forest road system." In: Proceedings of the conference 34 international erosion control association; ISSN 1092-2806. International Erosion Control Association: 301-310. http://www.srs.fs.usda.gov/pubs/ja/ja_grace011.pdf	Opposing view #20: *"Roads and skid trails have been identified as a major contributor to increased turbidity of water draining logging areas resulting in increases from 4 to 93 parts per million (Hoover, 1952). Forest roads have been found to have erosion rates from one to three orders of magnitude greater than similar undisturbed areas (Megahan, 1974) and perhaps account for as much as 90 percent of all forest erosion (Megahan, 1972). Forest roads can also cause soil erosion and stream sedimentation, which adversely impact on the nation's water quality (Authur et al., 1998).* **FS Response:** The opposing view cites several very old research articles that formed the basis for the modern Best Management Practices utilized today. Some of the erosion control techniques advocated in the research publication are Best Management Practices or Project Design Criteria used in R2 and in the Cumbres project.

Author/Date/Title	Response to literature cited in opposing views
Gucinski, Hermann Ph.D., Michael J. Furniss, Robert R. Ziemer Ph.D. and Martha H. Brookes, Editors. 2001. **"Forest Roads: A Synthesis of Scientific Information."** USDA Forest Service, General Technical Report *PNW-GTR-509*. http://www.fs.fed.us/pnw/pubs/gtr509.pdf	Opposing view #21: *"Roads have well-documented, short- and long-term effects on the environment that have become highly controversial, because of the value society now places on unroaded wildlands and because of wilderness conflicts with resource extraction."* *"(Road) consequences include adverse effects on hydrology and geomorphic features (such as debris slides and sedimentation), habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, degraded water quality and chemical contamination, degraded aquatic habitat, use conflicts, destructive human actions (for example, trash dumping, illegal hunting, fires), lost solitude, depressed local economies, loss of soil productivity, and decline in biodiversity."* **FS Response:** PNW-GTR-509 describes the effects roads have on ecosystems. It is a companion paper to "*Roads Analysis: Informing Decisions About Managing the National Forest Transportation System"* (USDA FS 1999). The report details the known issues related to road impacts on physical and biological resources, road impacts at various scales, and the socio- economics of roads. The report then describes the known science surrounding these issues. The focus of the report is to help the reader understand how roads function in the landscape. The concepts discussed in the opposing view are all well understood by the ID Team and those that seemed relevant to the Cumbres project area were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EIS.
Hann, W.J. et al. 1997 Landscape dynamics of the Basin. Pp. 337-1,055 in: Quigley, T.M. and S.J. Arbelbide (eds.) An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins: Volume II. USDA Forest Service, PNW-GTR-405 http://www.fs.fed.us/pnw/pubs/gtr405/pnw_gtr405aa.pdf	Opposing view #22: *"Fires in the roaded areas are more intense, due to drier conditions, wind zones on the foothill/valley interface, high surface-fuel loading, and dense stands."* **FS Response:** A thorough review of PNW-GTR-405, *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins: Volume II* revealed the opposing view quote is not contained in the document. Further, the author (Robert Keane) of the section most likely to contain the quote, *Trends and Ecology of Wildland Fire*, confirmed in personal communication that the quote would not be found in the Columbia Basin assessment as the use of the term "intense" is incorrect and should have been "severe." A response to this opposing view is not possible without an understanding of the context to which the quote is attributed.
Haskell, David G. Ph.D. 1999 "Effects of Forest Roads on Macroinvertebrate Soil Fauna of the Southern Appalachian Mountains. Conservation Biology, Vol. 14, No. 1 (Feb., 2000), pp. 57-63. http://www.jstor.org/stable/2641904	Opposing view #23: "*Many forested landscapes are fragmented by roads, but our understanding of the effects of these roads on the function and diversity of the surrounding forest is in its infancy. I investigated the effect of roads in otherwise continuous forests on the macroinvertebrate fauna of the soil. I took soil samples along transects leading away from the edges of unpaved roads in the Cherokee National Forest in the Southern Appalachian mountains of the United States. Roads significantly depressed both the abundance and the richness of the macroinvertebrate soil fauna. Roads also significantly reduced the depth of the leaf-litter layer. These effects persisted up to 100 m into the forest. Wider roads and roads with more open canopies tended to produce steeper declines in abundance, richness, and leaf-litter depth, but these effects were significant only for canopy cover and litter depth. The macroinvertebrate fauna of the leaf litter plays a pivotal role in the ability of the soil to process energy and nutrients. These macroinvertebrates also provide prey for vertebrate species such as salamanders and ground-foraging birds. The effect of roads on the surrounding forest is compounded by the sprawling nature of the road system in this and many other forests. My data suggest that even relatively narrow roads through forests can produce marked edge effects that may have negative consequences for the function and diversity of the forest ecosystem."* **FS Response:** This study took place in Tennessee in the Southern Appalachian Mountains with hardwood tree species; a substantially different ecosystem than that of the project area. The type of leaf litter produced and the macroinvertebrates found in Tennessee is not comparable to the spruce-fir coniferous forests of the southern Rocky Mountains in Colorado. In summary, the author found that roads significantly depressed the abundance and diversity of macroinvertebrates, due to a reduction in leaf litter. This opposing view is not relevant to the Cumbres project. Though we do not inventory macroinvertebrates as a matter of course in field surveys, complying with the R2 Soil Quality Standards would limit litter layer disturbance within the proposed harvest units. The effects of temporary roads were considered in the analysis by the applicable resource specialists in Chapter 3 of the EIS.
Hawbaker, Todd J., Volker C. Radeloff, Murray K. Clayton, Roger B. Hammer, and Charlotte E. Gonzalez-Abraham 2006. Road Development, Housing Growth, And Landscape Fragmentation In Northern Wisconsin: 1937–1999. Ecological Applications 16:1222 http://www.esajournals.org/doi/abs/10.1890/1051-0761%282006%29016%5B1222%3ARDHGAL%5D2.0.CO%3B2?journalCode	Opposing view #24: "*Roads remove habitat, alter adjacent areas, and interrupt and redirect ecological flows. They subdivide wildlife populations, foster invasive species spread, change the hydrologic network, and increase human use of adjacent areas. At broad scales, these impacts cumulate and define landscape patterns."* **FS Response:** This reference is a scientific journal article that looks at the dynamics of road networks over time and how they impact landscape patterns. More specifically, the study looked at relationships between road density changes, development, and landscape patterns, focusing on housing development. From a wildlife standpoint, the reference mentions in a broad context roads as sources of habitat fragmentation, spread of invasive species, and increased human use or presence. The environmental effects of the existing road system and the selected segments of new construction were

Author/Date/Title	Response to literature cited in opposing views
=ecap	thoroughly considered in Chapter 3 of the EIS. The concepts discussed in the opposing view are all well understood by the ID. Please also see the FS response to opposing view #1.
Ivins, Molly. 1997. Creators Syndicate, opinion piece. August 3, 1997. http://www.creators.com/opinion/molly-ivins/molly-ivins-august-3-1997-08-03.html	Opposing view #25: *"Last winter was unusually wet in the Pacific Northwest. The result was landslides all over caused by logging roads; five people died, spawning streams were ruined, water supplies were contaminated and the flooding was tremendously aggravated. According to David Bayles, conservation director of the Pacific Rivers Council, aerial surveys documented more than 650 landslides in February in Washington and Oregon alone. The stupidest and most dangerous practice is allowing logging roads on steep slopes — that's really asking for it.* *You may ask yourself why the taxpayers are expected to pony up to build roads for profitable logging companies. Build roads for the timber companies in order to stimulate the U.S. logging, paper and building industries. There's just one problem. A lot of U.S. logs get shipped overseas, mostly to Japan. We're actually subsidizing Japanese companies while doing terrible damage to our environment and not helping the U.S. job scene much except when it comes to cutting* *Start with the assumption that the U.S. Forest Service a component of the Department of Agriculture, is simply an auxiliary branch of the timber industry and you'll pretty much have the picture of what's going on. Last winter, the Forest Service refused a bid at a timber auction from an environmentalist who wanted to save, not harvest, a stand of evergreens in the Okanogan National Forest in Washington. Instead, the Forest Service accepted a bid of $15,000 from a logging company that cut 3.5 million board-feet of lumber in that stand. Try to find a price like that at Home Depot."* **FS Response:** This article was an opinion piece written over 16 years ago. The geomorphology and climate of the Pacific Northwest are very different from that of the Cumbres project area. Soils in the Cumbres project area are considered stable due to the relatively gentle slopes (EIS, section 3.10). As to exporting logs overseas, 36 CFR 223.188 (Prohibitions against exporting unprocessed Federal timber) specifically prohibits the exporting of unprocessed federal timber: *No person who acquires unprocessed timber originating from Federal lands west of the 100th meridian in the contiguous 48 States may export such timber from the United States, or sell, trade, exchange, or otherwise convey such timber to any other person for the purpose of exporting such timber from the United States. This prohibition does not apply to specific quantities of grades and species of such unprocessed Federal timber that the Secretary of Agriculture determines to be surplus to domestic manufacturing needs.* The environmentalist who bid on a timber sale on the Okanogan National Forest defaulted on the contract when he was not able to comply with the terms of the contract.
Jones, Julia A. Ph.D., Frederick J. Swanson Ph.D. Beverley C. Wemple Ph.D., and Kai U. Snyder. "Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks." *Conservation Biology* 14, No. 1. 2000. http://www.jstor.org/stable/2641906	Opposing view #26: *"Although disturbance patches are created by peak flow and debris flow disturbances in mountain landscapes without roads, roads can alter the landscape distributions of the starting and stopping points of debris flows, and they can alter the balance between the intensity of flood peaks and the stream network's resistance to change."* **FS Response:** The impacts of roads in mountain landscapes on peak flows are well understood by the project hydrologist and documented in section 3.9 of the EIS. Debris flows of any size are a rare occurrence in the high elevation streams of the Cumbres project area due to the relatively small size of the streams and stream buffers are used to protect riparian areas and unnatural debris input.
Kahklen, Keith. **"A Method for Measuring Sediment Production from Forest Roads."** Pacific Northwest Research Station, USDA Forest Service. Research note *PNW-RN-529*, April 2001. http://www.fs.fed.us/pnw/pubs/rn529.pdf	Opposing view #27: *"In the Pacific Northwest, the two main processes that contribute to sediment production are mass failure and surface erosion from forest roads (Fredriksen 1970, Reid and Dunne 1984). In the Clearwater River basin in the State of Washington, as much as 40 percent of the sediment produced in the watershed was attributed to logging roads (Reid 1980).* **FS Response:** This literature is an excellent source of data for analyzing effects of roads in the Pacific Northwest; however the terrain and climate are considerably different that of the project area. Additionally, the opposing view cites several very old research articles that formed the basis for the modern Best Management Practices utilized today. Some of the erosion control techniques advocated in the research publication has been included in Best Management Practices used in R2 and in the Cumbres project. Sections 3.9 and 3.10 of the EIS discuss Hydrology and Soils for the project area.
Karr, James R. Ph.D., Christopher A. Frissell Ph.D., Jonathan J. Rhodes, David L. Perry Ph.D. and G. Wayne Minshall Ph.D. Excerpt from a letter to the Subcommittee on Forests & Forest Health U.S. House of Representatives. 3 July, 2002. http://www.nativeforest.org/campaigns/wildfi	Opposing view #28: *"It is indisputable that roads are one of the greatest threats to the ecological integrity of forested systems and associated river, wetland, lake, and coastal ecosystems. Yet, the USFS has failed to adopt a policy that mandates reversing the worst ecological effects of roads, or that precludes incursion of roads into roadless areas. Despite widespread recognition of these facts, the USFS diverts staff and money to extraordinarily costly salvage logging projects at the expense of reducing the extent of the road network or undertaking needed fine-fuels reductions in unburned forests."* **FS Response:** The referenced document is excerpt from a letter, which is a rebuttal to the Forest Service Chiefs' testimony regarding the "Beschta report" which pertains to post-fire salvage logging. The opposing view has no

Author/Date/Title	Response to literature cited in opposing views
re_info_center/letter_from_beschta.htm [Link does not function]	relevance to the Cumbres project as the project does not include fire salvage operations, nor does it include treatments in roadless areas.
Lawren, Bill 1992 "Singing the Blues for Songbirds: Bird lovers lament as experts ponder the decline of dozens of forest species" *National Wildlife* http://www.nwf.org/News-and-Magazines/National-Wildlife/Birds/Archives/1992/Singing-the-Blues-for-Songbirds.aspx	Opposing view #29: *"Forest fragmentation, as scientists call the intentional felling of woodland, is actually two processes. In populated areas such as the Atlantic seaboard, it means reduction in the size of forest tracts, usually due to suburbanization and development. In less inhabited areas--northern New England, for example--forest fragmentation refers to isolation of one patch of forest from another by logging, or by the building of roads or power lines."* **FS Response:** This reference is an article giving a synopsis of evidence and research showing declines in songbirds at regional scales in response to forest fragmentation. The reference is not current and does not provide best available science or specific information related to the Cumbres project; nor does the commenter demonstrate a specific connection to this project. Potential effects to Management Indicator Species, some of which are songbirds and migratory birds are disclosed in section 3.4 of the EIS. Please refer to the FS responses to opposing views #1 and #3.
Lowe, Kimberly Ph.D.,"Restoring Forest Roads." A Northern Arizona University Ecological Restoration Institute publication *Working Paper 12*. June, 2005. http://www.eri.nau.edu/en/information-for-practitioners/restoring-forest-roads	Opposing view #30: *"The compaction of forest road soils is known to reduce aeration, porosity, infiltration rates, water movement, and biological activity in soils. Research indicates that soil bulk density, organic matter, moisture, and litter depths are much lower on roads than on nearby forest lands. Macropores, which provide soil drainage and infiltration, have been shown to significantly decrease in size as a result of road construction and use. Reduced infiltration and increased compaction promote soil erosion, especially during the seasonal southwestern monsoon rains (Elseroad 2001)."* *"Physical disturbances caused by road construction and vehicle use create ideal conditions for colonization by invasive exotic plant species. The use of roads by vehicles, machinery, or humans often aids the spread of exotic plant seeds. Once established, they can have long-term impacts on surrounding ecosystems and can be difficult to remove."* *"Roads are known to cause habitat fragmentation. Many create ecological 'edges' with different plant species, light levels, and hiding cover, all of which may alter animal survival, reproductive success, and movement patterns. The introduction of exotic plants can disrupt the availability of native vegetation used by wildlife for food and shelter (Trombulak and Frissell 1999)."* *"Forest roads often develop a water-repellent soil layer caused by lack of vegetative cover and changes in soil composition. This can substantially influence how runoff is processed. Erosion, the formation of water channels beside the road, and increased sediment loads in nearby streams are common results of this process (Baker 2003)."* *"Because they provide easier access to many forest tracts, forest roads often allow more human-caused fires to be ignited."* **FS Response:** The cited reference looks at the dynamics of road networks over time and how they impact landscape patterns. More specifically, the study looked at relationships between road density changes, development, and landscape patterns, focusing on housing development. From a wildlife standpoint, the reference mentions in a broad context that roads can contribute to habitat fragmentation, the spread of invasive species, and increased human use or presence. The Soils section of Chapter 3 of the EIS and the Region 2 Forest Service Manual for Soil Management both acknowledge a forest road experiences changed properties of reduced aeration, porosity, infiltration rates, water movement, and biological activity. A water-repellent layer caused by lack of vegetative cover and changes in soil composition is common and expected. Forest Service system roads are not considered part of the productive vegetative land base and function of the road surface for the qualities described in the opposing view are not managed for or included in Forest Plan outputs. Please see response to opposing view #1 for more specifics on how effects to wildlife and wildlife habitat were addressed in the EIS. The invasive plant and wildland fire ignition concepts discussed in the opposing view are all well understood by the ID Team and were considered in the analysis.
Luce, Charles H. Ph.D., 2002. "Hydrological processes and pathways affected by forest roads: what do we still need to learn?" Hydrologic Processes: 16(14), 2901–2904. http://www.fs.fed.us/rm/boise/teams/soils/Publications/Luce%202002%20HP.pdf	Opposing view #31: *"Almost everywhere people live and work they build and use unimproved roads, and wherever the roads go, a range of environmental issues follows."* *"Among the environmental effects of unimproved roads, those on water quality and aquatic ecology are some of the most critical. Increased chronic sedimentation, in particular, can dramatically change the food web in affected streams and lakes."* *"The nearly impervious nature of road surfaces (or treads) makes them unique within forested environments and causes runoff generation even in mild rainfall events, leading to chronic fine sediment contributions."* *"If we look at the issue of what we need to learn or the research priorities for forest road hydrology, I would argue*

Author/Date/Title	Response to literature cited in opposing views
[Link does not function]	*that the areas of cutslope hydrology and effectiveness of restoration efforts are perhaps most critical."* *"At a few sites in the mountains of Idaho and Oregon a substantial portion of the road runoff (80–95%) came from subsurface flow intercepted by the cutslope (Burroughs et al., 1972; Megahan, 1972; Wemple, 1998)."* **FS Response:** This commentary piece on forest road hydrology was written to call for prioritizing research in the areas of the effects of roads on hillslope hydrological functions and on the effectiveness on eliminating the effects of roads during restoration activities. Since this commentary was written, a considerable amount of research has been conducted and published regarding hillslope hydrology and forest roads. The conditions and additional information on the existing roads are described in sections 3.9 and 3.15 of the EIS.
Maholland, Becky and Thomas F. Bullard Ph.D., "Sediment-Related Road Effects on Stream Channel Networks in an Eastern Sierra Nevada Watershed." Journal of the Nevada Water Resources Association, Volume 2, Number 2, Fall 2005. http://www.nvwra.org/docs/journal/vol_2_no_2/NWRAjournal_fall2005_article4.pdf [Link is not functional]	Opposing view #32: *"Roads in the watershed contribute to sediment production by concentrating runoff, thereby increasing sediment load to the stream network. Most unimproved (dirt) roads connect either directly or indirectly with streams and, therefore, act as extensions of stream networks by effectively increasing watershed drainage density and subsequently sediment loads to streams. In the South Fork subwatershed of Squaw Creek, road connectivity has resulted in an increase in effective drainage density of approximately 250%. Throughout the Squaw Creek watershed, it is estimated that dirt roads potentially contribute as much as 7,793 metric tons/year to the watershed sediment budget."* **FS Response:** This reference could not be located for review, so it could not be evaluated.
Malecki, Ron W. "A New Way to Look at Forest Roads: the Road Hydrologic Impact Rating System (RHIR)" The Road-RIPorter, Autumn Equinox, 2006 http://www.wildlandscpr.org/files/uploads/RIPorter/rr_v11-3.pdf	Opposing view #33: *"One of the greatest impacts of roads and (especially motorized) trails is their effect on the hydrology of natural landscapes, including the flow of surface and ground water and nutrients. These hydrologic effects are responsible for changes to geomorphic processes and sediment loads in roaded areas (Luce and Wemple 2001)." (pg. 12)* **FS Response:** The above quote is from a two page article describing a "Road Hydrologic Impact Rating System (RHIR)" apparently developed by the author to assess road impacts. Variables that are measured include width, gradient, cut & fill slope gradient, surface material, surface, and type of use. This rating system is not used by the Forest, but the condition and effects of the road system in the Cumbres project area are described in sections 3.5, 3.9, and 3.14 in the EIS.
McCashion, J. D. and R. M. Rice Ph.D. 1983. "Erosion on logging roads in northwestern California: How much is avoidable?" Journal of Forestry 81(1): 23-26. http://www.fs.fed.us/psw/rsl/projects/water/McCashion.pdf	Opposing view #34: *"A study was made on 344 miles of logging roads in northwestern California to assess sources of erosion and the extent to which road-related erosion is avoidable. At most, about 24 percent of the erosion measured on the logging roads could have been prevented by conventional engineering methods. The remaining 76 percent was caused by site conditions and choice of alignment. On 30,300 acres of commercial timberland, an estimated 40 percent of the total erosion associated with management of the area was found to have been derived from the road system."* **FS Response:** This 30 year old research paper was prepared in a time before modern Best Management Practices had been developed, tested, and proved to provide superior reductions in sediment delivery to streams. Papers like this are useful in that they formed the basis for the modern Best Management Practices utilized today. The BMPs and PDC are effective at minimizing erosion. .
McFero III, Grace, J. "Sediment Plume Development from Forest Roads: How are they related to Filter Strip Recommendations?" An ASAE/CSAE Meeting Presentation, Paper Number: 045015, August 1-4, 2004 http://www.srs.fs.usda.gov/pubs/ja/ja_grace017.pdf	Opposing view #35: *"Research has shown that roads can have adverse impacts on the water quality on the forest landscape (Authur et al. 1998; Binkley and Brown 1993; Megahan et al. 1991). The forest road system has been identified by previous research as the major source of soil erosion on forestlands (Anderson et. al 1976; Patric 1976; Swift 1984; Van Lear et al. 1997). Furthermore, roads are cited as the dominant source of sediment that reaches stream channels (Packer 1967; Trimble and Sartz 1957; Haupt 1959)."* **FS Response:** The referenced material discusses the effects of filter strips and their use to control sedimentation. The study was completed in Alabama and Georgia, which have substantially different soils, climate, and forest conditions. They also have different road building practices that are unique from how the Forest Service builds and maintains roads in Colorado. Filter strips are an integral part of some Best Management Practices utilized on forest roads.
McGarigal, Kevin Ph.D., William H. Romme Ph.D. Michele Crist Ph.D. and Ed Roworth Ph.D. "Cumulative effects of roads and logging on landscape structure in the San Juan Mountains, Colorado (USA)" Landscape Ecology, Volume 16, Number 4 / May, 2001 http://www.springerlink.com/content/w12557624742tv77/	Opposing view #36: *"Overall, roads had a greater impact on landscape structure than logging in our study area. Indeed, the 3-fold increase in road density between 1950–1993 accounted for most of the changes in landscape configuration associated with mean patch size, edge density, and core area."* **FS Response:** This paper investigated changes in landscape structure resulting from roads and logging activity since the 1950s in the southern Rocky Mountains on the San Juan National Forest (SJNF). This paper also states: "*We investigated the magnitude of change in landscape structure resulting from roads and logging since the onset of timber harvest activities in 1950. We found limited evidence for significant impacts in our study area when all lands within the landscape were considered*." The paper makes a distinction between the impacts of roads and timber harvest at different scales and at areas of different management emphasis. This reference also includes a discussion about how not all sediment sources from roads can be avoidable.

Author/Date/Title	Response to literature cited in opposing views
	The history and management of the SJNF and the Rio Grande NF are broadly similar, since they share a border along the Continental Divide and both forests have large acreages of wilderness and roadless areas. As stated in the article, the most notable changes in forest structure were in the lands included as part of the suitable timber base. These effects were considered as part of the forest planning process and addressed in the Forest Plan and FEIS (1996). At the time of this study (1999) the spruce beetle epidemic had not begun, so the authors were discussing the effects of roads in the context of the large acreages of mature spruce/fir forests, which has changed rapidly over last several years. At the project level scale, the existing road system and proposed temporary roads are addressed by resource specialists in chapter 3 of the EIS. In general, negative road-stream interactions are minor and streams and riparian areas are in good conditions. The Hydrology, Watershed, Aquatics- section 3.9 of the EIS describes the current road system sources of sediment and describes the expected effects of implementing either action alternative
McLellan, Bruce N. "Relationships between Human Industrial Activity and Grizzly Bears" Bears: Their Biology and Management, Vol. 8 International Conference on Bear Research and Management February 1989 (1990), pp. 57-64 http://www.bearbiology.com/fileadmin/tpl/Downloads/URSUS/Vol_8/McClellan_8.pdf	Opposing view #37: "*Road construction in remote areas appears to be the major long term impact of resource extraction industries and the most significant problem facing grizzly bears in most locations. Open roads are an influence in all 5 ways that people affect bears. Vehicles on roads can harass bears, displace them from quality habitats, and cause reduced bear use of altered habitats, such as cutting units. Bears that are displaced from roads may cause social disruption in areas away from roads. Finally, roads permit access for many people and some of these will shoot bears." (Pg. 62)* **FS Response:** This paper reports one of many studies that 1) have documented grizzly bear avoidance and displacement from areas with human presence and that 2) have concluded that human-caused mortality is a primary cause of death for adult grizzly bears. This study has little relevance to the Cumbres project, since grizzly bears are not known to occur in southern Colorado.
Megahan, Walter F. Ph.D. "Predicting Road Surface Erosion from Forest Roads in Washington State" from a presentation presented at the 2003 Geological Society of America meeting. http://gsa.confex.com/gsa/2003AM/finalprogram/abstract_67686.htm	Opposing view #38: "*Erosion from forest roads can be a large source of sediment in watersheds managed for timber production.*" **FS Response:** This presentation was not about deleterious effects of sedimentation of rivers but details the SEDMODL and an updated Washington Road Surface Erosion Model which is not used in R2. Responses to opposing views regarding sediment production from forest roads are found throughout this document. Please see the responses to opposing views #3 and #18. The impacts of roads in mountain landscapes on sediment production to streams is well understood by the project hydrologist and well documented in the section 3.9 of the EIS.
Montgomery, David Ph.D., Statement at a Press Conference with Senator Robert Torricelli about S. 977 and HR 1376), the Act to Save America's Forests April 28, 1998, U.S. Capitol http://www.saveamericasforests.org/news/ScientistsStatement.htm	Opposing view #39: "*Today, addressing the adverse impacts of forest roads is consistently identified as one of the highest watershed restoration priorities in U.S. forests—in many forested watersheds in the western United States there is a greater road density than stream density. It is simply irrational to spend millions of dollars subsidizing further forest road construction when we are simultaneously spending millions of dollars to offset detrimental effects associated with similar actions in the past.*" **FS Response:** The cited letter is statements made by the five scientists in support of the Act to Save America's Forests, which did not pass into law. This opposing view is beyond the scope of project level planning such as the Cumbres project as the view more directed at national level budgetary priority setting. See FS Response to #12.
Noss, Reed F., Ph.D. 1995. "The Ecological Effects of Roads or the Road to Destruction" Wildlands CPR http://www.wildlandscpr.org/ecological-effects-roads	Opposing view #40: "*Nothing is worse for sensitive wildlife than a road. Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity - habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting - are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as access corridors that encourage development, logging and poaching of rare plants and animals.*" *"Most public agencies disregard the ecological impacts of roads, and attempt to justify timber roads as benefiting recreation and wildlife management. Even when a land manager recognizes the desirability of closing roads, he or she usually contends that such closures would be unacceptable to the public."* *"The Forest Service and other public agencies will claim that road closures, revegetation, and other restorative measures are too expensive to be implemented on a broad scale. But much of the approximately $400 million of taxpayers' money squandered annually by the Forest Service on below-cost timber sales goes to road-building. Road maintenance is also expensive. Virtually all of this money could be channeled into road closures and associated habitat restoration. This work would be labor-intensive, and providing income to the many laid off loggers, timber sale planners, and road engineers -- for noble jobs, rather than jobs of destruction!"* **FS Response:** The cited reference is an opinion piece that discusses the effects of all roads in general and potential mitigation measures to reduce the effects. Many of the effects discussed in this paper are those associated with paved, well-maintained, high-speed roads. However, it is recognized that lower-standard, unpaved Forest roads can have effects as well. Specifically, the article addresses the following potential road-related impacts: road kill, road

Author/Date/Title	Response to literature cited in opposing views
	aversion, isolation of populations, barriers, negative edge effects, invasive weeds, loss of forest interior habitats, brown-headed cowbird parasitism, human access, poaching, collisions, snag removal, and increases in fire ignitions. In a section titled Impacts on Terrestrial Habitat, the article states that *"A narrow logging road with no maintained verge would not be expected to generate substantial edge effects, particularly if surrounded by a tall forest canopy. In this sense, the road would not differ much from a hiking trail (even trails create some edge effects, however, such as invasion of weedy plants caused by pant- legs dispersal). As forest roads are 'improved,' road clearance increases and allows more penetration of sunlight and wind. Edge species are then attracted to these openings. Two-lane roads with maintained rights-of-way and all interstate highways are lined by edge habitat. A forest criss-crossed by improved roads may be largely edge habitat, and its value for conservation of native flora and fauna diminished accordingly."* This rationale acknowledges that small forest roads typically have much less of an impact on wildlife than larger, higher-volume road systems. The ID Team wildlife biologist is well aware of the effects of forest roads on wildlife habitat. Please see the FS response to opposing view #1. In response to the third paragraph of this opposing view regarding national level transportation policy, please see the FS response to opposing view #12.
Ortega, Yvette K.; Capen, David E. 1999. "Effects of forest roads on habitat quality for Ovenbirds in a forested landscape" Auk. 116(4): 937-946. http://www.fs.fed.us/rm/pubs_other/rmrs_1999_ortega_y001.html	Opposing view #41: "*Numerous studies have reported lower densities of breeding Ovenbirds (Seiurus aurocapillus) adjacent to forest edges. However, none of these studies has considered habitat use and reproductive success to address mechanisms underlying the observed pattern, and most were conducted in fragmented landscapes and ignored juxtapositions of forest with narrow openings such as roads. We studied the influence of forest roads on Ovenbird density in an extensively forested region of Vermont, evaluating habitat use and reproductive success relative to mechanisms proposed to explain the density-edge relationship. Territory densities on seven study plots were 40% lower within edge areas (0 to 150 m from unpaved roads) than within interior areas (150 to 300 m from roads). We simulated the distribution of Ovenbird territories and concluded that passive displacement, where birds perceive habitat interfaces as boundaries and limit their territories entirely to forest habitat, did not account for the observed density-edge pattern. Territory size was inversely related to distance from roads, providing an alternative explanation for reduced densities near edges and suggesting that habitat quality was higher away from roads. Pairing success was lower within edge areas than within interior zones, but the difference was not statistically significant. The proportion of males that produced fledglings did not differ between edge and interior areas. We conclude that habitat quality for Ovenbirds may be lower within 150 m of unpaved roads in extensive forested landscapes, affecting territory density and possibly reproductive success."* **FS Response:** The referenced journal article analyzed the effects of roads and associated edge effects on ovenbird populations. The document concluded that "*habitat quality for ovenbirds may be lower within 150 m of unpaved roads in extensive forested landscapes, affecting territory density and possibly reproductive success."* Effects to the ovenbird (*Seiurus aurocapillus*) were not analyzed in the Cumbres project as the species is not found on the Rio Grande National National Forest. However, the focus of this document is primarily the negative edge effects of roads on forest interior species. The wildlife effects in section 3.4 of the EIS adequately analyze the issue of fragmentation by assessing habitat impacts and species viability for Threatened & Endangered Species, Sensitive Species, Management Indicator Species, and Migratory Birds. The EIS demonstrates that impacts to wildlife habitat will be kept within acceptable thresholds for species conservation.
Reed, R.A., Johnson-Barnard, J., and Baker, W.A. 1996. "Contribution of Roads to Forest Fragmentation in the Rocky Mountains." Conservation Biology 10: 1098-1106. http://cpluhna.nau.edu/Research/contribution_of_roads_to_forest_.htm	Opposing view #42: "*Increasingly, previously extensive, continuous tracts of forest are being reduced to widely dispersed patches of remnant forest vegetation by logging and road-building, but few measures of the effects of roads on forest fragmentation are available. Fragmentation affects animal populations in a variety of ways, including decreased species diversity and lower densities of some animal species in the resulting smaller patches. This study seeks to quantify the effects of roads and logging activities on forest habitat."* *"Roads precipitate fragmentation by dissecting previously large patches into smaller ones, and in so doing they create edge habitat in patches along both sides of the road, potentially at the expense of interior habitat. As the density of roads in landscapes increases, these effects increase as well. McGurk and Fong (1995) considered the additive effects of clearcuts and roads, but did not measure the amount of associated edge habitat. Thus a more direct measurement of the impacts of roads on landscapes is needed."* **FS Response:** The provided reference study looked at habitat fragmentation from a negative edge effect standpoint in coniferous forests of Wyoming and how the fracturing of interior forests may impact forest interior species. The study concluded that roads associated with logging activities often have potentially detrimental impacts on animal and plant communities. The authors suggested that timber harvests should be planned to minimize impact on the landscape and exacerbation of the current landscape fragmentation problems on many forestlands. Please refer to the FS responses to opposing views #1 and #41.
Reid, L. M. Ph.D. and T. Dunne (1984), "Sediment Production from Forest Road Surfaces," Water Resources	Opposing view #43: "*Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use*

Author/Date/Title	Response to literature cited in opposing views
Research, 20(11), 1753–1761. http://www.agu.org/pubs/crossref/1984/WR020i011p01753.shtml	*levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface."* **FS Response:** This study found that traffic level on gravel surfaced roads was the primary factor determining the amount of sediment produced from the road surface. Rainfall mobilized fines brought to the surface, delivering the fines to cross drain culverts. The study was conducted in western Washington where annual precipitation during study averages greater than 150 inches. This nearly 30 year old research paper was prepared in a time before modern Best Management Practices had been developed, tested, and proved to provide superior reductions in sediment delivery to streams. Papers like this are useful in that they formed the basis for the modern Best Management Practices utilized today. The effectiveness of BMPs and Project Design Criteria is well documented in the section 3.9 of the EIS.
Reid, Leslie M. Ph.D., Robert R. Ziemer Ph.D., and Michael J. Furniss 1994. **"What do we know about Roads?"** USDA Forest Service. http://www.fs.fed.us/psw/publications/reid/4Roads.htm	Opposing view #44: *"Roads are associated with high sediment inputs and altered hydrology, both of which can strongly influence downstream channel habitats. Roads are also important as a source of indirect human impacts and as an agent of vegetation change and wildlife disturbance."* *"Any ground disturbance increases the potential for erosion and hydrologic change, and roads are a major source of ground disturbance in wildlands. Compacted road surfaces generate overland flow, and much of this flow often enters the channel system, locally increasing peak flows. Localized peak flows are also increased where roads divert flow from one swale into another, and where roadcuts intercept subsurface flows."* *"Overland flow from the road surface is a very effective transport medium for the abundant fine sediments that usually are generated on road surfaces. Road drainage also can excavate gullies and cause landslides downslope in swales. Cut and fill slopes are often susceptible to landsliding, and road-related landsliding is the most visible forestry-related erosional impact in many areas."* **FS Response:** This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EIS. Please also see the FS response to opposing views #3, #4, #5, and #18.
Rice, Raymond M. Ph.D., Forest B. Tilley and Patricia A. Datzman. 1979. "Watershed's Response to Logging and Roads: South Fork of Caspar Creek, California, 1967-1976."USDA Forest Service, Research Paper PSW-146. http://www.fs.fed.us/psw/publications/rice/Rice79.pdf	Opposing view #45: *"Disturbances from road building and logging changed the sediment/discharge relationship of the South Fork from one which was supply dependent to one which was stream power dependent, resulting in substantial increases in suspended sediment discharges."* *"Road construction and logging appear to have resulted in increases in average turbidity levels (as inferred from suspended sediment increases) above those permitted by Regional Water Quality Regulations."* **FS Response:** This 34 year old research paper was prepared in a time before modern Best Management Practices had been developed, tested, and proved to provide superior reductions in sediment delivery to streams This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EIS. Please also see the FS response to opposing views #3, #4, #5, and #18.
Riedel, Mark S. Ph.D. and James M. Vose Ph.D., "Forest Road Erosion, Sediment Transport and Model Validation in the Southern Appalachians." Presented at the Second Federal Interagency Hydrologic Modeling Conference, July 28 – August 1, 2002. http://www.srs.fs.usda.gov/pubs/ja/ja_riedel002.pdf	Opposing view #46: *"Sediment eroded from gravel roads can be a major component of the sediment budget in streams in this region (Van Lear, et al, 1995)."* **FS Response:** This reference from Georgia and Tennessee discusses different sediment sources associated with watershed restoration planning. Although the landscape for the Cumbres project in Colorado is different than that of the southeastern U.S., the process used to develop this project is similar. The type of road maintenance/reconstruction activities that could be needed on existing and temporary roads is described in section 3.15 of the EIS; the potential for sediment in streams is considered and evaluated in section 3.9.This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of chapter 3 of the EIS. Please also see the response to opposing views #3, #4, #5, and #18.
Rowland, M. M., M. J. Wisdom, B. K. Johnson, and M. A. Penninger 2005. "Effects of Roads on Elk: Implications for Management in Forested Ecosystems." Pages 42-52	Opposing view #47: *"Early studies of elk were among the first to address effects of roads on wildlife, establishing a precedent for subsequent research on a wide range of terrestrial and aquatic species. These early elk-roads studies included those reported in a symposium on the topic in 1975 (Hieb 1976), the seminal studies of Jack Lyon in Montana and northern Idaho (Lyon 1979, 1983, 1984), the Montana Cooperative Elk-Logging Study (Lyon et al.*

Author/Date/Title	Response to literature cited in opposing views
in Wisdom, M. J., technical editor, The Starkey Project: a synthesis of long-term studies of elk and mule deer Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group. http://www.fs.fed.us/pnw/pubs/journals/pnw_2004_rowland001.pdf	*1985), and work by Perry and Overly (1977) in Washington and Rost and Bailey (1979) in Colorado.* *As research and analysis techniques have become more sophisticated, particularly with the advent of geographic information systems (GIS) and high-resolution remote imagery, the study of effects of roads on terrestrial and aquatic communities has evolved into a unique discipline of "road ecology" (Forman et al. 2003). Road effects are far more pervasive than originally believed and include such disparate consequences as population and habitat fragmentation, accelerated rates of soil erosion, and invasion of exotic plants along roadways. Indeed, "in public wildlands management, road systems are the largest human investment and the feature most damaging to the environment" (Gucinski et al. 2001:7). Summaries of the effects of roads on wildlife habitats and biological systems in general have been compiled by Forman and Alexander (1998), Trombulak and Frissell (2000), Gucinski et al. (2001), Forman et al. (2003) and Gaines et al. (2003)."* **FS Response:** The cited document describes the current knowledge on road effects to elk; outlines how a distance-band approach could be used instead of the traditional road density approach to assess road effects to elk and habitat effectiveness; and discusses the broader implications of road-related policies and land management with regard to elk. Elk are considered a Management Indicator Species on the Forest. Potential project effects on elk are considered in the wildlife report and summarized in section 3.4 of the EIS. Since no additional system roads are proposed in this project and closed roads would remain closed to public use, any additional disturbance would be temporary and last only until any project activities were completed in particular areas. Project effects on elk are summarized in table 3-6.
Schwartz, Chuck Ph.D. - March 1998 "**Wildlife and Roads**" The Interagency Forest Ecology Study Team (INFEST) newsletter http://www.sf.adfg.state.ak.us/sarr/forestecology/fsroads.cfm	Opposing view #48: *"The consequences of road construction to wildlife are generally negative. Roads result in increased human access, habitat fragmentation, disturbance, and in some cases direct mortality due to vehicle collisions."* *"Research has documented an 80% decline in grizzly bear habitat use within 1 km of open roads used by motorized vehicles in Montana[9]. This has been ascribed either to bears avoiding humans or to the selective over-harvest of bears habituated to humans that would otherwise more fully use areas heavily influenced by people."* **FS Response:** The concepts discussed in the opposing view are all well understood by the ID Team wildlife biologist and were considered in the environmental effects analysis in the wildlife resource section 3.4 of the EIS. Please also see the FS response to opposing views #1, 3, 29, and 41.
Shanley, James B. and Beverley Wemple Ph.D. "Water Quantity and Quality in the Mountain Environment" Vermont Law Review, Vol. 26:717, 2002 http://www.uvm.edu/~bwemple/pubs/shanley_wemple_law.pdf	Opposing view #49: *"The effects of forest roads on hydrology are related to the effects of forest clearing. Most logging requires road access, and the roads often remain after the logging, so there are both short and long-term effects.[94] Forest road surfaces are relatively impermeable. Water readily runs over the road surface and associated roadside ditches, often directly to a stream channel, with the net effect of extending channel networks and increasing drainage density.[95] In addition to providing conduits for overland flow, forest roads involve slope-cuts and ditching that may intersect the water table and interrupt natural subsurface water movement.[96] This diversion of subsurface water may be quantitatively more important than the overland flow of storm water in some watersheds.[97] The importance of roads in altering basin hydrology has been underscored in paired-watershed studies and recent modeling studies.[98] " (Pgs. 730 and 731)* **FS Response:** This reference discusses hydrology in mountains in a general textbook approach, presenting a number of accepted traits associated with wildland hydrology. The excerpt deals with the effects forest roads can have on hydrology based on a few other cited sources. The EIS fully discloses these effects and discusses them in detail in section 3.9. Additional road maintenance work that would be completed prior to project implementation would address some of the effects the road system is having on the project streams by applying BMPs and Project Design Criteria, which decrease the effects roads in the project area have on the stream network.
Swift Jr., L. W. "Soil losses from roadbeds and cut and fill slopes in the Southern Appalachian Mountains." Southern Journal of Applied Forestry 8: 209-216. 1984. http://cwt33.ecology.uga.edu/publications/403.pdf	Opposing view #50: *"Roads are often the major source of soil erosion from forested lands (Patric 1976)."* *"Generally, soil loss is greatest during and immediately after construction."* **FS Response:** This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EIS. Please also see the response to opposing views #3, #4, #5, and #18.
Switalski, Adam "Where Have All the Songbirds Gone? Roads, Fragmentation, and the Decline of Neotropical Migratory Songbirds" Wildlands CPR, September 8, 2003	Opposing view #51: *"More subtle causes of habitat loss include the construction of roads and power lines. These linear barriers also have been correlated with a decline in neotropical migrant songbirds (Berkey 1993; Boren et al. 1999; Ortega and Capen 2002). Whether by forest conversion or the construction of roads and power lines, fragmentation subdivides habitat into smaller and smaller parcels. The result is an increase of edge habitat, or the boundary between intact forest and surrounding impacted areas. Small forests with large amounts of edge habitat are a hostile landscape for nesting neotropical migratory songbirds. In these areas, songbirds face two great*

Author/Date/Title	Response to literature cited in opposing views
http://www.wildlandscpr.org/node/213	*threats: 1) the loss of eggs and nestlings to predators and, 2) parasitism by cowbirds."* **FS Response:** This article addresses potential causes for the apparent decline in songbird populations, listing loss of habitat as the major factor and construction of roads and power lines as more subtle causes. According to the article, the primary issue in regard to road fragmentation of songbird habitat is creation of edge habitat and the fracturing of interior forest habitat, which can lead to nest predation, brood parasitism, noise disturbance, or avoidance. The effects analysis for migratory songbirds can be found in the Migratory Bird portion of section 3.4 of the EIS. The Rio Grande National Forest is within the Southern Rockies Colorado Bird Conservation Region (BCR 16). The primary potential effects identified for birds of concern in BCR 16 that occur in spruce/fir habitats was not habitat fragmentation caused by management activities, but more the continued loss of the mature spruce forest habitat attributes due to the bark beetle. Any disturbance caused by any management activities would be temporary, but could impact individual birds, but Project Design Criteria and retention of any untreated patches would mitigate effects.
• Trombulak, Stephen C. Ph.D. and Christopher A. Frissell Ph.D. "Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities" Conservation Biology, Volume 14, No. 1, Pages 18–30, February 2000 • http://www.transwildalliance.org/resources/200922144524.pdf	Opposing view #52: *"Roads are a widespread and increasing feature of most landscapes. We reviewed the scientific literature on the ecological effects of roads and found support for the general conclusion that they are associated with negative effects on biotic integrity in both terrestrial and aquatic ecosystems. Roads of all kinds have seven general effects: mortality from road construction, mortality from collision with vehicles, modification of animal behavior, alteration of the physical environment, alteration of the chemical environment, spread of exotics, and increased use of areas by humans. Road construction kills sessile and slow-moving organisms, injures organisms adjacent to a road, and alters physical conditions beneath a road. Vehicle collisions affect the demography of many species, both vertebrates and invertebrates; mitigation measures to reduce road kill have been only partly successful. Roads alter animal behavior by causing changes in home ranges, movement, reproductive success, escape response, and physiological state. Roads change soil density, temperature, soil water content, light levels, dust, surface waters, patterns of runoff, and sedimentation, as well as adding heavy metals (especially lead), salts, organic molecules, ozone, and nutrients to roadside environments. Roads promote the dispersal of exotic species by altering habitats, stressing native species, and providing movement corridors. Roads also promote increased hunting, fishing, passive harassment of animals, and landscape modifications. Not all species and ecosystems are equally affected by roads, but overall the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian systems. More experimental research is needed to complement post-hoc correlative studies. Our review underscores the importance to conservation of avoiding construction of new roads in roadless or sparsely roaded areas and of removal or restoration of existing roads to benefit both terrestrial and aquatic biota."* **FS Response:** The citation is a general synthesis of some of the deleterious effects of roads on the natural environment. It is very broad based and while some of it pertains to conditions in the project area, it contains no specific information that can be used in the analysis. The EIS recognizes some of these effects and in the case of aquatics, attempts to reduce the sediment-related effects project area roads have on stream channels by implementing BMPs and Project Design Criteria. This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of chapter 3 of the EIS.
Watson, Mark L. "Habitat Fragmentation and the Effects of Roads on Wildlife and Habitats." Background and Literature Review 2005. http://www.wildlife.state.nm.us/conservation/habitat_handbook/documents/2004EffectsofRoadsonWildlifeandHabitats.pdf	Opposing view #53: *"Roads are a major contributor to habitat fragmentation because they divide large landscapes into smaller patches and convert interior habitat into edge habitat. As additional road construction and timber harvest activities increase habitat fragmentation across large areas, the populations of some species may become isolated, increasing the risk of local extirpations or extinctions (Noss and Cooperrider 1994)."* *"Habitat fragmentation creates landscapes made of altered habitats or developed areas fundamentally different from those shaped by natural disturbances that species have adapted to over evolutionary time (Noss and Cooperrider 1994 in Meffe et al. 1997). Adverse effects of habitat fragmentation to both wildlife populations and species include:* *"Increased isolation of populations or species, which leads to:* • *Adverse genetic effects; i.e. inbreeding depression (depressed fertility and fecundity, increased natal mortality) and decreased genetic diversity from genetic drift and bottlenecks,* • *Increased potential for extirpation of localized populations or extinction of narrowly distributed species from catastrophic events such as hurricanes, wildfires or disease outbreaks,* • *Changes in habitat vegetative composition, often to weedy and invasive species,* • *Changes in the type and quality of the food base,* • *Changes in microclimates by altering temperature and moisture regimes,* • *Changes in flows of energy and nutrients,* • *Changes in the availability of cover and increases edge effect, bringing together species that might otherwise not interact, potentially increasing rates of predation, competition and nest parasitism, and*

Author/Date/Title	Response to literature cited in opposing views
	• *Increased opportunities for exploitation by humans, such as poaching or illegal collection for the pet trade."* **FS Response:** This paper includes a list of potential effects of roads and highways. It also includes an appendix with a literature review of road effects to wildlife and habitats, with the literature cited following it. The quoted section above lists potential effects of roads. It is recognized that lower-standard, unpaved forest roads do have potential effects. The effects of forest fragmentation on wildlife are addressed in the FS response to opposing views #1, #3, #42, and #51.
Wisdom, Michael J., Richard S. Holthausen Ph.D. Barbara C. Wales Ph.D., Christina D. Hargis Ph.D. Victoria A. Saab Ph.D., Danny C. Lee Ph.D. Wendel J. Hann Ph.D. Terrell D. Rich, Mary M. Rowland, Wally J. Murphy, and Michelle R. Eames "Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications Volume 2 – Group Level Results." USDA Forest Service, PNW-GTR-485, May 2000. http://maps.wildrockies.org/ecosystem_defense/Science_Documents/Wisdom_et_al_2000/Vol_2a.pdf	Opposing view #54: *"Our analysis also indicated that >70 percent of the 91 species are affected negatively by one or more factors associated with roads."* *"Roads in forested areas increase trapping pressures for martens and fishers, resulting in significantly higher captures in roaded versus unroaded areas (Hodgman and others 1994) and in logged versus unlogged areas, in which the difference was again attributed to higher road densities in logged stands (Thompson 1994). Secondary roads also might increase the likelihood that snags and logs will be removed for fuel wood. This could impact fishers, martens and flammulated owls, and also could have a negative effect on the prey base for goshawks (Reynolds and others 1992)."* *"An additional, indirect effect of roads is that road avoidance leads to underutilization of habitats that are otherwise high quality."* **FS Response:** This large multi-agency effort defined habitat requirements and assessed trends in these habitats for terrestrial vertebrates across 145 million acres of public and private lands in the northwest. They also summarized knowledge about species-road relationships, and described the results in relation to broad-scale patterns of road density. This opposing view is of the same nature and scope as previous opposing views found in this attachment. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of chapter 3 of the EIS. The Cumbres project does not propose to construct any additional permanent, system roads. The existing open roads have been present since the 1950s and the travel system will remain the same in that road currently closed to public travel will remain closed which would minimize additive effects of the current road system. All temporary roads would be closed and rehabilitated following use and since the level of tree mortality is very high, it is not expected this area would entered for harvest activity for many decades which would further minimize long-term effects.
Wright, Bronwen, Policy Analyst and Attorney Pacific Rivers Council Excerpt from a May 11, 2009 letter to the Rogue River-Siskiyou National Forest Travel Management Team http://www.pacificrivers.org/protection-defense/comment-letters/Rogue%20River%20Siskiyou%20TMP%20DEIS.pdf	Opposing view #55: *"According to the DEIS, the Forest now manages a total of 5,914 miles of roads across the Forest. Scientific literature has established that roads have numerous widespread, pervasive and, if left untreated, long-lasting biological and physical impacts on aquatic ecosystems that continue long after completion of construction. (Angermeier et al. 2004). Roads increase surface water flow, alter runoff patterns, alter streamflow patterns and hydrology, and increase sedimentation and turbidity. Roads are the main source of sediment to water bodies from forestry operations in the United States. (US EPA 2002). Road construction can lead to slope failures, mass wasting and gully erosion. Road crossings can act as barriers to movement for fish and other aquatic organisms, disrupting migration and reducing population viability. (Schlosser and Angermeier 1995). Chemical pollutants that enter streams via runoff, such as salt and lead from road use and management, compound these impacts. Most of these adverse effects are persistent and will not recover or reverse without human intervention. The techniques for road remediation are well established, agreed upon and readily available. (Weaver et al. 2006)." (Pg. 2)* **FS Response:** The citation is a comment letter to the Forest Service on travel management in the Oregon Cascade Mountains which is a very different climate and setting than the southern Rockies Mountains. The letter cites other literature that discusses the adverse effects of roads on aquatic environments. This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of chapter 3 of the EIS.
Wuerthner, George 2008 "Ecological Differences between Logging and Wildfire" http://wuerthner.blogspot.com/2008/12/ecological-differences-between-logging.html	Opposing view #56: *"Fires do not leave a large road network in place (assuming the blaze was not suppressed otherwise there may be dozer lines, etc.). Logging creates roads that fragment habitat and generally increase human access, both of which affect the use of the land by wildlife. Moreover, roads and logging equipment can become vectors for the dispersal of weeds."* **FS Response:** The cited article is an opinion piece that discusses the ecological differences between logging and wildland fire. The article presents wildland fire as a beneficial force and logging as a source of deleterious impacts on the forests. The article describes the ecosystem functions performed by fire and lists potential road-related impacts associated with logging, including habitat fragmentation, human access, disturbance, habitat avoidance (grizzly bears), hunting, poaching, and roads as vectors for invasive weeds. This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental

Author/Date/Title	Response to literature cited in opposing views
	effects analysis in the resource sections of chapter 3 of the EIS. Spruce-fir forests are classified as a fire regime V, stand-replacement fires. Please see response to opposing views #1, #17, and #40.
Zimmerman, E.A. and P.F. Wilbur "A Forest Divided" New Roxbury Land Trust newsletter, 2004 http://www.ourbetternature.org/forestfrag.htm	Opposing view #57: *"Forest fragmentation occurs when large, contiguous blocks of forest are broken up into isolated islands by development, roads, or clearing for agriculture. Just as inbreeding among the royal families of Europe spread hemophilia, forest fragmentation negatively impacts the long term sustainability of both plant and animal communities. Geographic isolation results in inbreeding and diminishes biodiversity."* **FS Response:** The cited article broadly discusses the potential causes of forest fragmentation, including road-related impacts, impacts to human health, and economic impacts. The article lists the following road- related impacts: habitat fragmentation, inbreeding and diminished biodiversity stemming from isolation of populations, road kill, and increased predation of woodland birds. This opposing view is of the same nature and scope as previous opposing views found above. The concepts discussed in the opposing view are all well understood by the ID Team and were considered in the environmental effects analysis in the resource sections of Chapter 3 of the EA. Please see FS response to opposing views #1, #40, #51, and #53.

Attachment #15- Dick Artley

"Forest Service Leaders Stress that Independent, Unbiased Science Conclusions should Always form the Basis for Proposed Public Land Treatments"

Author/Date/Title	Response to literature cited in opposing views
Excerpts from an interview with Hilda Diaz-Soltero, Associate Chief for Natural Resources, USDA Forest Service, Women in Natural Resources, Vol. 21, No. 3, August 2000. http://www.fs.fed.us/publications/2000/00nov02-Hilda-Diaz-Soltero-Interview.pdf	***USFS leader statement on best science #1*** *- "The agency has been able to face changing and challenging times and incorporate new information based on science."* *"I am very much involved in trying to integrate the science and the management sides of the Forest Service. It's very, very important that we conduct that integration, because our management decisions are scientifically based, and there is an ever increasing need for more scientific information."* **FS Response:** The article is an interview piece of Ms. Diaz-Soltero's career experiences with Puerto Rico Department of Natural Resources, Conservation International, US Fish & Wildlife Service, National Marine Fisheries Service and the US Forest Service when she became the Associate Chief of Natural Resources in 1999. Since 2010, she has worked as the Senior Invasive Species Coordinator for the USDA. The first quote is an excerpt from a paragraph where she was praising the USFS for being "*one of the finest, conservation organizations not just in the federal government, but in the world*". Remainder of the section…"*The Forest Service is in the process of modifying how it manages the landscape. We are looking at it holistically, not just from a biological point of view. We are examining out relationships with communities and with private landowners and creating opportunities for a new, strong partnerships so that we can take an ecosystem approach to our conservation efforts*". The second quote follows her brief statement of working with forest inventories, like the Forest Inventory and Assessment or the National Resources Inventory System as part of her role of providing a link between national forest issues and the business side of the agency. Ms. Diaz Soltero was working at the national policy level and speaking to data used to evaluate trends over larger-scales. The Cumbres Vegetation Management project is a local, site specific project. Data collected was consistent with current protocols for collecting vegetation and other resource specific data, as needed to make an informed decision. The EIS disclosed potential effects on relevant resources and provided opportunities for local input and feedback.
Dr. Ann Bartuska, Deputy Chief for Research and Development, USDA Forest Service. Excerpt from testimony before the House Resources Forest and Forest Health Subcommittee. July 15, 2004. http://www.fs.fed.us/congress/108/house/oversight/bartuska/071504.html	***USFS leader statement on best science #2*** *- "Forest Service managers strive to use the best science available in their decision making."* **FS Response:** The quote is from the summary statement of the testimony given regarding restoring forests after catastrophic events such as wildfires, hurricanes, tornados, ice storms, insects/disease outbreaks, and invasive species. The main focus was on short and longer term restoration activities following wildfires. The testimony highlighted the uses of technology or other tools such as satellite imagery, modeling (FVS with the Fire & Fuels Extension tool, FIREMON, Fire Effects Information System) and research studies to assess and determine appropriate treatment needs with the goal of focusing rehabilitation or restoration treatments in areas where natural recovery may not meet land management objectives as defined in forest plans. The testimony also included discussion on the need to remove trees for both ecological and economic reasons is accordance with silvicultural prescriptions, while maintaining other ecosystem values such as snags and coarse woody material along with the need to consider reforestation in accordance with

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	forest plans. The development and analysis of potential effects of the Cumbres project has been consistent with the principles of this testimony, considering the scale of the project. As described in sections 3.2 and 3.12, site-specific field sampled data was used to model vegetation/fuels changes over time for no action and the action alternatives using FVS, the Fire and Fuels extension to FVS along with FMAPlus and BehavePlus. Implementation of any approved forest management activities would be consistent with the Record of Decision and signed silvicultural prescriptions, which re-state Forest Plan and/or Project Design Criteria needed to maintain biodiversity elements such snags or coarse woody debris; reforestation needs will also be addressed by the silviculturist following any harvest activities.
Dale Bosworth Chief, USDA Forest Service. Excerpt from a statement before the Committee on Energy and Natural Resources United States Senate. March 3, 2004. http://www.pirate4x4.com/forum/land-use-issues/232684-statement-dale-n-bosworth-chief-usda-forest-service.html	***USFS leader statement on best science #3*** - *"We are committed to accomplishing the aggressive treatments planned in the President's Budget for FY 2005 using new authorities in the Healthy Forests Restoration Act that improve the condition class of the nation's watersheds and thus protect communities and resources for future generations, and our Research Station directors are committed to providing the Forest Service with the best science available."* **FS Response:** The quote is from testimony given by a previous Chief of the Forest Service 10 years ago to a congressional committee regarding the budget proposed by then President Bush. A primary focus of the Agency at that time was the Four Threats: invasive species, loss of open space, unmanaged recreation and catastrophic wildfires and their costs. The Healthy Forest Restoration Act was recently signed (12/2003) and there was a recognized need to integrate the fuels reduction program with wildlife habitat improvement, watershed enhancement, vegetation management, and forest product programs in order to improve overall forest and rangeland health. There was also renewed focus on firefighter safety and reducing risks to firefighters following the 2001 Thirtymile firefighter fatalities. The Cumbres project does not use the Healthy Forest Restoration Act authorities, but the alternatives do consider firefighter and visitor safety as dead trees continue to accumulate and eventually fall over time. The analysis area has adjacent private land with homes and other structures on the east and west edges, along with the Trujillo Meadows Reservoir and forest service campground on the northern edge, all of which would be at risk should a large wildfire start in the vicinity. Both action alternatives included specific fuels reduction activities adjacent to private land that have been determined to be effective in modifying fire behavior; salvage activities adjacent to the campground, in conjunction with recently completed hazard tree removal in the campground, would help protect campground infrastructure.
Sally Collins Associate Chief USDA Forest Service. Excerpt from testimony before the Committee on Energy and Natural Resources, United States Senate. July 11, 2006. http://www.fs.fed.us/congress/109/senate/oversight/collins/071106.html	***USFS leader statement on best science #4*** - *"Our direction will address these emerging issues to ensure it is based on the available best science."* **FS Response:** The testimony was regarding the development of renewable energy sources on National Forest System lands as part of the Energy Policy Act of 2005, P.L 109-58. The quote is from a section in the testimony regarding wind energy development on federal lands and how wind energy development on NFS lands would have different guidance than that on BLM lands due to "continuing advances in wind energy technologies, as well as new information of its effects on wildlife and civilian and military radar". Since this testimony is focused on the development of wind energy and its emerging issues, it has no direct relation to the Cumbres Vegetation Management Project.
Dale N. Bosworth Chief USDA Forest Service Excerpt from a speech on *Sustainable Management of the National Forests*, at the Andrus Center for Public Policy, Boise State University. December 12, 2001. http://www.andruscenter.org/images/transcripts/Sustainable_transcript.pdf	***USFS leader statement on best science #5*** - *"The American people have come to expect us to use the best science, and we ought to use the best science." (pg.4)* **FS Response:** The focus of this speech was on then Chief Bosworth's three intertwined parts of sustainability: ecological, social, and economic, along with the need to balance and bring together national interests and the needs of local communities. The quote is part of a couple of paragraphs discussing "analysis paralysis" and the process requirement to continuously incorporate bits of new information, which affects the timeliness of decisions and continual debate of national policies at the local level. He also talked about the National Fire Plan with the need to "work closely with local communities to identify and choose projects that will meet local needs, including the need for jobs and local stability" and also to "work with local communities to restore and maintain healthy ecosystems in order to meet the needs of present and future generations". A definition of sustainability is now incorporated into FSMs 1905 and 2020; the current definition incorporates the elements described by Chief Bosworth. The project analysis completed for the Cumbres project has considered and disclosed expected effects on relevant ecological, social, and economic trends at the project level scale. The protection of local, adjacent residences were considered during project development and no concerns about the project have been raised by local residents.
Sally Collins, Associate Chief USDA Forest Service. Excerpt from a speech to the Land Trust	***USFS leader statement on best science #6*** - *"Always use the best science. Science can't decide for us, but it can help us understand the consequences of our decisions. Forest Service Research and others in*

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Alliance Rally "Protecting Open Spaces: Partners in a Common Cause". October 31, 2004 http://www.fs.fed.us/news/2004/speeches/10/open-spaces.shtml 2007 -2012 strategic plan	*academia can deliver some of the best science and technical resources to help inform how these special areas should be managed for the long term."* **FS Response:** This speech, given over 13 years ago, included a brief history of the reasons the national forests were established and how the loss of open space was of concern near fast growing urban/suburban areas and how land exchanges, along with private/public partnerships, can be used maintain ecological processes and lifestyles in critical areas. The above quote is from the "*Common Vision*" portion of the speech which included four points: 1) focus on the critical few areas […]; 2) work with local communities toward local solutions […]; 3) always use the best science [quote cited above]; 4) help others see the need for active management […]. "What's at stake isn't active management, but sustaining ecological processes and lifestyles. Ecosystems are dynamic and we may need to actively introduce fire, treat for invasive species, and thin trees. This is fundamental to managing lands in a sustainable way […]." Based on scoping comments from the local communities, area visitors, and permittees, the Cumbres project is generally consistent with the sentiments expressed in this speech.
Statement by Heidi Valetkevitch National Media Officer USDA Forest Service to Joe Bauman, reporter for the *Deseret Morning News*. December 24, 2004 http://www.deseretnews.com/article/600100084/New-forest-rules-focus-on-holistic-approach.html	***USFS leader statement on best science #7*** *- "The new rule directs forest managers to use the best science available to protect species at a landscape level. The emphasis is to preserve ecosystems as a whole."* **FS Response:** The interview was given just prior to the January 5, 2005 Federal Register Notice for the 2005 planning rule which was intended to replace the 2000 planning rule. The 2005 rule was challenged in court and enjoined in 2007 and was never implemented.
Brown, Joel "**Power to the People!**", *SRM Rangeland News*, November 2007 http://www.rangelands.org/RN/Nov.RN07.pdf	***USFS leader statement on best science #8*** *- On June 29, 2007, Chief of the Forest Service, Gail Kimbell expressed her support of employees participating in professional societies. The following is an excerpt from her support letter:* *"As stewards of forests and rangelands, we must respond to the many challenges of managing a wide variety of resources and values. To meet these various challenges, a diverse and highly qualified cadre of natural resource and other professionals is critical to assure that management approaches are based on the best science. More than ever, it is important for each of us to continue to learn, enhance our resource knowledge, and develop innovative approaches to cooperatively conserve this Nation's natural resources." (pg. 5)* **FS Response:** The quote was from a letter written by then Chief Kimball encouraging membership and participation in professional societies as a means of "keeping abreast of emerging science, policy debates, and changing societal demands" among other benefits. This policy is still an agency policy though declining budgets have affected the ability of employees to travel and the agency to provide training.
Statement by Chief Dr. Mike Dombeck "**Forest Chief Shifts focus to clean water**". April 1998 *TRANSITIONS* http://www.waterplanet.ws/transitions/tr9804/	***USFS leader statement on best science #9*** *- "The Forest Service must be a leader in using the best science and the best managers to accomplish what I think is one of the noblest, most important callings of our generation bringing people together and helping them find ways to live within the limits of the land." (Pg. 30)* **FS Response:** The referenced article is apparently a compilation of quotes of unclear origin and dates. The quote above is listed in the article. In 1998 then Chief Dombeck imposed an 18 month moratorium on new road building on NFS lands. This moratorium was followed in 2000/2001 by the Clinton Roadless Conservation Rule which dominated the attention until 2013 when the final litigation was settled. Chief Dombeck's concerns about extensive road systems on NFS lands was continued as part of the Agency's ongoing Travel Management Process (36 CFR Parts 212, 251, 261, and 295; Federal Register Notice published 11/9/2005) requirements to identify a minimum road system along with unneeded roads considering management objectives in land management plans, statutory requirements, and to reflect long-term funding expectations for road maintenance, which are generally declining. No new system roads planned are planned for Cumbres project that would add to the long-term road maintenance needs. Any temporary roads needed under the Selected Alternative would be closed and rehabilitated following use, as described in 3.15 Transportation.
Chief F. Dale Robertson From FIVE YEAFt REVIEW - B-3 # # http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_053856.pdf	***USFS leader statement on best science #10*** *- "We have made great progress under New Perspectives to get land managers and scientists working together as a team in doing the best job possible. Let's keep it up and make sure our decisions reflect the best science and close the gap between the level of scientific knowledge and its application in our day-to-day management."* **FS Response:** The quote came from a memo signed by then Chief Robertson to Regional Foresters and Station Directors dated June 4, 1992; it was included in Appendix B of the 1993 Lolo NF plan five year review documentation. *New Perspectives* was the name of the program at that time that was used to bring a more ecological approach to achieve the multiple-use management of the national forests and grasslands by

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	blending the needs of people and environmental values to ensure that ecosystems remain productive, diverse, and sustainable. This memo was issued over 20 years ago and consideration and use of ecological diversity concepts and values as part of multiple-use is included in the Objectives, Standards, and Guidelines incorporated into the Forest Plan along with agency directives, manuals, and handbooks. The Cumbres project is consistent with the Forest Plan and agency directives.
Smith, Ted "***Chief's Ecosystem Stewardship Conference Workshop Review***" *Eco-Watch*, February 26, 1996 http://www.fs.fed.us/eco/eco-watch/ew960226.htm Link does not work; document was found on internet	***USFS leader statement on best science #11*** - *"In 1994 Chief Jack Ward Thomas of the U.S. Forest Service invited private foundations to join the USFS and other federal resource management agencies in co-funding a national workshop designed to bring the best science, broadly defined, to an 11-day workshop of agency natural resource managers.1 Having a science background himself, Thomas wanted to capture the scientific underpinnings of ecosystem dynamics in order to establish a more solid basis for sustainable resource management. Private foundations, invited for the first time to join the Forest Service in this way, would, Thomas felt, add legitimacy and assist in bringing in scientific talent from outside the government."* **FS Response:** The article is a commentary/review written about an Ecosystem Stewardship Workshop hosted by Jack Ward Thomas, then Chief of the Forest Service, which was held in Tucson, AZ in December 1995. Participants included scientists, federal resource management agencies, and environmental organizations/foundations that had the task of trying to integrate "imperfect" scientific knowledge with resource management. The author's conclusion seemed to be that time was needed to see if ecosystem management, adaptive management, interagency collaboration, public participation, and training became part of the agency culture. See responses to #8 and # 10. Though adaptive management is not an objective of the Cumbres project, any actions that are approved would be monitored and evaluated (see section 2.6). Implementation monitoring can lead to improvements in future management activities. Opportunities for public participation occurred throughout the analysis process for this project.
Agriculture Secretary Dan Glickman From an Announcement of Interim Ban on Forest Road Construction. Washington, D.C., February 11, 1999 http://www.ibiblio.org/london/permaculture/permaculture-list-archives-1999-2002/msg04621.html	***USFS leader statement on best science #12*** - *"Our challenge is to protect all the different uses of our forests which well-kept roads undoubtedly serve while protecting these remaining untouched places. This is a long and delicate process. It will not happen overnight. We must rely on the best science and broad-based public participation. But in the interim, I am prepared to authorize an 18-month moratorium on the construction of new roads in the last pristine areas of our national forests."* **FS Response:** The document accessed by the link is a forest service press release regarding the 18 month road building moratorium that occurred on portions of national forests, but it does not contain the cited quote.
Statement by USFS Chief Tom Tidwell From an interview with Rob Chaney of the *Missoulian*, June 19, 2009 http://westinstenv.org/sosf/2009/06/19/tidwell-interviewed-by-the-missoulian/	***USFS leader statement on best science #13*** - *"We have some of the best science, and we need to make sure we're applying that, using that and sharing that as we move forward. I think we have a key leadership role, not only in the application of science but to help inform and educate our community and the folks we work with."* **FS Response:** This article could not be found at the link provided or by an internet search, so could not be evaluated.
Potyondy, John P. 2007 "**The Evolution of Channel Maintenance Science in the Forest Service**" Mr. Potyondy is the WO Watershed, Fish, Wildlife, Air, and Rare Plants Staff http://www.stream.fs.fed.us/afsc/pdfs/Potyondy.pdf	***USFS leader statement on best science #14*** - *"Since that time, they have consulted with a wide array of scientists in the Forest Service, other agencies, universities, and consultants, with the aim of arriving at a consensus on the best science available to address this issue."* **FS Response:** This article describes the evolution of knowledge in understanding and modeling the amount and timing of water flows needed for stream channel maintenance that occurred from the early 1980s to 2007. Models evolved from a static model into a dynamic model then into a two phased model to better describe how sediments are transported. The importance of vegetation in providing streambank stability and a properly functioning channel is also better understood for many channel types. The author's identified the need for additional research in the coarse-grained gravel bed channels typically found in mountain watersheds along with linkages between streamside vegetation and streamflows in mountains. The Cumbres project used field surveys to evaluate existing conditions and incorporated BMPs and Project Design Criteria (table 2-1) to protect stream channels which reflects the best science available at this time. If better information becomes available during the life of this project, BMPs and PDC could be updated, as necessary.
Melle, Ann R. "**The U.S. Forest Service Approach to Forest Law Enforcement**" A presentation to the East Asia Ministerial Conference, September 12, 2001	**USFS leader statement on best science #15** - *"The FS manages the National Forest System's natural resources with a commitment to long term ecosystem sustainability, multiple use, local community involvement and economic stability, interaction of social and cultural values with forest resource management, and the use of management practices based on the best science available."*

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Ms. Melle is the Asst. Director of Law Enforcement and Investigations, USDS Forest Service http://www.for.gov.bc.ca/hfd/library/documents/bib49682.pdf	**FS Response:** The above quote is from the introduction section of the presentation given in Indonesia over 12 years ago. The introduction and background focused on describing the Forest Service lands and their uses and the multiple-use mandate; the remainder of the paper focused mostly on law enforcement as related to timber accountability and timber theft prevention. See FS responses to #5 and #10.
Statements by retired Chief Dr. Mike Dombeck "Politics vs. Science," October 19, 2006 Published by the University of Wisconsin, Board of Regents. http://whyfiles.org/247sci_politics/index.php?g=5.txt Link not functional – could not find on internet	**USFS leader statement on best science #16** - *"The responsible policy maker ought to seek out the best science, because ultimately that will yield the best result.". "* *"To put things in perspective, Dombeck says, "Science should not be the only driver of policy; there are economic, social and political concerns, but ... scientists can provide information that informs policymaking; 'If we adopt this policy, this will be the outcome,' and that certainly does not appear to be happening." "* **FS Response:** This article could not be found at the link provided and could not be located with an internet search.
Kaufmann, Merrill R. 2005 "**Good Fire, Bad Fire**" Mr. Kaufmann is the Rocky Mountain Research Station's team leader for ecosystem management Fort Collins, CO, USDA Forest Service (*retired 2006)* http://csfs.colostate.edu/pdfs/Good_Fire_Bad_Fire.pdf	***USFS leader statement on best science #17*** - *"Carefully done science can provide common ground for agreement among different stakeholders, enabling communities to unify."* *"The best science available tells us that at some point we must reinstall this missing ecosystem process so the natural machinery functions properly again." (pg. 9)* **FS Response:** *Good Fire, Bad Fire* is a short publication written for the general public following some high profile, destructive fires (i.e. Hayman Fire in Colorado 2002) to describe the role of fire in natural ecosystems and how western landscapes have changed, especially in the dry ponderosa pine/mixed conifer sites, since Euro-American settlement due to the change in fire frequency. The quotes above come from a section entitled "*Tough Love: Realigning Our Ideals with Ecological Reality*" that discusses the likelihood that the forests and grasslands that we see today are often not natural or sustainable and science could help define a more sustainable condition by using fire and/or mechanical treatments to recreate sustainable forests and grasslands. The Cumbres project is located in the high elevation spruce-fir vegetation zone. As described in section 3.12 Fire and Fuels, this vegetation type is generally categorized as a Fire Regime V, with infrequent (200+ years), stand replacement wildfires that are more likely to occur following extended droughts and to burn with high intensities. This situation was not addressed in the referenced publication.
Bravo, Aguirre Celedonio and Carlos Rodriguez Franco, compilers 1999. *North American Science Symposium: Toward a Unified Framework for Inventorying and Monitoring Forest Ecosystem Resources.* Guadalajara, Mexico (November 2-6, 1998). Proceedings RMRS-P-12. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station http://cwt33.ecology.uga.edu/publications/pubs_martha_new_01282003/Batch_2_@300dpi/PDF/1389.pdf	***USFS leader statement on best science #18*** - *"The general objective of this Symposium was to build on the best science and technology available to assure that the data and information produced in future inventory and monitoring programs are comparable, quality assured, available, and adequate for their intended purposes, thereby providing a reliable framework for characterization, assessment, and management of forest ecosystems in North America."* **FS Response:** The above quote is from the abstract of the publication. Review of the Science and Technology section does indicate how technology availability (GPS, GIS) has greatly improved and costs have decreased in the 15 years since it was published; the resolution of remotely sensed data has also greatly increased. The cost of field sampled data continues to increase, so a combination of field sampled data and modeling is becoming more common. See FS response to #2.
McDaniel, Josh 2007 "The Zaca Fire: Bridging Fire Science and Management" Widland Fire Lessons Learned, http://www.wildfirelessons.net/Additional.aspx Link not functional – found with internet search	***USFS leader statement on best science #19*** - *"The experience of the Zaca Fire demonstrates a window of opportunity to improve the link between science and management. A major concern often expressed in both fire research and fire management circles is that there is a lot of science being produced, but very little that can or is being incorporated (depending on your perspective) into fire management. There may be a current opening to change that state of affairs."* **FS Response:** The article described how several types of technology (RAWS weather station, fire spread models) were used to develop fire suppression strategies for the complex 2007 Zaca wildfire that burned in California. The fire burned on two fronts into both wilderness and wildland-urban interface. The models being used were not accurately portraying rate of spread and model outputs were not useful to the fire suppression team. The model developer was brought in to modify the model and create outputs useful in planning fire suppression strategies. The above quote is located toward the end of the article and is a summary of the situation. The situation described was an interesting example of how a beneficial change, that will improve results for others over time, occurred successfully in an emergency situation. Incremental improvements continue to occur with models used in projects similar to the Cumbres project; this is expected to continue.
CENTER FOR BIOLOGICAL DIVERSITY v. UNITED STATES FOREST SERVICE	***USFS leader statement on best science #20*** - *"Accordingly, we find that the Final EIS fails to disclose and*

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Argued and Submitted July 15, 2003. -- November 18, 2003 Before: KLEINFELD, WARDLAW, Circuit Judges, and POGUE, Judge. In the United States Court of Appeals, Ninth Circuit http://caselaw.findlaw.com/us-9th-circuit/1173711.html	*discuss responsible opposing scientific viewpoints in the final statement itself in violation of NEPA and the implementing regulations. We therefore reverse the district court's grant of summary judgment and remand to the district court with directions that it remand the final statement to the Forest Service for further proceedings consistent with this opinion. See Vitarelli v. Seaton, 359 U.S. 535, 545, 79 S.Ct. 968, 3 L.Ed.2d 1012 (1959) (standing for the well-established principle that an agency is generally required to follow its regulations); see also Cal. v. Block, 690 F.2d at 769 ("Agencies are . obliged to adhere to the procedures mandated by NEPA.") (citing Vt. Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc., 435 U.S. 519, 549 n. 21, 98 S.Ct. 1197, 55 L.Ed.2d 460 (1978)).* *REVERSED AND REMANDED."* **FS Response:** This is a case from the 9th circuit. The case concerned the effort to amend all forest plans in the southwest region to incorporate habitat needs for the northern goshawk (sensitive species). As result of this court ruling, R3 completed a supplement to the FEIS following extensive literature reviews and discussions of habitat preference of the northern goshawk. As stated in the Record of Decision (link below), following the literature review, it was determined that the *Management Recommendations for the Northern Goshawk in the Southwestern United States* (GTR-RM-217) still had the best synthesis of scientific knowledge to date, though continual study and learning is warranted; the project moved forward as the best option based on the best information available at the time. Beyond the requirements of 40 CFR 1509.9(b), this case has limited applicability to the site specific Cumbres Vegetation Management Project. http://www.fs.usda.gov/detail/r3/landmanagement/planning/