APPENDIX K

COMMENTS ON DEIS
AND
FOREST SERVICE RESPONSES

INTRODUCTION

A 45-day comment period for South George Vegetation and Fuels Management Project DEIS was provided for interested and affected publics. Letters requesting comments were sent to the mailing list of interested parties maintained at the Umatilla National Forest Supervisor's Office on February 14, 2012. They included federal, state and local agencies, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Indian Tribe, various environmental organizations, and interested individuals (see project file for mailing list).

A notice that the DEIS was available for public review, called a notice of availability (NOA), was published in the Federal Register on February 24, 2012. The publication date of the NOA in the Federal Register is the exclusive means for calculating the dates lf the formal notice comment period for a proposed action in a DEIS (36 CFR 215.5(b)(1)(v)). Comments were accepted until April 9, 2012 (including correspondence postmarked April 9, 2012).

A legal notice, in our newspaper of record (East Oregonian), to request comments was published on February 28, 2012. The Forest Service received comments from different sectors of the public, with a range of concerns and comments. The responsible official will be considering these comments in the decision-making process.

The Forest Service received thirteen (13) responses during the 45-day comment period. Responses were received electronically and some responses were sent by U. S. Mail. All correspondence was reviewed and our responses to those comments are located on the following pages. All correspondence received is kept in the project file and is available for review at the district office in Pomeroy, Washington.

The following table is a summary of letters received.

Table K-1 Letters Received During the 45-day Comment Period for South George Project

Letter Identification Number and Date Received	Author(s)	Individual, Organization or Agency	Comments on Page Numbers
Letter #1- 02/24/12	Jean Public	Individual	K-3
Letter # 2 - 03/09/12	Richard Artley	Individual	K-3 to K-21
Letter # 3 -Dated 03/23/12 Received 03/27/12	Dave Fritts, Resource Manager	Guy Bennett Lumber Company	K-21 to K-22
Letter #4 –04/02/12	Michael Krochta	Individual	K-22 to K-25
Letter #5-04/04/12	Bill Higgins, Resource Manager	Idaho Forest Group	K-25 to K-26
Letter #6 - 04/05/12	Tom Schirm, Area Habitat Biologist	Washington Department of Fish and Wildlife (WDFW)	K-26 to K-28
Letter #7 - 04/09/12	Lindsay Warness Forest Policy Analyst	Boise Cascade, LLC	K-28 to K-33
Letter #8 – 04/09/12	Alison O'Brien Regional	U. S. Department of the Interior	K-33

	Environmental Officer	Portland, OR	
Letter #9 – 04/09/12	Irene Jerome, AFRC Representative	American Forest Resource Council (AFRC)	K-33 to K-36
Letter #10 – Dated 04/06/12 Received 04/09/12	Christine B. Reichgott, Unit Manager	U.S. Environmental Protection Agency Region 10, Seattle, WA	K-36 to K-40
Letter #11 – 04/09/12	Linda Driskill	Grant County Conservationists	K-40 to K-41
Letter #12 – 04/09/12	Jeff Juel, Forest Policy Director *and on behalf of* David Mildrexler, Ecosystem Prot. Coordinator Doug Heiken Michael Garrity	The Lands Council Hells Canyon Preservation Council Oregon Wild Alliance for the Wild Rockies	K-41 to K-207
*Letter #13 – Postmarked 04/09/12 Received 04/11/12	Karen Coulter	Blue Mountain Biodiversity Project, League of Wilderness Defenders	K-208 to K-258
Letter #13 and handwritten comments with this letter are attached to the end of this appendix. All other correspondence received is located in the project file and is available for review at Pomeroy Ranger District.			

Comments Received
And
Forest Service Response to Comments

Letter #1	
Jean Public (JP) – 02/24/12	
Comment Number	**Comment and Forest Service Response**
JP-1	**Comment:** pomeroy ranger district 2012-0039 - i object to this plan to burn up the forest, cut it down by logging, and drown it in toxic herbicides by monsanto or dow. this was in the federal register and i am objecting to this plan. it needs to be shut down. it destroys forest health and costs too much money bludgeoned from taxpayers, l out of 2 are presently living in poverty. **Response:** **While we appreciate the fact that you took time to respond to our invitation to comment on the South George project, your comment does not accurately describe the project that we have proposed. The purpose and need for this project were described in Chapter 1 of the DEIS. The alternatives were described in Chapter 2 of the DEIS. The effects to Forest Health and to Economics were discussed in Chapter 3 of the DEIS.**

Letter #2	
Richard Artley (RA) – 03/09/12	
Comment Number	**Comment and Forest Service Response**
RA-1 p. 2	**Comment:** Unnecessary Conifer Tree Manipulation Comment: Whenever a forest is biologically diverse with a mixture of size classes and species, Forest Service line-officers want to return to some historical stand characterists that resemble private industrial tree farms (i.e. parklike, tree species with a high limber value which excludes climax species, and few small diametrter trees. **Response:** **The purpose and need for this project is to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, Chapter 1, p. 1-4). These forest attributes (structure, composition, density) relate to important forest processes, including wildfire, insects, and diseases, and they were not selected or used**

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Richard Artley (RA) – 03/09/12	
Comment Number	**Comment and Forest Service Response**
	(in the analysis) to represent private industrial tree farms or their stand characteristics
RA-2 p. 2	**Comment**: Unnecessary Conifer Tree Manipulation Comment: Please cite the USFS policy directing land managers to manipulate the vegetation in such a way near private land to "improve suppression capabilities" on private land. Please cite the USFS policy directing land managers to manipulate the vegetation in such a way that firefighter safety is guaranteed. This is not a valid reason to log! By eliminating climax species like grand fir, western red cedar subalpine fir and hemlock the Responsible Official will be removing wet sit wildlife habitat. Please include the species whose habitat will be destroyed in the final EIA. **Response**: **In 2001 National Fire Plan was approved by Congress to provide funds for federal and state agencies and local communities to better plan and prepare for future wildfire seasons (www.nationalfireplan.gov). The goals of the National Fire Plan are to ensure sufficient firefighting resources for the future, to rehabilitate and restore fire-damaged ecosystems and rangelands at risk, especially near communities, and to work with local residents to reduce fire risk and to improve fire protection (www.nationalfireplan.gov). The 10 Year Comprehensive Strategy (2001) was developed by Congress as a framework to accomplish the goals set forth by the National Fire Plan. It is a collaborative approach that includes states and local governments to implement a long term program to 1) improve fire prevention and suppression, 2) reduce hazardous fuels, 3) restoration and post-fire recovery of fire-adapted ecosystems and 4) promote community assistance. (www.forestsandrangelands.gov/resources/plan/documents/10-year strategyfinal_dec2006.pdf)** **The implementation outcomes associated with (1) improved fire prevention and suppression is the losses of life are eliminated, and firefighter injuries and damage to communities and the environment form wildfires are reduced (www.forestsandrangelands.gov/resources/plan/documents/10-yearstrategyfinal_dec2006.pdf).** **DEIS, Chapter 3 clearly shows in the indirect effects tables for species composition (Table 3-25, page 3-56, and Table 3-34, page 3-64) that none of the existing tree species will be eliminated by implementing the project. Some of the existing species would be increased, and others would be decreased, by implementing the project, but those changes are desired because they move the species composition closer to the historical range of variability, which is one component of the desired future condition for the planning area.** **Note that western red cedar and hemlock do not occur in the South George planning area, or in the Blue Mountains physiographic province of northeastern Oregon and**

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	southeastern Washington. **Wet sites are protected (DEIS, Chapter 2, Table 2-5, page 2-24). Habitat for some wildlife species will be affected, but there would be minimal effects to wildlife populations. See DEIS, Chapter 3, pages 3-97 to 3-144 for a discussion of effects to wildlife.**
RA-3 p. 3	**Comment**: Unnecessary Conifer Tree Manipulation Comment: Acting Ranger Martinez you follow the USFS script well. I know that the other 3 reasons stated for this timber shown sale above are sugar-coated false justifications. The real reason for the sale is #4. You have been instructed to show it last to make it appear as an afterthought. My timber staff supervisor directed me to do this many times. Most of the time it deceived the public as it was supposed to do. If you wish to maintain your credibility with the public when need #4 shows up in the P&N in the final EA please provide the following information with references: a) identify the "local community," b) tell the public what percent of the employment in the community is based on wood products, c) compare the unemployment statistics for the community in question with similar sized communities not dependent on wood products, d) provide statistics showing the number of people who will return to work if the Loafer Timber Sale is sold, e) indicate if there is a mill in the "local community," f) indicate how much volume the mill has under contract, and g) tell the public the % of the log-yard is currently full. h) most importantly the final EA should state that the sale will be sold under Small Business Authority to assure the logs will be purchased by a corporation in the local community. **<u>Response</u>:** **This comment seems directed at some other project on some other forest; there is no "Acting Ranger Martinez" associated with this project, nor has there ever been a "Loafer Timber Sale" discussed with the South George project. However, we will respond to the statements made in this comment as though they had actually been made for the South George project.** **We respectfully disagree with this comment on the reasons for this project. Information on demographics of the local community and employment are located in the DEIS, Chapter 3, Economic Analysis, pages 3-170 to 3-175. Information on project feasibility, financial efficiency, economic impacts, and references can be found in these pages. Also note Table 3-80 which shows and economic comparison by alternative for this project. Consideration of local economies would also meet Umatilla Forest Plan Goal 1 – *Provide land and resource management that achieves a***

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	more healthy and productive forest and assists in supplying lands, resources, uses, and values with meet local, regional, and national social and economic needs (**Forest Plan, page 4-1*****) and Forest Plan Goal 15 –*** ***Provide for production and sustained yield of wood fiber and insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency*** **(Forest Plan, page 4-2) (DEIS, Chapter 1, page 1-5).**
RA-4 pp. 3-4	**Comment**: Unnecessary Conifer Tree Manipulation Comment: The so-called wildlife habitat need is just a frilly filler in the P&N that the Responsible Official added because he knew it would be popular with the public. Inserting the wildlife habitat need this way is absurd. Every resource on the forest could be added to the P&N with the 2 sentence verbage shown above. Ranger Fujishin, this isn't even a good attempt to deceive the public into thinking this timber sale will be ecosystem-friendly. In order for a wildlife habitat enhancement P&N to be legitimate it must identify: • the species of wildlife that has insufficient habitat, • how and when it was determined that the habitat is insufficient, • how the Proposed Action will correct the wildlife habitat problems, and • literature cites by independent, unbiased scientists indicating that implementing activities like the Proposed Action will be an effective fix. If this cannot done then the Responsible Official has no business including "Wildlife" in the P&N for the final EIS. **<u>Response</u>:** **We respectfully disagree with this comment. Because the majority of acres (about 18,700 acres) in the project planning area are Forest Plan management area allocations with big game and wildlife habitat goals (C3, C3A, and C4) the District Ranger determined that there is a need to continue to provide and manage wildlife habitat and its components (cover and forage) in South George project planning area (DEIS, Chapter 1, page 1-4). This would be achieved by meeting Forest Plan goals and management area standards and guidelines allocated to the project planning area for wildlife habitat (DEIS, Chapter 1, pages 1-5 to 1-7).** **Consideration of continuing to provide and manage wildlife habitats and its components would also meet Umatilla Forest Plan Goal 9, -** ***Provide and manage big game (elk and deer) habitat and its components (cover, forage, and roads) to assist in meeting states wildlife agency population management objectives*** **(Forest Plan, page 4-2).** **Wildlife habitat and species are analyzed in the DEIS, Chapter 3, pages 3-98 to 3-141.**
RA-5 p. 4	**Comment:** Creating industrial tree farm conditions (as the South George timber sale will do) in any

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	forest reduces the all-important biological diversity so critical to the proper functioning of the non-vegetative natural resources. Please serve the American people by taking action to benefit the natural resources in the forest rather than taking action to assure that next year's timber-related budget items for the Umatilla National Forest are not reduced below the level for this FY. The countless natural resources in the forest cannot be improved by implementing activities that use 30,000 pound heavy industrial equipment with spinning wheels and tracks. The best activity in this timber sale area is RX burning and road decommissioning. Forests are more than merchantable conifer tree species. Please live-up to the USFS motto: "Caring for the Land and Serving People." This project does neither. **Response:** **We respectfully disagree with this comment. The following narrative found in the DEIS, Chapter 1, pages 1-4 to 1-5 describes why there is a need for taking action.** **Vegetation – There is a need to move forest structure, species composition, and stand density toward their historical ranges of variability (HRV). By moving these forest attributes toward HRV, ecosystem processes, such as response to wildfire, insects and disease, are more resilient and self-sustaining (Egan and Howell 2001, Holling and Meffe 1996, Kaufmann et al. 1994). This would be accomplished by favoring fire tolerant species, increasing old forest structure, and reducing stocking density to levels that resist insects, diseases, and stand-replacing wildfire(s). Improving vegetation resilience and sustainability are expected to increase proper ecosystem function, not reduce it as is claimed.** **Fuels – There is a need to manage forest stands in Condition Classes 2 and 3 to begin to restore vegetation characteristics and fire return intervals characteristic of historical fire regimes. This would decrease the probability of uncharacteristic high intensity wildfires by reducing fuel loads to levels expected under natural fire disturbance regimes. This would be achieved by lowering stand densities, increasing the relative abundance of fire tolerant species, reducing existing ladder, surface, and canopy fuels, while improving suppression capabilities on forest land and adjacent private land, and reintroducing landscape prescribed fire into the ecosystem.** **Timber Production – There is a need to provide sawlogs and wood fiber for utilization by regional and local economies. This would be accomplished by the commercial harvest of wood fiber.** **Wildlife Habitat – There is a need to continue to provide and manage, over time, for wildlife habitat and its components (cover and forage). This would be achieved by**

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	meeting Forest Plan goals and management area standards and guidelines allocated to the project planning area for wildlife habitat.
RA-6 p. 6	**Comment**: Timber Harvest Comment #1: The South George project is not a multiple use project because it damages "the various renewable surface resources of the national forests" in order to extract trees to generate profit for the purchaser. **Response**: **We respectfully disagree with this comment. Please see response to Comment RA-5.**
RA-7 p. 7	**Comment:** Timber Harvest Comment #2: The log landings, temporary roads, skid trails and skyline chutes created for the South George project's logging activities will be a source of sediment during precipitation events. The only way to prevent erosion from bare soil created by logging activities is to place sediment traps between all bare soil created and live water. This has not been proposed. **Response**: **DEIS, Chapter 2, Table 2-5 Project Design Features and Management Requirements pages 2-20 to 2-23 identifies where and how work will occur. No landings, temporary roads, skid trails, or skyline chutes would be created inside RHCAs by the projects proposed activities in South George project planning area. RHCAs would provide sediment trapping and filtering for any ground disturbance that could occur from these activities, DEIS, Chapter 3, pages 3-23 to 3-26.** **There will be standard placement of erosion control barriers and diversions; these are the usual and accustomed practices within timber sale contracts. Administration of past timber sale contracts has shown these practices to be effective in preventing any erosion from entering streams (DEIS, Chapter 3, page 3-31). In addition is standard practice there are effective ground cover requirements intended to minimize the production of sediment from exposed ground. Lastly temporary roads would be decommissioned as part of the project design and placed back into productive capacity in the long-term; this decommissioning will improve infiltration and surface roughness to the point that erosion and sediment will return to background levels. During the time of the project implementation it is assumed that there will not be a measureable increase to sediment delivery.**
RA-8 p. 7	**Comment**: Timber Harvest Comment #3: The log extraction activities that will occur on the South George project will adversely affect hydrologic processes by 1) reducing canopy interception/evapotranspiration, 2) decreasing hydraulic conductivity and increase soil bulk density, 3) collapsing some of the subsurface pipes, 4) increasing local pore water pressure in the soil which will increase the chance of landslides. This ecological damage cannot be mitigated. The Responsible Official must not deny that this damage will occur without science citations to verify the claim. The Responsible Official must not tell the public that

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	these are acceptable, short term results of timber harvest without science citations to verify the claim. **Response**: **We respectfully disagree with this comment. Changes in canopy closure and so in interception/evapotranspiration effects to water yield are incorporated into the analysis by modeling; DEIS, Chapter 3 pages 3-18 and 3-27 and would have no measureable effect to hydrologic function including capture, storage, or release of water.**
RA-9 p. 7	**Comment**: Timber Harvest Comment #4: The log extraction activities that will occur on the South George project will remove material that harbors a myriad of organisms, from bacteria and actinomycetes to higher fungi. These organisms play an important role in the forest. Rotting logs are the only way the organic matter in forest soils is replenished. When living trees are removed and not allowed to fall and deteriorate into the soil naturally the future growing conditions will be harmed. This project does not include fertilization to mitigate the loss of organic matter. **Response**: **It is true that rotting logs and forest detritus do harbor such environments and biological communities that are beneficial to the soil and there is no plan to add amendments for soil productivity. However, the project is to remove material viable for merchantable sale; rotting logs and forest detritus are extremely unlikely to be considered a merchantable forest product.**
RA-10 p. 8	**Comment**: Road Construction Comment #1: The Responsible Official's Proposed Action ignores Dr. Dombeck's wisdom. No amount of timber harvest justifies the long term damage caused by constructing forest roads. This applies to temporary roads that are not fully obliterated by bringing the soil back to the natural angle of repose (putting the soil in the fills back) and seeding with native grasses. **Response**: **Not sure of the original source of this citation, but there is a long list of peer reviewed papers that suggest this may be an over simplification; provided that there is soil left for restoration. Froehlich & McNabb 1983 found that tree growth can positively be influenced by soil tillage. Henninger et al. 2002, provide some quantitative results indicating that subsoiling will improve both volume and yield of trees. Then when we read Luce 1997, it is learned that some soils do not remain decompacted without some return of organic matter. While Luce does not speak of recontouring (putting back the soil slope) in his paper; personal communication with the author indicates that judicious application of full obliteration (where needed for hydrological reasons) can achieve a reasonable recovery.**

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RA-11 p. 8	**Comment**: Road Construction Comment #2: The map of the South George sale area shows a road density that's so high that it will be impossible for the aquatic resources in the vicinity of the proposed timber sale to function properly. At the present time there is enough road in the national forests of America to stretch to the moon and halfway back. If the Responsible Official were really concerned with serving the public and protecting the resources no roads would be constructed on this project. Indeed, it is not tragic if the trees without road access are left standing. This is a situation where the Responsible Official's obsession with accumulation maximum volume should yield to the protection of all natural resources. **Response**: **We respectfully disagree with this comment. Effects of the current road system are evaluated in the DEIS, Chapter 3, pages 3-17 to 3-18 and road maintenance has been proposed to treat those issues on sale haul routes (pages 3-23 to 3-24). Alternative C proposes 31 miles of road decommissioning and an additional 15 miles of decommissioning of unauthorized roads.**
RA-12 p. 8	**Comment**: Road Construction Comment #3: The new road construction planned for the South George project will have compacted road surfaces which will generate overland flow containing sediment during precipitation events. Much of this sediment often enters the stream channel system, locally increasing peak flows and increasing aquatic resource-harming turbidity. No mitigation or BMP application will remove all the sediment laden water before it reaches the stream. This should be reflected in the cumulative effects analysis in Chapter 3. Please don't lowball the sediment being produced from old system roads and old temporary roads that still generate sediment. Please don't tell the public that such adverse effects are acceptable because they are "short term." **Response**: **We respectfully disagree with this comment. Temporary road construction is proposed in Alternative B (approximately 3 miles) (DEIS, Chapter 2, page 2-15). Proposed locations would minimize ground disturbance (Appendix A – maps). These locations are not connected to the hydrologic system because of their locations and so any potential sediment would not reach streams, see DEIS Chapter 3, page 3-24.** **See response RA-11 regarding the existing road and unauthorized road system.**
RA-13 p. 8	**Comment**: Road Construction Comment #4: The new road construction planned for the South George project will fragment wildlife habitat and alter animal behavior by causing changes in home ranges, movement, and reproductive success, and will divide large landscapes into smaller patches which will convert interior habitat into edge habitat. This cannot be mitigated. This should be reflected in the cumulative effects analysis in Chapter 3. Please don't lowball the adverse wildlife effects of the road construction to wildlife. Please don't tell the public that such adverse effects are acceptable because they are "short term."

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	Response: **We respectfully disagree with this comment. No new system road construction is proposed. All temporary roads would be decommissioned after project activity use. The effects of the proposed temporary roads were evaluated for various wildlife species and habitats (DEIS, Chapter 3, pages 3-103 to 3-141.**
RA-14 p. 8	**Comment**: Road Construction Comment #5: Of course the Responsible Official is now trying to determine who will write the denial statements for the 4 road construction comments above. Please assure that these denial statements include references to unbiased, independent science that support the denial. We both know that USFS line-officers will say anything to continue their forest's timber program. **Response**: **We respectfully disagree with this comment regarding USFS line officers.** **See responses to Comments RA-10, 11, 12, and 13.**
RA-15 p. 8	**Comment**: Road Construction Comment #6: The DEIS indicates that 3 miles of "temporary" road will be constructed and decommissioned after project activity use. Real temporary roads are obliterated after us so there is no running surface and the fill material is placed back so the sideslope is the same angle as it was before the road was constructed Decommission is defined in the glossary: Decommission – Activity that results in the stabilization and restoration of unneeded roads to a more natural state. Removes the road segment from the Forest road inventory system. Decommissioning can involve: closing entrances; scarifying road surfaces, or decompacting (sub-soiling) to establish vegetation and reduce run-off.; seeding to control erosion; partial to full restoration of stream channel by removing culverts and fills; and removing unstable portions of embankments. Obliterate is conveniently not defined in the glossary. Finally, a so-called "temporary" road is a road and definitely not ecosystem benign unless it is obliterated. Please don't deceive the public by using the word "decommissioned" when knowledgeable people know this will render the road a long-term sediment source … even if brush is spread on the surface and it is planted to grass. A temporary road is only temporary when it is modified such that it can never be driven by any vehicle again **Response**: **To decommission a road, either a temporary road or a system road, is the process to stop the route being used for any further motorized travel activities, breakup the compaction that the construction or use of the road has created, restore hydrologic**

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	function, stop any movement of sediment along the route and begin reestablishment of vegetation. **Decommission versus obliteration is basically the same end result of removing a road from the landscape, however decommission allows an approach that matches the landscape where the road exists. In the past obliteration involved ripping a road no matter what the subsurface composition was. This produced some very poor results in thin soils underlain with solid or fractured rock. With decommissioning, roads in the thinner soils could be scarified and no subsurface rock disturbed, the surface drained and revegetated. Decommissioning allows the process and end product to promote a desired end result that is matched to the situation on the landscape.** **Also see your comment RA-5 where you state "The best activity in this timber sale area is RX burning and road decommissioning".**
RA-16 p. 10	**Comment**: Insect Comment #1: Such natural disturbance events are necessary to maintain the forest's biological diversity. Insect activity is an indicator of a healthy properly functioning forest. Trees killed by insect activity are important habitat for scores of wildlife species. Trees killed by insect activity provide the organic matter to replenish and enrich mineral soils. Indeed, dead and dying trees have great ecological value in the forest. These conditions cannot be artificially created. **Response**: **While it may be clear that trees dying from any vector (insects, disease, or maturity) can add to the organic content of the soil. It is not clearly understood if there is a direct correlation to the mineralization of nutrients (i.e. enrichment); a recent study by Page-Dumroese et al. 2010 found no western US study that identified a reduction in OM from thinning. The paper then assumed that it is unlikely "one thinning would remove enough OM to cause such soil changes; repeated thinning over the life of the stand might impact some soils". Since this proposal is for one entry it is assumed that there will be no measureable impact to soil productivity.** **The insect and disease susceptibility section of the DEIS, Chapter 3, page 3-70, states that "Having an ecologically appropriate representation of insect and disease susceptibility well distributed throughout the South George planning area is a desired future condition for forest vegetation." This statement acknowledges that insects and diseases are an important component of ecosystem function, and we agree in principle with the commenter's statement that "Insect activity is an indicator of a healthy properly functioning forest." However, insect and disease susceptibility also occurs within characteristic levels that are closely related to forest structure, species**

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	composition, and stand density because these components provide habitat for insect and disease organisms. This means that when structure, composition, or density occur at uncharacteristic levels (either above or below their historical ranges of variability), then uncharacteristic levels of insect or disease activity would also be expected. No aspect of the project's purpose and need, or its proposed action, is designed to reduce insect activity and its associated ecosystem services (snag and down wood creation, nutrient cycling, wood decomposition, etc.) to levels below what is considered characteristic for native insects and diseases of the planning area. **Effects to wildlife that utilize dead and dying trees were considered in this analysis (DEIS, Chapter 3, pages 3-98 to 3-141).**
RA-17 p. 10	**Comment**: Poor Lumber Market Comment #1: The Purpose & Need describes why this timber sale is being planned. There is no need for logs. It's unwise to push timber on the nation that isn't needed … and spend precious dollars and harm the forest ecosystem simultaneously. **Response**: **We respectfully disagree with this comment. One only needs to talk with local mill owners, workers, county commissioners, and timber industry spokespersons to understand that there is still a demand for lumber and biomass. While it is true that the demand is not as high as it was during the past few decades, there is still unmet demand.** **In addition, this project is designed to implement a part of the Umatilla Forest Plan. Umatilla National Forest Land and Resource Management Plan, as amended (Forest Plan, 1990) includes multiple-use forest-wide goals and objectives for management of the National Forest. Forest-wide goals apply to all areas of the forest, whereas allocated management area (MA) goals are applied to specific management areas. One of the goals cited for this project is as follows (DEIS, Chapter 1, page 1-5): Forest Plan Goal 1 –** ***Provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources, uses, and values with meet local, regional, and national social and economic needs*** **(Forest Plan p. 4-1).**
RA-18 p. 10	**Comment**: Poor Lumber Market Comment #2: The article states: "Local log contractors say the Forest Service needs to do a better job in understanding the marketplace before offering timber for sale." The Umatilla National Forest is no different. Selling timber sales now to bolster the timber availability when the market returns to normal is absurd. There is no more room to deck the logs at the mills. **Response:** **We respectfully disagree with this comment. The management of Umatilla National Forest has the potential to affect local economies. Production of resources and recreational use on the Forest generate employment and income in the surrounding**

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	communities and counties and generate revenues that are returned to the federal treasury. **The economic analysis for this project measures three aspects of the project's economic merits. They are project feasibility (sale viability), financial efficiency (PNV), and economic impacts (number of jobs). An economic comparison by alternative is located in Chapter 3, Table 3-80 (DEIS, Chapter 3, pages 3-170 to 3-175).** **The Western Wood Products Association (WWPA) Index (C) is an average of delivered lumber prices for all the main timber species from all the mills within this geographic region. During a 3 year period from June 2009 to June 2011, timber prices increased on average 68% for all species within this area (copies of WWPA indices are located in the project file).** **See response to Comment RA-17.**
RA-19 p. 10	**Comment**: Poor Lumber Demand Comment #3: The Responsible Official is proposing this project to fulfill his Regional volume expectations … it's certainly not needed now with housing starts at an all-time low and with the timber coming from private industrial tree farms more than meeting the domestic need for products made from softwood. **Response**: **See responses to Comments RA-3, RA-17, and RA-18** **About 44% of Washington's forestland is federal, but only 2% of the annual harvest comes from federal forestlands (source: Forest Facts & Figures, Washington Forest Protection Association, Olympia WA; 2001; 17 p.). Since the Umatilla National Forest's Forest Plan allows timber harvest as a socioeconomic activity, then why shouldn't harvest occur and thereby provide social and economic benefits while also addressing the disparity between federal and non-federal harvest levels? The FEIS for Umatilla Forest Plan clearly shows that timber harvesting is not being done solely to provide lumber, but also affects other resources, for example, it is used a tool for managing wildlife habitat, creating recreational opportunities, and creating transitory range that benefits grazing. To address a potential timber sale as only creating lumber is to greatly oversimplify forest management.**
RA-20 p. 11	**Comment**: Eliminating Fire far from the WUI Comment #1: Stand-replacing fires are not catastrophic in spite of USFS claims to the contrary. Of course merchantable trees burn and die during fires. So what? This would be a problem only if the USFS were mandated to spend taxpayer's money in the general forest far from any WUI to save merchantable trees for the timber industry. Thankfully, Congress has never indicated t that this is a USFS mission.

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	Response: **This project was not prepared using the Healthy Forest Restoration Act (HFRA), which contains a variety of provisions to expedite hazardous-fuel reduction and forest-restoration projects on specific types of Federal land, and uses an expedited process.** **Background information for this project (DEIS, Chapter 1, pages 1-2 to 1-4) shows that based upon current vegetative and fuel trends in the project planning area, and contrasting them with desired future conditions identified in Umatilla National Forest Land and Resource Management Plan (Forest Plan, pp. 4-3 to 4-14), and recommendations made in the Asotin Watershed Assessment (pages VI-1 to VI-3). The Asotin Watershed Assessment recommended the use of timber harvest to thin dense stands, reduce fir, retain pine and larch to convert to early-seral species stands, and allow fire prescriptions to reduce fuels. Based on these recommendations and the difference between the current conditions of the area and the Forest Plan's desired future conditions, the purpose of and need for action for this project is to improve forest health, vigor, and resilience to fire, insects, and disease in upland forests that are outside their historical pre-fire suppression conditions for species composition, structural diversity, stocking densities, and fuel loadings.**
RA-21 p. 11	**Comment**: Eliminating Fire far from the WUI Comment #2: If forests aren't supposed to burn in the forest then why does fire (lightening) come from the sky during the summer when the humidity is low and the temperatures are high? **Response**: **As with almost all drier forest types in the West, Native American, and lightning ignitions combined to produce relatively short fire return intervals (Agee 1993). Historically, fire was a dominant disturbance type in most forests in the Pacific Northwest. These fires kept stands from becoming overstocked and ground fuels from accumulating. In the late 1800's and early 1900's settlers began moving to the northwest and the establishment of Forest Service (Agee 1993.) Along with establishment of the Forest Service came policy to suppress all wildfires (Agee 1993.) Decades of fire suppression has allowed timber stands to become overstocked and ground fuels to accumulate resulting in increased fire severity in forest types that once were adapted to low intensity wildfires.** **Four historical fire regimes commonly occur in the Blue Mountains (Powel, 2005). Fire Regimes I, II, III and IV are represented in the South George project planning area. A fire regime is a classification of the historical role fire would play across a landscape and describes the historical fire conditions under which vegetative communities evolved and are maintained (Agee 1993). Fire regimes are classified based on the average number of years between fires (frequency) combined with the severity of the fire.** **South George project is designed to return the treated area to a condition that more**

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	closely resembles the historical conditions that existed prior to the major fire suppression effects of the 1900's.
RA-22 p. 11	**Comment**: Eliminating Fire far from the WUI Comment #3: Reducing fuels in the general forest not associated with a WUI is an excuse to extract volume. Please eliminate all references to fuels in the final EA. **Response**: **First, this project analysis is not being documented in an EA (environmental assessment), but in an EIS (environmental impact statement). Asking us to eliminate all references to fuels in the EIS is asking us to prepare an incomplete NEPA document and would violate the requirements of NEPA and its implementing regulations. We will not do this.** **Native American and lightning ignitions occurred throughout the entire forest. Human interaction with fire was common throughout dry forest types in the West (Agee 1993). Lightning fires added to the human ignitions (Agee 1993). In the Blue Mountains, fire return intervals in the Douglas-fir forests was 10 years (Agee 1993). Douglas-fir plant associations were once more open in appearance than they are today with western larch in areas (Agee 1993). Frequent low intensity fires kept sites open so that they were less likely to burn intensely even under severe fire weather (Agee 1993). Because of fire protection, stocking has increased and fires have become more intense in these drier forest types (Agee 1993). There is also high levels of insect and disease susceptibility, caused largely by overly dense forests and low vigor trees (a consequence of overcrowding) (Powell 2009). These are all symptoms of impaired forest health and deteriorating ecosystem integrity (Powell 2009).**
RA-23 p. 12	**Comment**: Clearcut Comment 1: The Responsible Official has no business treating the public land as if it were a private industrial tree farm especially given that polls show that 94% of the publics using the national forests abhor clearcuts. The Responsible Official prefers to serve the resource extraction corporations rather than the American public. Foresters educated in industrial forestry prescribe clearcut RXs because that's the regeneration method that generate the maximum $$$ return from the site. They were educated to manage private industrial tree farms. **Response**: **See response to Comment RA-1 – this project was not designed to represent private industrial tree farms or their stand characteristics.**
RA-24 p. 12	**Comment**: Clearcut Comment 1: The public deserves to know how the USFS ménages their land. Attachment #26 contains photographs of clearcuts on national forest land. Please choose the clearcut photo that will most closely resemble the clearcuts created as part of the South

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	George timber sale and insert it into the final EIS. If none of the pictures describe the clearcuts, please show the one that will be the closest. **Response**: **No photographs were received with the comment, so no response will be provided for them. The DEIS provides a conceptual drawing showing how clearcutting with reserves will be implemented for the South George project, see figure 2-2, page 2-12, in Chapter 2. As described in the caption for figure 2.2, and as depicted in the drawing, the clearcutting with reserves cutting method reserves (from harvest) both live trees and dead wood, while also providing open areas for regeneration of early-seral tree species and shrubs.**
RA-25 p. 12	**Comment**: Clearcut Comment 1: The Responsible Official has chosen to withhold this important information from the public without a reason. **Response**: **We respectfully disagree with this comment. A description of regeneration cutting and a visual example (Figure 2-2) is located in the DEIS, Chapter 2, pages 2-10 to 2-13.**
RA-26 p. 13	**Comment**: Alternative F - Bring project area streams into fully functioning condition. The Responsible Officials reason for rejecting this citizen-generated alternative: "Because current aquatic conditions are improving and meeting PACFISH RMOs (Chapter 3, Table 3-14), this alternative was considered but not analyzed in detail." Public Alternative Suggestions Rejected by Responsible Official Comment: The public is told in Chapter 3 that road construction and logging activities will adversely effects the aquatic conditions in the streams which will reduce the rate of improvement. This alternative makes sense, describes the public wishes for aquatic conditions in their forests and the results of the detailed analysis must be disclosed in the final DEIS. **Response:** **Alternative F – Bring project area streams into fully functioning condition as described in the DEIS, Chapter 2, pages 2-33 to 2-34, would have required entering riparian habitats that are not accessible. Current conditions on Umatilla Forest are at near "natural" condition. As noted in the comment, the habitat currently meets PACFISH RMO's (DEIS, Chapter 3, Table 3-14). Therefore, no further discussion of this alternative was put forward.** **The second part of the comment states that road construction and logging activities would adversely affect aquatic conditions is misleading. However, access to the riparian would be easier for grazing cattle by creating openings and pathways closer to the RHCA's. This could have an effect on riparian conditions. The Biological**

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	Determination as identified in Chapter 3, page 3-44 is "May Effect, Not Likely to Adversely Affect" for the short term (less than one year) for Snake River Steelhead and Columbia River Bull Trout. It is also noted that road obliteration, cutslope planting/stabilization, culvert replacements, downstream in-channel improvements will continue to improve the cumulative RMO values negating potential impacts as part of the preferred alternative.
RA-27 p. 13	**Comment**: Alternative G - Focus on wildlife habitat enhancement , watershed restoration activities, old growth protection (minimum fragmentation), and fewer impacts to non-motorized recreation Public Alternative Suggestions Rejected by Responsible Official Comment: Ranger Fujishin, by rejecting this alternative in favor of a corporate-friendly alternative you have directly assaulted the Americans in your area who enjoy recreating in the Umatilla National Forest. Incredibly, you reject Alternative G with the statement: "In reviewing the elements of this suggested alternative it was determined that it does not address the project's purpose and need to improve health, vigor, and resilience to fire, insects, and disease in upland forests that are outside their historical pre-fire suppression conditions for species composition (including hardwood species), structural diversity, stocking densities, and fuel loads, nor would it provide sawlogs and wood fiber products for utilization by regional and local industry. The purpose and need for this project includes the need to continue to provide and manage over time for wildlife habitat and its components (Chapter 1, page 1-5). Alternative D for this project is designed to maintain existing cover and structure in old forest stands and maintain existing structure in other declining stands that are still providing essential habitat for many wildlife species (p. 2-26). Implementation of proposed activities in Alternatives B, C, and D would continue to meet Forest Plan goals to provide and maintain wildlife habitat (pages 2-42 to 2-44). Based on the information above, this alternative, as stated, was considered but not analyzed in detail." This proves that the P&N for this timber sale was consciously constructed narrowly so as to provide you with illegal justification (that would be easily recognized by a child) to reject all alternatives that really improve the natural resources in the South George sale area. You know that if you analyzed Alternative G in detail you could not come up with enough lies to not select this "reasonable" alternative. This is a classroom example of how a USFS Responsible Official thinks they can violate with impunity. This one violation of law would guarantee a loss in Federal District Court. If alternative G is not analyzed in detail the public will never trust and respect you again. What you have done here defines "atrocity." Hundreds of millions of Americans would agree alternative G should be selected.

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	Those pesky members of the public sometimes actually try to interact with the USFS. **<u>Response</u>:** **Treatments in Alternative D respond to the purpose and need for the project and respond to the issue of maintaining existing moist old forest stands in the project planning area. Design elements for Alternative D are located in the DEIS, Chapter 2, pages 2-29 and 2-30.** **Environmental effects to old forest are described in the DEIS, Chapter 3, pages 3-102 and 3-103 as follows:** **No harvest would take place in either types of moist old forest (OFMS and OFSS). The approximately 580 acres of moist OFSS proposed for harvest in Alternatives B and C would not be treated in order to maintain cover and structure in stands adjacent to old forest and other key areas, thereby reducing fragmentation of forest canopy. No regeneration type harvest would occur in any structural stages in moist forest. There would be less intermediate harvest proposed in the largest patches of old forest, which are primarily old forest single story stands in mixed conifer grand fir.** **Overall, timber harvest and fuels reduction treatments would affect 1,300 fewer acres than Alternatives B and C. In comparison there would be a smaller effect on wildlife species that show a preference for higher canopy closure and generally more complex stands. All moist old forest stands would remain in their current state, providing more large tree, snag and down wood habitat for species such as pileated woodpecker and northern goshawk than Alternatives B and C.**
RA-28 p. 14	**Comment**: Best Science Comment #1: This member of the public feels that the science statements contained in the attachments to these comments constitute science that's at least as accurate as the science literature in the References section of the DEIS. **<u>Response</u>**: **Your comment has been noted. No attachments were provided.**
RA-29 p. 14	**Comment**: Best Science Comment #2: The Responsible Official consciously excluded science that describes natural resource harm from the References section in the DEIS. The Responsible Official carefully selected science references that support the timber sale (mostly authored by USDA employees). This clearly shows that the project is not based on best science. **<u>Response</u>:** **We respectfully disagree with this comment.** **The best available science as determined by resource professionals on the IDT for this project is identified in the literature cited section of the DEIS (pages L-1 to L-39). Also see Appendix L of the FEIS.**

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	Additional science references are located in the report entitled Review of Best Available Science for Forest Vegetation: South George Vegetation Management Project- November 2009 (project file).
RA-30 p. 14	**Comment:** Best Science Comment #3: There are hundreds of opposing views statements included in the attachments. If the Responsible Official is concerned about basing this project on best science, he will examine the literature cited in the attachments and modify this project according to the science that describes methods to reduce the environmental impacts of this timber sale. **Response:** **Your comment has been noted. No attachments were provided.**
RA-31 p. 17	**Comment:** Dangerous Herbicides Comment #1: The Responsible Official should tell the public if alternative noxious weed treatments were considered and why they were rejected. If cost is the reason, please describe if $$$ for safe unwanted vegetation treatment is not available and if other funding might be available. Most members of the public will demand that the agency spend more money to protect the health of their children. **Response:** **South George DEIS incorporates by reference Forest Plan Amendment #30, Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Umatilla National Forest Plan by adding management direction relative to invasive plants. The DEIS also incorporates by reference the Invasive Plants Treatment Project (FEIS), Umatilla National Forest, decision dated July 2010 which authorizes treatment of invasive plant species over a 5-15 year period using manual, mechanical, biological, herbicide, and cultural treatments. Under the 2010 decision, up to 4,000 acres may be treated annually, including known sites and those detected in the future (DEIS, Chapter 1, pages 1-11 to 1-12).** **Invasive plants in the project planning area will be treated as identified in this DEIS (Chapter 3, Table 3-72)**
RA-32 p. 17	**Comment**: Concluding Comment: It's certain that when the Proposed Action described in the DEIS is implemented the natural resources in (and downstream) from the project area will be degraded. This is not consistent with the duty of the Responsible Official to implement actions that will benefit the majority of the American people. There are no situations where the agency should harm the forest's natural resources to extract commodities. There is currently no shortage of raw materials for wood-based consumer products nor is their reliable science predicting such a shortage in the foreseeable future.

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	<u>Response</u>: **We respectfully disagree with this comment. Downstream natural aquatic resources will not be negatively impacted. Temperature and sediment were originally defined as the limiting factors for aquatic salmonid production (M.Kuttle Jr., March 2002). Since then sediment and temperature values have been reduced in these watersheds.** **Desired future condition for this area is for a more natural fire regime that allows for increased habitats for wildlife and big game. Road obliteration and revegetation of native species is a goal under this project.** **The Asotin Watershed has received Washington State recognition for restoration efforts. It has been determined, that habitat diversity is now the leading detriment to aquatic habitat. This project planning area has been selected as an Intensively Monitored Watershed (IMW, a National Program) to ensure that restoration and other activities positively improve conditions for the return of anadromous species (Project file, BE for TES Aquatic Species, page 17). The current assessment and project activities are being monitored by "Ecological Research" of Logan Utah, affiliated with Utah State University. This process has over sight from Washington Department of Fish and Wildlife, Snake River Salmon Recovery Board's Regional Technical Team, and the Governors Salmon Recovery Fund Board.**

Letter #3	
Dave Fritts – 03/27/12 Guy Bennett Lumber (GBL)	
Comment Number	**Comment and Forest Service Response**
GBL-1 p. 1	**Comment:** I would certainly agree that alternative B is the best of the four proposals for reduced stand densities for fire and healthy forests. **<u>Response</u>:** **Your comment has been noted.**
GBL-2 p. 1	**Comment:** I would however disagree with some of the prescriptions to achieve that goal. I would recommend that all small diameter trees (trees less than 7" dbh) be optional to the purchaser. **<u>Response</u>**

Letter #3	
Dave Fritts – 03/27/12 Guy Bennett Lumber (GBL)	
Comment Number	**Comment and Forest Service Response**
	DEIS, Chapter 2, page 2-7 under the heading description of timber harvest reads: Some treatment units may include the removal of sawlogs, small diameter trees (generally less than 7.0 inches diameter at breast height (DBH)) and excess down wood for use as woody biomass products. Harvest objectives would vary by stand condition and fire management objectives (see Appendix A for maps and Appendix B for a listing of units and treatments). **The FEIS does not require that trees less than 7" dbh be removed; note the word "may" in the above reference to the DEIS. This is allowing for the option of including this material. This is included so that as the effects analyses were prepared, our specialists, and the public, are informed of this possible treatment. There is a market for biomass products and, where appropriate based on the conditions in specific units, this treatment may be utilized to meet the desired treatment objectives while providing a commercial product.**
GBL-3 p. 1	**Comment:** I support your effort and encourage the Forest Service to get a sale from this project on the market. **Response:** **Your comment has been noted.**

Letter #4	
Michael Krochta (MK) – 04/02/12	
Comment Number	**Comment and Forest Service Response**
MK-1 p. 1	**Comment:** I urge you to discard the proposed South George Vegetation and Fuels Management Project in the Umatilla. **Response:** **Your comment has been noted**.
MK-2 p. 1	**Comment:** Commercial logging of old trees which are important components of habitat for Pileated Woodpeckers, American Marten, Gray Wolves, Canada Lynx, Elk, Northern Goshawk, Great Gray Owl, Three-toed Woodpecker, Black Bear and several neotropical songbirds is unacceptable **Response:**

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	Environmental effects analysis for species listed above is located in the DEIS, Chapter 3, pages 3-103 to 3-141. Findings of Consistency (DEIS, Chapter 3, pages 3-141-3-142) disclose that all action alternatives are consistent with Umatilla Forest Plan, Endangered Species Act, Migratory Bird Act, and Bald and Golden Eagle Protection Act.
MK-3 p. 1	**Comment:** If the area proposed in the South George project includes 43% land which has never been logged with no roads, this is a very rare and important condition which is crucial to species like gray wolves and lynx. **<u>Response:</u>** **Other undeveloped lands are defined as - These acres of land have no history of harvest activity, do not contain forest roads, and are not designated as a wilderness area or inventoried as a potential wilderness area (DEIS, Chapter 3,page 3-178). Many of these acres have not been harvested because they are open grasslands in the northern part of the project planning area, that have no evidence of ever having had trees on them. Please take a look at the orthophoto map H-1A (an orthophoto is basically a composite aerial photograph) in Appendix H. Open grasslands are not a rare or unique habitat on the Umatilla National Forest. See Table 3-81, page 3-179 for a contextual display of Wilderness and Roadless Ares in the PNW Region, Umatilla National Forest, Pomeroy RD, and South George project planning area.** **Other undeveloped lands with no proposed thinning or mechanized activity would retain their intrinsic physical, biological, and social values as described in the affected environment. They would remain free of developments such as forest roads or timber harvest stumps. All 8,785 acres of other undeveloped lands within the project planning area would still not be considered PWAs, inventoried roadless areas, or a designated wilderness area (DEIS, Chapter 3, page 3-187). All acres of other undeveloped lands would continue to not meet inventory criteria as potential wilderness areas and would continue to not be an inventoried roadless area or a designated wilderness area.** **Any areas with unique ecological values within South George project planning area are currently maintained for those values with Forest Plan standards and guidelines for management area allocations such as C1-Old Growth, C3-Big Game Winter Range, C3A- Sensitive Big Game Winter Range. See DEIS, Chapter 1, pages 1-12 to 1-14, for brief descriptions of goals, and standards and guidelines associated with each Forest Plan management area allocations located within South George project planning area (DEIS, Chapter 3, page 3-184).** **Umatilla National Forest is considered 'unoccupied' by Canada lynx (DEIS, Chapter 3, page 3-135) and a determination was made that proposed activities would have no effect.** **Proposed activities would not disturb key wolf areas such as den sites or rendezvous**

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	areas, would not change prey availability, and would not increase public access in the area. Wolves are not known to be using the area currently therefore; there would be no impact to gray wolf (DEIS, Chapter 3, page 3-139).
MK-4 p. 1	**Comment:** A timber sale like this would receive much opposition if more people knew about this percentage of pristine wilderness and I am surprised, living in Portland, that timber sales like this are proposed in the Umatilla as I am not used to seeing such in forests closer to my home like Mt. Hood NF. Logging trees over 21 inches dbh is not in the best interest of maintaining ecological balance within these rare stands. **Response:** **Sixty-one percent of national forest lands in the Blue Mountains are unavailable for timber harvest (Rainville et al. 2008, p. 60), and this same percentage applies to the Umatilla National Forest. This means that timber sales and wood products are generated from only 39% of the land base, with the balance retaining its status as "pristine wilderness." See DEIS, Chapter 3, Table 3-81, page 3-179 for a contextual display of wilderness, etc.** **This project complies with the Eastside Screens amendment to the Forest Plan, which dictates whether trees over 21 inches dbh can be removed during a timber harvest project (DEIS, Appendix C). For the Moist Upland Forest biophysical environment, an historical range of variability analysis indicates that removing trees over 21 inches dbh is unwarranted (other than for safety reasons, such as danger trees along travel corridors), and trees over 21 inches dbh will not be removed from the Moist Upland Forest portions of the project area. For the Dry Upland Forest biophysical environment, the historical range of variability analysis indicates that removing trees over 21 inches dbh is permissible when doing so is compatible with the project's goals and objectives (as described in Chapters 1 and 2 of the DEIS), and trees over 21 inches dbh will be removed from the Dry Upland Forest portions of the project area.**
MK-5 p. 1	**Comment:** The three action alternatives considered in the area (B,C,D) by the Forest Service include logging in old, never-logged forest, virtual clear-cutting (seed tree, shelterwood, or group openings-style logging), and logging on very steep slopes with sensitive soils. This kind of management does nothing to benefit previously mentioned species which use the area. Planned violations of the Forest Plan through amendments to rubber-stamp this project are unacceptable and in my opinion deserve litigation. **Response:** **The project does include timber harvest (logging) in old forest, application of regeneration cutting methods (clearcutting with reserves; seed-tree cutting with reserves), and harvest methods on steep slopes (skyline and helicopter systems) when doing so would move forest structure, species composition, and stand density toward**

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	their historical ranges of variability (DEIS, Chapter 1, p. 1-4). Note, however, that timber harvest occurring in old forest does not change the status of those areas from old forest to a different structural stage that is not old forest. As described in the DEIS for alternatives B and C (Chapter 3, page 3-58): "Although some of the existing old-forest stands (OFMS and OFSS) would be affected by proposed silvicultural activities in these alternatives, the overall amount of old forest is expected to increase after implementation because: **(1) Only improvement cutting is proposed for existing old-forest stands, and the post-treatment structural stage remains old forest because improvement cutting does not remove large-diameter trees.** **(2) Improvement cutting is used to transform certain stands of stem exclusion or understory reinitiation to old forest when they have a sufficient number of large-diameter trees (10 or more per acre that are 21-inches or larger in diameter) to qualify as old forest after treatment."** **See DEIS, Chapter 2, Table 2-5, pages 2-19 to 2-25 for design features and management requirements to protect resources in the project planning area.** **See responses to Comments MK-2 and MK-3 regarding project effects on wildlife species that use the area.**
Mk-6 p. 1	**Comment:** Please pursue alternative A (no action) regarding the South George Vegetation and Fuels Management Project. **<u>Response</u>:** **Your comment has been noted.**

Letter #5	
Bill Higgins – 04/04/12 Idaho Forest Group (IFH)	
Comment Number	**Comment and Forest Service Response**
IFH-1 p. 1	**Comment:** IFG is supportive of the preferred Alternative B for the following reasons: • This alternative will provide the maximum proposed vegetation treatment • This alternative maximizes economic benefit to the government • This alternative will generate the maximum timber output that is critical to forest industry and employment in the region • This alternative allows temporary road construction that will facilitate harvest while

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Bill Higgins – 04/04/12 Idaho Forest Group (IFH)	
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	minimizing the use of helicopter logging that may not be economically feasible. The proper use of temporary road or permanent road utilizing best management practices to protect resources including aquatics must be used to avoid the economic burden of helicopter systems or foregoing treatment of fuels just to avoid road construction, temporary or otherwise. **Response:** **Your comment has been noted.**
IFH-2 p. 1	**Comment:** IFG is supportive of using best management practices to mitigate any negative impacts of forest roads, including sediment delivery to streams. Often, this can be done through traffic control and aggressive use of road storage practices that minimize costs to reuse/recondition when vegetation treatments are planned. It is important to properly maintain the transportation system for future forest management activities while protecting wildlife and aquatic resources. IFG encourages thoughtful transportation system planning that will not unnecessarily encumber or decrease opportunity for future management action. **Response:** **Your comment has been noted.**

Letter #6	
Tom Schirm Washington Department of Fish and Wildlife (WDFW)	
Comment Number	**Comment and Forest Service Response**
WDFW-1 p. 1	**Comment:** First, the Department supports the USFS in its mission of managing the forest within the historic range of variation. **Response:** **Your comment has been noted.**
WDFW-2 p. 1	**Comment:** WDFW recommends Alternative C be chosen for addressing Access Management. The decommissioning of roads, expansion of existing seasonal closures, and closing the unauthorized roads and trails will positively address the temporary reduction of available elk habitat through timber harvest and increased vulnerability to human harvest (legal and

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Tom Schirm **Washington Department of Fish and Wildlife (WDFW)**	
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	illegal) of elk. **<u>Response:</u>** **Your comment has been noted.**
WDFW-3 p. 1	**Comment:** Although the elk population estimate within GMU-175 Lick Creek is at or near the identified population goal, the structure of the population has failed to achieve recommended levels. The number of bulls within this area has only recently met WDFW minimum levels of 12 bulls per 100 cows, and has failed to ever reach the desired levels of 22-27 bulls per 100 cows (Blue Mountains Elk Plan, Draft 2012). WDFW survey data indicates that bull ratios within this area started increasing after 2006, which we attribute to the August and September emergency closures of the Forest during the fires of 2005 and 2006. Data from 2012 indicates that this population metric is again decreasing (12 bulls: 100 cows) as normal Forest use has resumed. WDFW has identified open road density as a major factor that increases elk vulnerability to harvest (McCorquodale et al. 2010). WDFW recommends the USFS move towards decreasing the vulnerability of elk within this project area by reducing open road density through the full implementation of Alternative C. **<u>Response</u>**: **Your comment has been noted. When the Final EIS and ROD are issued, we hope to incorporate some of your concerns about open road density.**
WDFW-4 p. 2	**Comment:** Ridge-Hogback Status Implementing the recommended August first closure (WDFW prior letter), along with the unauthorized roads and trails currently connecting to it, will greatly improve habitat use, availability, and decrease vulnerability within this portion of the landscape**.** **<u>Response:</u>** **Your comment has been noted. We believe there is consensus and support from the vast majority of commenters relative to closing unauthorized roads and trails within the project planning area. This concern will be scrutinized closely when the Final EIS and ROD are issued.**
WDFW-5 p. 2	**Comment:** Winter Range Closure The Draft EIS identifies management units within the identified big game winter range and effectively manages activity within those areas (Dec 1 – Mar 31). WDFW would like to recommend that access to other management units during this time frame be limited to roads not proceeding through winter range closures (Smoothing Iron ridge road). **<u>Response:</u>**

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Tom Schirm Washington Department of Fish and Wildlife (WDFW)	
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	Your comment has been noted. We understand your concern and can see the rationale and connection between winter range closures and open roads. We will consider the option, when making the decision for implementation of the project, concerning haul routes down Smoothing Iron Ridge during the winter season of Dec. 1 – Mar. 31. We will consider that aspect of winter hauling as final contract clauses and haul routes are developed.
WDFW-6 p. 2	**Comment:** Timber Harvest The scale of the proposed harvest raises concerns about cumulative effects on a number of species. We agree that Forest level effects on populations will not likely be discernable, but at the project scale there will likely be negative effects on species such as elk and northern goshawks. We recommend that future projects be reduced in scale. **Response:** **See DEIS, Chapter 3, pages 3-106 to 3-110 for direct, indirect and cumulative effects to elk and pages 3-128 to 3-130 for effects to northern goshawks, and protection of goshawk habitat in Chapter 2, Table 2-5, page 2-24.** **See response to Comment BC-2 below.**

Letter #7	
Lindsay Warness – 04/09/12 Boise Cascade, LLC (BC)	
Comment Number	**Comment and Forest Service Response**
BC-1 p. 1	**Comment:** It is appropriate to manage the forest towards its historical range of variability as this will return the area to a functioning ecological condition **Response:** **Your comment has been noted.**
BC-2 p. 1	**Comment:** Please consider treating more acreage through mechanical thinning prior to burn only treatments. This type of treatment is more economically viable since it directly creates income for local economies. A study conducted by the USFS concluded that mechanical treatments followed by prescribed fire had the greatest impact towards mitigating fire behavior (Cram et al, 2). The project should treat more than 20% of the project area with

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Lindsay Warness – 04/09/12 Boise Cascade, LLC (BC)	
Comment Number	**Comment and Forest Service Response**
	mechanical thinning. Increased fiber supply is critical to the survival of the wood products industry and will help to maintain jobs in the area. **<u>Response</u>:** **During project planning, much coordination occurs between the silviculturist and the fuels specialist on the interdisciplinary team to examine alternative amounts and combinations of both mechanical (intermediate and regeneration cutting methods) and fuels (prescribed fire, mastication, slashing, pile burning, etc.) treatments to be included in the DEIS. This coordination considers many factors, including possible tree damage (trees can be damaged during prescribed fire depending on when and how it is applied), fire hazard due to woody debris (slash) after mechanical treatments, and the variety of ecosystem benefits or services to be derived from both types of treatment.** **Costs are also considered, as are socioeconomic benefits including local employment. In many instances, one result of this coordination process is that both types of treatment are proposed for the same areas – a mechanical treatment first to reduce stand density levels enough to allow fire to be applied safely, followed by a prescribed fire to reduce natural and activity fuel loading, and to reintroduce fire as a keystone ecosystem process. Using a mechanical treatment first (but not to the exclusion of using fire later) is also supported by research examining the effects of canopy biomass reductions on crown-fire susceptibility (Cram has also completed this type of work). Two examples of these research findings are provided here from the South George silviculture specialist report (pages 13 and 14):** **"Improvement cutting is also proposed for areas with high amounts of canopy biomass (crown bulk density) because research showed it to be a more effective treatment than low thinning for disrupting canopy fuel continuity. In a study conducted on the Okanogan National Forest in Washington and the Fremont National Forest in Oregon, it was found that "harvesting only 9-inch and under trees leaves 69% of the beginning high risk stands in a moderate or high risk category, whereas thinning to a target of 45 square feet of basal area per acre almost eliminates the high risk" (Mason et al. 2003).** **"In a related study examining the potential effectiveness and costs of hazardous fuel treatments for Montana, the authors concluded that "it is critical that managers carefully review options before applying hazard reduction treatments. Considerable money and effort can be expended with little improvement in fire hazard or ecological condition. For example, applying the TB9 treatment that removes only trees 9 in and smaller from hazardous stand conditions is expensive, yet has little effect on lowering crown fire hazard" (Fiedler et al. 2004). The primary reason that crown-fire hazard was not reduced to a low level in this Montana study (Fiedler et al. 2004) is that a 9-inch upper-diameter limit did not allow sufficient disruption of canopy fuel continuity to occur."**

Letter #7	
Lindsay Warness – 04/09/12 Boise Cascade, LLC (BC)	
Comment Number	**Comment and Forest Service Response**
BC-3 p. 1	**Comment:** Is helicopter logging the only option for harvest on some of the acres proposed? Logging with helicopters will increase the costs of this project astronomically. The road system seems to be fairly extensive in this area, are there roads in the project area that could be used to implement a different type of logging system that will be more economically viable? I suggest contacting some helicopter logging companies and obtaining an estimate of what the cost would be to treat these acres using helicopters. **Response:** **Several factors were considered in selecting which harvest systems to utilize in this project, such as terrain, existing transportation system, feasibility, and equipment availability. The need to protect other resources and mitigate potential adverse effects was also considered. The harvest system designated for any particular unit is a balance of all these factors.**
BC-4 p. 1	**Comment:** On page 2-8, the DEIS states that "Trees >21 inches DBH in the moist forest biophysical environment would not be harvested." I recommend amending the forest plan to allow for the removal of undesirable species greater than 21 inches DBH. Recently the Wallowa-Whitman proposed an amendment to their forest plan that allows for the removal of White Fir and trees highly infected with mistletoe that are greater than 21 inches DBH. Leaving trees solely for because they are greater than 21 inches DBH hinders the silviculturalist's ability to prescribe a treatment for a specific stand that may improve the overall health of the stand by removing trees greater than 21 inches DBH. **Response:** **We agree with the concept that under certain circumstances, amending the Forest Plan can provide additional flexibility for meeting the project's purpose and need to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, Chapter 1, p. 1-4). Examples provided in the comment for the Wallowa-Whitman NF also pertain to the Umatilla NF in some situations, particularly when the species composition portion of the purpose and need emphasizes restoration of early-seral species (ponderosa pine, lodgepole pine, western larch, primarily) for stands where the existing composition is dominated by late-seral species (grand fir, subalpine fir, Engelmann spruce, primarily).** **For the South George project, reference to Tables 3-18 (Chapter 3, page 3-49 in DEIS) and 3-26 (for alternatives B/C, Chapter 3, page 3-57) indicate that implementing the preferred alternative would result in reasonable progress on species composition objectives (ponderosa pine increases, and grand fir decreases, for the Dry UF biophysical environment; western larch increases, and grand fir and spruce-fir decrease, for the Moist UF biophysical environment).**

Letter #7	
Lindsay Warness – 04/09/12 Boise Cascade, LLC (BC)	
Comment Number	**Comment and Forest Service Response**
	Dwarf mistletoe in Douglas-fir was examined in detail for the South George project planning area, and although the planning area has significant acreages of moderate or high susceptibility, they were still considered to be within, or close to, the range of variation for this dwarf mistletoe species. The two insects/diseases of special concern for the planning area, in terms of uncharacteristically high levels of susceptibility, are fir engraver and defoliating insects (budworm/tussock moth); see DEIS, Chapter 3, Table 3-42, page 3-71. **Since the preferred alternative makes measurable progress toward addressing species composition issues for the South George project planning area, and because dwarf mistletoe is not a major insect or disease concern for the planning area as a whole (recognizing that it can certainly qualify as a significant consideration at the stand level), it was not considered necessary to propose a Forest Plan amendment to allow trees over 21 inches dbh to be removed from the Moist UF biophysical environment.**
BC-5 p. 1	**Comment:** I commend the USFS for allowing the removal of trees larger than 21" from the dry forest, it is necessary to remove undesirable species and some of these trees may be larger than 21". **Response:** **Your comment has been noted.**
BC-6 p. 1	**Comment:** It is appropriate to have regeneration units in the projects. These sites will provide additional forage for elk and other large ungulates such as deer and moose. **Response:** **Your comment has been noted.**
BC-7 p. 1	**Comment:** Why will the fuels treatments in the 25 acres of Riparian Habitat Conservation Areas allow for materials up to 18"dbh to be removed and decked but not included in the commercial sale? There is a potential that the material removed will be commercially viable and the income may help to offset other project activities. **Response:** **A concern that we have considered is staying with Forest Plan standards and guidelines which does not allow commercial removal of material within RHCA's without a Forest Plan Amendment under PACFISH guidelines. At this time our determination is that the material is of minimal quantities such that it would not significantly affect bid rates/viability of any sale offering. Current plans for that material have not been solidified as of yet, but we are considering using it for additional habitat restoration efforts or other public uses.**

Letter #7	
Lindsay Warness – 04/09/12 Boise Cascade, LLC (BC)	
Comment Number	**Comment and Forest Service Response**
BC-8 p. 1	**Comment:** Please ensure that pulpwood removal is optional for the purchaser. This provision will ensure that all commercially viable fiber is used in the most cost effective manner. **<u>Response:</u>** **See response to Comment GBL-2**
BC-9 p. 1	**Comment:** Roads are important for future management needs, fires suppression and livestock management. Please ensure that only the highest priority roads are decommissioned while closing lower priority roads to protect future management needs. **<u>Response:</u>** **Road decommissioning was analyzed by the IDT. In the analysis area there were many duplicate road systems on the ridges. All resource areas were involved in selecting the roads to be proposed for decommissioning. The selection of roads to be decommissioned left an adequate road system in place for all future management activities. The roads analysis completed for this project rated roads for risk and value based on established criteria (Roads Analysis, pages 12-17, and maps, project file). Roads were evaluated for high value/high risk; high value/low risk; low value/high risk; and low value/low risk.**
BC-10 p. 1	**Comment:** Layout costs for the project area may be prohibitive and require extensive work from a marking crew. Paint for marking is also expensive. One way to mitigate these costs is to implement designation by description (DxD) or designation by prescription (DxP) methods. Our studies show virtually 100% success in Leave Tree Marking (LTM) units and 60-70% success in Individual Tree Marking (ITM) units in meeting NEPA Basal Area targets. Please select the tree selection vehicle that will be the most cost effective. **<u>Response</u>:** **We realize the costs associated with preparing a project of this size and we intend to utilize these marking systems where feasible.**
BC-11 p. 1	**Comment:** It appears that based on the analysis done, alternative 4 would not achieve the goal of bringing the project area back into its historical fire regime. Implementing alternative 4 would also require entering the stands again as they will return to a condition class outside of their natural fire regime faster. **<u>Response:</u>** **Your comment has been noted.**

Letter #7	
Lindsay Warness – 04/09/12 Boise Cascade, LLC (BC)	
Comment Number	**Comment and Forest Service Response**
BC-12 p. 1	**Comment:** Please choose the alternative that will have the most beneficial impact with regards to jobs creation. There is a large demographic shift away from small rural communities due to lack of family wage jobs. This project will help to create family wage jobs that create healthy rural communities. **Response:** **Your comment has been noted.**

Letter #8	
Allison O'Brien – 04/09/12 U.S. Department of the Interior, Portland, OR – (DOI)	
Comment Number	**Comment and Forest Service Response**
DOI-1	**Comment:** The Department of the Interior has reviewed the Draft Environmental Impact Statement for the South George Vegetation and Fuels Management Project, Asotin and Garfield Counties, Washington. The Department does not have any comments to offer. **Response:** **Thank you for taking the time to respond.**

Letter #9	
Irene Jerome – 04/09/12 American Forest Resource Council (AFRC)	
Comment Number	**Comment and Forest Service Response**
AFRC-1 p. 1	**Comment:** In a summary on the web page, the general planning area associated with the South George project is identified as about 21,000 acres and the total acres treated is estimated at 4500 acres. AFRC recognizes that numerous elements go into the analysis of planning areas and that actual acres treated are a result of that analysis. However, the extremely high costs

Letter #9	
Irene Jerome – 04/09/12 American Forest Resource Council (AFRC)	
Comment Number	**Comment and Forest Service Response**
	associated with Forest Service planning efforts require that the maximum number of acres be treated in a planning area if at all possible. The general concept currently being used in eastern Oregon is about 50% of a planning area should receive on the ground treatment. I urge you to revisit the planning area for South George and determine if there are additional areas that can be added to the actual treatment acres. The pace of treatment must be greatly escalated in eastern Oregon if restoration is going to get ahead of the decline. An analysis done on the Malheur National Forest by a collaborative group indicated that 40,000 to 60,000 acres, with actual on the ground treatment occurring on about 50 percent of those acres, must be implemented annually for the forest to move from a state of decline to a state where the HRV was being restored. **Response:** **We recognize that over the last 20 years, a relatively small proportion of forested lands administered by Blue Mountains national forests are being treated with silvicultural activities. One reason for a low treatment percentage is that 61% of national forest lands in the Blue Mountains are unavailable for timber harvest (Rainville et al. 2008, p. 60), and this same percentage applies to the Umatilla NF. This means that timber sales and wood products are generated from only 39% of the land base (for the Umatilla NF as a whole). But for individual planning areas like South George, the percentage of the land base available for treatment can be higher than the 39% figure for the whole Forest. [Note that these percentages apply only to timber management practices; the Forest Plan allows more of the landbase to be treated with prescribed fire than with a chain saw.]** **For South George project planning area, the forest vegetation affected area (which is the area that is suitable for timber management activities according to Forest Plan standards and guidelines) is 14,060 acres (the other 6,940 acres in the planning area are either nonforest or unsuitable for timber production – see DEIS, Chapter 3, Table 3-16 on page 3-47. For alternatives B/C, the sum of commercial timber activities (intermediate and regeneration harvests totaling 3,900 acres) and noncommercial activities (thinning and ladder fuel removals, and an RHCA treatment, totaling 1,175 acres) is 5,075 acres, which is about 36% of the forest vegetation affected area. Since vegetation treatments must be closely coordinated with other objectives such as wildlife habitat and water quality, we believe 36% of the affected environment is a reasonable treatment percentage.**

Letter #9	
Irene Jerome – 04/09/12 American Forest Resource Council (AFRC)	
Comment Number	**Comment and Forest Service Response**
AFRC-2 p. 2	**Comment:** AFRC fully supports Alternative B, the Proposed Action and Preferred Alternative. Indeed, in the current economic climate it is really the only viable alternative. Helicopter logging is rapidly becoming a thing of the past and locating helicopter logging contractors is becoming increasingly more difficult. The type of material removed in conjunction with the cost of jet fuel is cost prohibitive. If you did not seek the expertise of a helicopter logging contractor when designing alternatives for this project and during the economic analysis of the various alternatives I strongly urge you to do so in the future. **Response**: **See response to Comment BC-3.**
AFRC-3 p. 2	**Comment:** Treatment activities in Old Forest Habitat are critical if shifts in stand structure and species are to be implemented. It is imperative for the public to understand that short term disturbances are necessary for conservation of these forests in the future. The risk of not treating these areas is the total loss of these ecosystems to insects, disease and fire. **Response:** **We note in the DEIS that timber harvest would occur in old forest stands, but the proposed treatments would not change the status of these areas from old forest to another structural stage that is not old forest. As described in the DEIS for alternatives B and C (Chapter 3, page 3-58): "Although some of the existing old-forest stands (OFMS and OFSS) would be affected by proposed silvicultural activities in these alternatives, the overall amount of old forest is expected to increase after implementation because:** **(1) Only improvement cutting is proposed for existing old-forest stands, and the post-treatment structural stage remains old forest because improvement cutting does not remove large-diameter trees.** **(2) Improvement cutting is used to transform certain stands of stem exclusion or understory reinitiation to old forest when they have a sufficient number of large-diameter trees (10 or more per acre that are 21-inches or larger in diameter) to qualify as old forest after treatment."**
AFRC-4 p. 2	**Comment:** The need for providing forest products to maintain current forest infrastructure and renewable building materials for our nation is absolutely critical to this project and arguably the highest priority for forest restoration in eastern Oregon at this time. Forests will not be restored if the industry infrastructure is lost. **Response:** **Your comment has been noted. Part of the Purpose and Need identified in Chapter 1 of the DEIS is to provide sawlogs and wood fiber for utilization by regional and**

Letter #9	
Irene Jerome – 04/09/12 American Forest Resource Council (AFRC)	
Comment Number	**Comment and Forest Service Response**
	local economies. The economics effects of the alternatives are addressed in Chapter 3 of the DEIS (DEIS, pages 3-170 to 3-175).
AFRC-5 attachment	**Comment:** Attached find a letter recently sent out by Regional Forester Kent Connaughton regarding Forest Restoration and Industry Infrastructure Retention. This letter outlines numerous points critical to both subjects. Please ensure that the strategy for meeting the points in this letter are clearly articulated in the South George final environmental analysis and highlight them in the purpose and need for the project. **Response:** **Your comment has been noted. It seems the purpose and need for this project does include the intent of Regional Forester Kent Connaughton's letter of March 30, 2012. It is highlighted under Timber Production in responding to Forest Plan desired future condition statements which expresses the need to provide sawlogs and wood fiber for utilization by regional and local economies.**

Letter #10	
Christine B. Reichgott – (EPA) U.S. Environmental Protection Agency, Seattle WA	
Comment Number	**Comment and Forest Service Response**
EPA-1 p. 3	**Comment:** Riparian Science Page 3-21 of the DEIS states that the action alternatives propose to conduct fuels treatments within two Riparian Habitat Conservation Areas (RHCA units 1 and 2). Given the limited extent of the proposed treatment (25 acres), and the need to address crown fire potential, the EPA does not object to the proposed treatment. We question, however, the decision to include references to the 1991 and 2007 studies (Caldwell et al. 1991, and Gravelle et al. 2007) in the context of demonstrating the likelihood of no temperature effect from treatment without also acknowledging the broader range of science on this topic. The EPA believes that impacts to shade and stream temperatures from timber harvest within 100 feet of streams have been widely demonstrated. As an attachment to this letter we are including a list of citations for studies and modeling efforts that address the interaction of stream shade, stream temperature, and riparian buffers. We encourage the Forest to consider this information in the design of future RHCA treatments. **Response:** **Thank you for your comment and for the list of citations. Some of these will prove very useful as we design RHCA treatments in the future. Much of the western Oregon**

Letter #10	
Christine B. Reichgott – (EPA) U.S. Environmental Protection Agency, Seattle WA	
Comment Number	**Comment and Forest Service Response**
	and Washington work evaluating thinning effects in young, previously harvested stands is less useful for analysis of the proposed treatments which are in mature eastern Washington stands and designed to remove understory trees resulting from fire exclusion.
EPA-2 p. 3	**Comment:** Riparian Science Page 3-21 of the DEIS goes on to state that BMPs have been developed to address stream temperature increases due to the removal of riparian vegetation, and directs the reader to Appendix D. Our review of Appendix D finds reference to PACFISH/INFISH protocols, but no specific BMPs for protection of shade. We believe Appendix D would be an appropriate place to include the design criteria referenced on page 3-22 that would limit shade reductions to 10 percent (leaving an estimated 80 percent effective shade). **Response:** **The reference to Appendix D was in error. Site specific BMPs have been developed for the project and are located in Chapter 2, Table 2-5.**
EPA-3 p. 3	**Comment:** **Ecological Forestry** The project proposes to use a mix of clearcut with reserves, improvement cutting, low thinning, seed-tree harvest and fuels treatments in order to put the project area on a trajectory toward desired future conditions (DFC). In order to achieve DFC, the action alternatives propose to move forest structure, species composition, and stand density toward their historical ranges of variability (HRV). Using historical references poses a challenge in a rapidly changing environment', but we agree that taking an HRV approach should result in a more resilient and self-sustaining landscape. We recommend, however, that the Forest consider how principles of what has come to be called "Ecological Forestry "might be further incorporated into the harvest prescriptions **Response:** **We agree, and plan to continue incorporating the principles and concepts of ecological forestry (Franklin et al. 2007), including treatments such as variable-density thinning with skips and gaps, into vegetation management projects on the Umatilla NF. Note that much of the Johnson and Franklin literature referenced in these comments was developed primarily in the context of west-side Douglas-fir and western hemlock forests and, although we recognize that many of the concepts and principles will translate directly to east-side ecosystems, some of the operational recommendations will need to be adjusted for our local conditions. Making such adjustments is another reason for why the Umatilla NF is actively working to obtain additional experience with ecological forestry concepts.**
EPA-4 p. 3	**Comment:** **Ecological Forestry**

Letter #10	
Christine B. Reichgott – (EPA) U.S. Environmental Protection Agency, Seattle WA	
Comment Number	**Comment and Forest Service Response**
	For thinning/intermediate treatments, an Ecological Forestry approach looks beyond indicators of species composition, forest structural stages, and tree density classes to include an emphasis on spatial heterogeneity. This can be achieved through variable density thinning. We believe the Forest is already incorporating these principles, but we recommend that the FEIS be explicit about the Forest's intent to use an Ecological Forestry approach, including variable density thinning, where practicable. **Response:** **Umatilla Nnational Forest's staff has been "experimenting" with variable-density thinning, including its use with skips and gaps, on some recent projects. We will explore using variable-density thinning for some portion of the South George thinning treatments, including the noncommercial activities, even though variable-density thinning was not mentioned explicitly in the DEIS as a thinning method. As implementation of variable-density thinning and similar approaches becomes more common on the Umatilla NF, and as we accumulate a breadth of experience with its use across a range of biophysical environments, we expect to incorporate variable-density thinning, by name, into future project proposals because we will then be able to fully describe and disclose its design criteria and operational characteristics.** **Currently, Umatilla Forest personnel are compiling a contract package for variable-density, noncommercial thinning that would be used in conjunction with our service contracts. But at this point, variable-density thinning has not been used widely enough on Umatilla NF to include it in project proposals as a standard operating practice.**
EPA-5 pp. 3-4	**Comment:** **Ecological Forestry** For regeneration and seed-tree units, an Ecological Forestry approach places an emphasis on biological legacy retention. This concept goes beyond coarse wood and snag retention to include a broader array of organisms, organic matter (including structures), and biologically created patterns. We encourage the Forest to consider recent literature around these concepts as the FEIS is developed (Franklin et al. 2007, Johnson and Franklin 2009, Johnson and Franklin 2012). **Response:** **Some aspects of project design include ecological forestry concepts, such as the "clearcutting with reserves" and "seed-tree cutting with reserves" regeneration cutting methods. One of the reasons for selecting the "with reserves" variants (in lieu of clearcutting and seed-tree cutting without reserves, (which is the historical or traditional approach) is that we will retain live trees for not only aesthetic and wildlife purposes, but so they can also function as biological legacies and provide inter-generational ecosystem memory.** **Umatilla National Forest's staff has been considering ecological forestry literature and included it in recent white papers developed for dry-forest management (Active**

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Christine B. Reichgott – (EPA) U.S. Environmental Protection Agency, Seattle WA	
Comment Number	**Comment and Forest Service Response**
	Management of Dry Forests in the Blue Mountains: Silvicultural Considerations, White Paper F14-SO-WP-Silv-04, 128 p., July 2011; and Active Management of Moist Forests in the Blue Mountains: Silvicultural Considerations, White Paper F14-SO-WP-Silv-07, 275 p., April 2012). The white papers, along with digital copies of recent ecological literature (including many of the items included in your comments as footnotes), are included on the Forest's intranet site in order to make them readily available to employees.
EPA-6 p. 4	**Comment:** **Ecological Forestry** Finally, a key tenet of Ecological Forestry is that of recovery periods, or allowing time for significant structural complexity to develop between rotations. We recommend that the FEIS include a discussion of future entry, and what is considered to be an appropriate recovery period. **Response**: **As described in the DEIS (Chapter 3, page 3-53), the temporal context for analyzing environmental effects associated with proposed vegetation treatments is 5 years. If much longer timeframes are described in the DEIS – such as full rotations, including any potential treatments occurring between those proposed now and the end of the rotation period occurring decades from now, would be highly speculative and could introduce NEPA issues if specialists attempt to include the entire treatment sequence in their effects analysis, particularly since the future treatments would be considered speculative. But even so, the Forest will consider options for providing additional information about the timing and nature of future treatments, perhaps by including it as background information rather than as future proposed actions.**
EPA-7 p. 4	**Comments:** **Road Impacts** As noted in our scoping comments, the EPA favors minimizing road construction (including temporary road construction) because roads contribute more sediment to streams than any other management activity and interrupt the subsurface flow of water, particularly where roads cut into steep slopes. In addition, roads and their use contribute to habitat fragmentation, wildlife disturbance, and the introduction or exacerbation of noxious weeds. **Response:** **Hydrologic effects are discussed in the DEIS, Chapter 3, page 3-24. Proposed temporary road locations are on ridge tops with no proximity to stream channels or surface water. In addition, Alternative C includes road decommissioning. As discussed in our response to the Washington Department of Fish and Wildlife, this is proposed in part to reduce open road density impacts to wildlife.**
EPA-8 p. 4	**Comment:** We appreciate that the proposed action (Alternative B) would not result in the addition of

Letter #10	
Christine B. Reichgott – (EPA) U.S. Environmental Protection Agency, Seattle WA	
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	any permanent roads to the road system. Alternative B does not, however, maximize the potential environmental benefit of the project by including road decommissioning. Alternative C was developed in part to respond to public concerns over roads within the project area. Because the road decommissioning component in Alternative C would reduce road density and improve habitat value without compromising the recreational value of the project area, we encourage the Forest to bring forward the road decommissioning components of Alternative C, including the maintenance level change and seasonal closure of FR 4302. **Response:** **Your comment has been noted.**

Letter #11	
Linda Driskill – 04/09/12 Grant County Conservationists (GCC)	
Comment Number	**Comment and Forest Service Response**
GCC-1 p. 1	**Comment:** The plan for heavy logging particularly of irreplaceable trees over 21" in diameter in never-logged forests boggles the mind. Hundreds of acres of virtual clearcuts especially in such a highly ecologically valuable and special places as these we hope will be reconsidered and stopped. **Response:** **Your comment has been noted. The characterization of this proposed action as "heavy logging" is an inaccurate characterization of this project. Tree over 21" are replaceable. On Umatilla National Forest we have documented measurements of second growth stands under 50 years old that have trees which have grown since the stand was harvested to over 21" in diameter. A review of the orthophoto map H-1A (an orthophoto is basically a composite aerial photograph) in Appendix H will show that some of this area has had previous timber harvest.**
GCC -2 p. 1	**Comment:** We urge you to present an alternative in line with the views we believe to be of the vast majority of Americans which support such as: •"mature" trees being allowed to grow to old growth status and within old growth ecosystems •recognition of the important role of "insects and disease" as part of the whole ecological picture, seriously considering the necessity such processes contribute to the survival of bellwether species such as the Black Backed and Three-toed Woodpeckers.

Letter #11	
Linda Driskill – 04/09/12 Grant County Conservationists (GCC)	
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	•recognition of the inability of humans (management) to control wildfire and insect and disease outbreaks in many cases (and the hubris of past promises made to the public that this is what you will be accomplishing with thinning, "control" burns, spraying, etc.) •the value of roadless areas just for their untouched character (which a majority of people responding to surveys by the Columbia River Basin Ecosystem Management Project surported) **Response**: **We believe that all of the bullet items in your comment have been addressed in the alternatives we analyzed in detail (See DEIS, Chapter 3) and as follows:** • **old growth – See response to Comments TLC-8b, TLC-12c, TLC-20, TLC-20d, and 21b** • **insects and disease – See response to Comments TLC-8d, and TLC-17** • **black-backed and three toed woodpeckers – See response to Comment TLC-16** • **roadless – See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, 4a, and 4b.**

Letter #12	
Jeff Juel The Lands Council (TLC) *and on behalf of* David Mildrexler – Hells Canyon Preservation Council Doug Heiken – Oregon Wild Michael Garrity – Alliance for the Wild Rockies	
Comment Number	**Comment and Forest Service Response**
TLC-1 p. 1	**Comment:** **NEPA Analysis Failures Concerning Uninventoried Roadless and Ecologically Significant Areas.** **A. Contiguous Roadless Extent and the Irreplaceable Environmental Importance of Roadless areas** This same logic applies to the FS, which is required by NEPA to objectively evaluate the affects to the undeveloped characteristics of an area even if the area is not an IRA. Instead of an accurate objective assessment of the conditions within and impacts to these areas, the South George Vegetation and Fuels Management Project does not adequately consider the project's irretrievable impacts to uninventoried roadless areas and large roadless expanses

Letter #12	
Jeff Juel **The Lands Council (TLC)** ***and on behalf of*** **David Mildrexler – Hells Canyon Preservation Council** **Doug Heiken – Oregon Wild** **Michael Garrity – Alliance for the Wild Rockies**	
Comment Number	**Comment and Forest Service Response**
	that are spatially and functionally contiguous with existing IRA's. **<u>Response</u>:** **We respectfully disagree with this comment. The commenter does not define their terms "uninventoried roadless areas and contiguous roadless extent" in their comment, nor does the Forest Service have a definition of such a term, so it is impossible to analyze an ambiguous, undefined term.** **The confusion surrounding the many terms used for this issue was expanded. The terms used to disclose impacts to this topic are Wilderness, Inventoried Roadless Area, Potential Wilderness Area, and Other Undeveloped Lands. See the DEIS, Chapter 3, pages 3-176 to 3-178 for Forest Service agency definitions of terms and agency procedures for the inventory of resources. The term uninventoried roadless areas has no meaning because all lands relevant to South George project planning area were considered and inventoried (DEIS, Appendix H, pages H-1 to H-10 and maps H-0 to H-8).** **The Forest Service considered all lands in the project area when following the established procedures for what areas qualify for inclusion in the inventory of PWAs. Procedures for identifying areas that quality for inclusion in the inventory of PWAs comes from the national Forest Service Handbook 1909.12, Chapter 70, Section 71, which are established by the Forest Service Washington Office, and apply to all national forest managed lands throughout the entire country. The procedures in Section 71 were followed (DEIS, Appendix H). Affected environment and environmental effects were disclosed in Chapter 3 of the DEIS on pages 3-176 to 3-188. The presence of logging within other undeveloped lands does not constitute an irreversible and/or irretrievable commitment of resources** **As identified in the DEIS Chapter 1, page 1-2 and Chapter 3, page 3-178, Asotin Creek IRA and Wenatchee Creek Inventoried Roadless Areas (IRAs) are separated from South George project planning area by existing main access forest system roads (Forest Roads (FR) 4400, 4300 and 4304).** **The four definitions that Merriam-Webster dictionary gives to the word contiguous are as follows:** **1. being in actual contact: touching along a boundary or at a point.** **2. of angles – adjacent**

Letter #12	
Jeff Juel **The Lands Council (TLC)** ***and on behalf of*** **David Mildrexler – Hells Canyon Preservation Council** **Doug Heiken – Oregon Wild** **Michael Garrity – Alliance for the Wild Rockies**	
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	3. next or near in time and sequence **4. touching or connected throughout in an unbroken sequence.**
TLC-1a p. 2	**Comment:** The South George Project would conduct logging, road building, mechanized activities, thinning, and/or extensive burning in undeveloped and unroaded areas that currently provide ecologically important habitat and refugia. Though uninventoried roadless areas are included among the project units, the DEIS fails to accurately disclose and address the ecological importance and actual contiguous roadless extent of these areas, fails to correctly disclose their ecological site-specific conditions, and fails to adequately address the proposed project's logging, roading, mechanized thinning, and other management action impacts upon these areas. The DEIS as such is legally and environmentally deficient. **<u>Response</u>:** **We respectfully disagree with this comment. Commenter is again using the term "uninventoried roadless areas."** **The Forest Service agrees lands with values and features that often characterize inventoried roadless areas are increasingly important within developed landscapes in order to provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide areas that are important for biological diversity, dispersed outdoor recreation, and also serve as bulwarks against the spread of non-native invasive species and provide reference areas for study and research (36 CFR 294[Federal Register/Vol. 66, No. 9, page 3245]). The crux of the PWA analysis is to determine which lands within the project planning area, aside from Inventoried Roadless Areas, with these characteristics may apply.** **The Forest Service considered all lands in the project area when following the established procedures for what areas qualify for inclusion in the inventory of PWAs. Procedures for identifying areas that quality for inclusion in the inventory of PWAs comes from Forest Service Handbook 1909.12, Chapter 70, Section 71. The procedures in Section 71 were followed (DEIS, Appendix H). No PWAs were identified to be included in the inventory for South George project.** **Environmental effects to inventoried roadless areas, potential wilderness areas, and other undeveloped lands are disclosed in Chapter 3 (see pages 3-176 to 3-188),**

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	Appendix H, of the DEIS, and specialist reports in the project file. Effects to other resources are found throughout Chapter 3 of the DEIS. **See response to Comment TLC-1.**
TLC-1b p. 2	**Comment:** Scientific research recommendations conclude that it is imperative to avoid logging, roads, mining, development, intrusive mechanized management, and motorized recreation in roadless areas >1000 acres; ecologically significant unroaded areas <1000 acres; or any roadless area adjacent to existing Wilderness or research natural areas, and all inventoried roadless areas. Part or all of several such areas are within the South George planning area. South George action alternatives B, C and D all include commercial and non-commercial units that overlap roadless forests verified by the Forest Service's own analysis and the Oregon Wild roadless GIS database. The map below shows the proposed action (Alt. B) and illustrates the overlap between roadless expanses labeled as "Other Undeveloped Lands" and unit prescriptions. **<u>Response</u>:** **We respectfully disagree with this comment. The commenter has not identified any scientific research that would be applicable to how we should follow the procedures outlined in Forest Service Handbook 1909.12, Chapter 70, Section 71. The Forest Service followed Forest Service agency direction related to areas with evidence of past logging and roads (Appendix H). The inventory of potential wilderness areas (PWAs) does not require scientific research; it is about following the procedures in the Forest Service Handbook 1909.12, Chapter 70, Section 71, which identifies criteria for what areas qualify for placement on the inventory of potential wilderness areas.** **An outcome of the PWA inventory process found at FSH 1909.12, Chapter 71 was the identification of isolated polygons of other undeveloped lands (see DEIS, Appendix H, Map H-5, and Table H-1B). These polygons did not meet inventory criteria as potential wilderness areas and they are not inventoried roadless areas or a designated wilderness area. Each individual polygon of isolated land has no history of harvest activity and does not contain forest roads. They are stand-alone polygons of varying acreages all less than or equal to 4,999 acres within the project planning area (Table H-1B). The process used to identify undeveloped lands is described in Appendix H, pages H-1 to H-10 followed by maps depicting this process.**

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	The map you provided is from Appendix H of the DEIS and is entitled interaction between other undeveloped lands and Alternative B (Map H-6) and does show treatment units. **There are no forest-wide or management area standards specific to other undeveloped lands in Umatilla Forest Plan; however, there are allocated management areas that prohibit scheduled harvest of timber. All lands, including undeveloped lands, are managed consistent with forest-wide standards and guidelines and by designated Forest Plan management area allocations (Forest Plan – pp. 4-94 to 4-195) (DEIS, Chapter 3, page 3-182).** **Any areas with unique ecological values within South George project planning area are currently maintained for those values with Forest Plan standards and guidelines for management area allocations such as C1-Old Growth, C3-Big Game Winter Range, C3A- Sensitive Big Game Winter Range. See Chapter 1, pp. 1-12 to 1-14, for brief descriptions of goals, and standards and guidelines associated with each Forest Plan management area allocations located within South George project planning area (DEIS, Chapter 3, page 3-184).** **No logging is proposed in Potential Wilderness Areas (PWA), Inventoried Roadless Areas (IRA), or Congressionally designated Wilderness (see maps H-6, H-7, and H-8 in Appendix H of the DEIS). The presence of logging within other undeveloped lands does not constitute an irreversible and/or irretrievable commitment of resources. Although these acres are not Wilderness, Inventoried Roadless Areas, and do not meet PWA criteria, proposed actions do not eliminate their inclusion in such categories at a future date based on changes to inventorying efforts (PWAs), Administrative rulemaking (IRA), or Congressional action (Wilderness).**
TLC-1c p. 3	**Comment:** Many of the unit prescriptions are commercial requiring tractors entering these previously unlogged forest stands for the first time ever, creation of damaging skid trails in these roadless forests, opening the area to invasive weeds, and damaging wildlife habitat. Moreover, temporary road building is proposed within the largest roadless expanse. The potential wilderness quality of all commercial treatments will be irreparably damaged, and the impacts of non-commercial treatments will also degrade the potential wilderness quality across hundreds of acres.

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	<u>Response</u>: **We respectfully disagree with this comment. As explained in our previous responses, this comment uses the undefined term of 'roadless expanses." The Forest Service used its nationally published procedures to evaluate every acre of the proposed project planning area.** **Environmental effects to other undeveloped lands is disclosed in the DEIS, Chapter 3, pages 3-185 to 3-188 and design features and management requirements (for all activity areas) to minimize effects of management activities is located in Chapter 2, Table 2-5, pages 2-19 to 2-25.** **See response to Comments TLC-1, TLC-1a, and TLC-1b.**
TLC-1d p. 3	**Comment:** The South George Project DEIS fails to analyze the significant impacts to wilderness quality lands. These roadless areas provide valuable natural resource attributes that must be protected. These include: water quality; healthy soils; core wildlife habitat and refugia; wildlife corridors; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; areas that are relatively less at-risk from noxious weeds and other invasive non-native species; and many other significant values. The proposed commercial logging, thinning, mechanized intrusive management, and/or road building would irreparably degrade these important ecological values. Logging undeveloped areas would only further move the project's forest ecosystem lands away from, instead of toward, the historic range of variability for large snags, viable wildlife habitat, and other LOS components. **<u>Response</u>:** **This comment uses another undefined term, "wilderness quality lands."** **Environmental effects analysis to resources in South George project planning area are located in Chapter 3 of the DEIS. Any areas with unique ecological values within South George project planning area are currently maintained for those values with Forest Plan standards and guidelines for management area allocations such as C1-Old Growth, C3-Big Game Winter Range, C3A- Sensitive Big Game Winter Range. See**

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	Chapter 1, pp. 1-12 to 1-14, for brief descriptions of goals, and standards and guidelines associated with each Forest Plan management area allocations located within South George project planning area (DEIS, Chapter 3, page 3-184). **No special or unique values in other undeveloped lands have been identified by project resource specialists in their environmental analysis for the implementation of any alternative analyzed in detail. Other undeveloped lands include soils, water, fish and wildlife habitat etc. that have not been impacted directly by past harvest and road building. The current condition of soil; water quality; air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; noxious weeds; recreation; and cultural resources within the project planning area, including other undeveloped lands are described elsewhere in this Chapter (DEIS, Chapter 3, page 3-184). All temporary roads would be decommissioned after project activity use, (DEIS, Chapter 2, pages 2-15 and 2-31).** **Also see the Wildlife Species and Habitat section, DEIS, Chapter 3, pages 3-97 to 3-141.** **See response to Comments TLC-1, TLC-1a, TLC-1b, and TLC-1c.**
TLC-2 p. 4	**Comment:** **B. The South George DEIS fails to recognize the unique qualities of the "South Fork Asotin Creek Roadless Area," or polygon 1 as identified by the DEIS.** The DEIS PWA approach diminishes the true extent of the South Fork Roadless Area and fails to recognize the Potential Wilderness characteristics of the area It is important to note that the DEIS states at 3-183 that "The largest polygon of other undeveloped lands is approximately 4,440 acres or just under seven square miles. This polygon (number 1 on Map H-4 in Appendix H and see Table H-1C) is, the largest polygon, approximately 2.6 miles in gross length. It has a gross width of roughly 2.2 miles and a pinch-point less than one mile in width. The eastern boundary, a length of 2.7 miles, of this polygon is adjacent to private land." These polygons chronically underestimate the true roadless extent of an area due to the PWA methodology used to derive them, which rules out all areas within 300 ft. of a road and any areas containing evidence of past harvest. Some of these areas adjacent to roads have minimal to no signs of past human activity. The DEIS recognizes the biased nature of this approach at H-3 where it states: We recognize stumps are not present along every mile of forest road; for example roads adjacent to a meadow, talus, or a lake. The judgment we applied in setting a PWA boundary

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	balanced inventory criteria regarding excluding past harvest and facilitating easy on-the-ground identification." **<u>Response</u>:** **We respectfully disagree with this comment. First it should be noted that there is no "South Fork Asotin Creek Roadless Area" in any national or local analyses of roadless areas, but it is only a name that this commenter for reason known only to them, have assigned to an area.** **The Forest Service took a hard look at polygon 1 that you identified as "South Fork Asotin Creek Roadless Area." Appendix I of South George DEIS describes and displays with maps how the Forest Service considered the polygon submitted as roadless by Oregon Wild. This appendix compares Oregon Wild's polygon with Forest Service polygons of inventoried roadless areas (IRAs), potential wilderness areas (PWAs), other undeveloped lands, forest roads, past harvest, and other relevant information. Environmental effects to the polygons on Oregon Wild's map can be derived using narratives, maps, and tables in Appendix I, Appendix H, and Chapter 3 of the DEIS (Appendix I, page I-1).** **Additional consideration of this polygon can be found in the DEIS, Appendix H, Table H-1C, pages H-8 to H-10.** **See response to Comments TLC-1 to TLC-1d.**
TLC-2a p. 4	**Comment:** This "easy on-the-ground" approach systematically rules out all of the areas within 300 ft. of a road even when these roads are passing through extremely remote areas or steep topography where the Wilderness quality is intact within this 300 ft. buffer area. All-told, this approach rules out 4,925 acres within the planning area and undoubtedly contains significant errors. The errors in this component of the analysis alone would most likely put the South Fork Asotin Creek roadless area above 5000 acres. Moreover, the PWA approach systematically rules out any areas containing evidence of past harvest despite the well known verified fact that the impacts from historical logging can recover quickly and not be visible to the casual observer. Additionally, this polygon is adjacent to private lands which can in some cases include additional roadless lands.

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	Even with all of the biases that together act to restrict the true extent of this roadless area, the South Fork Asotin Creek Roadless Area is still estimated at 4,400 acres, just 600 acres less than the size of an IRA. We contend that this is an underestimate and the South Fork Asotin Creek Roadless Area qualifies as a Potential Wilderness Area. **<u>Response</u>:** **The background, methodology, and agency policy for inventory of potential wilderness areas (PWAs) and identification of other undeveloped lands is disclosed in Appendix H of the DEIS. The identification of roads is discussed on pages H-3 and H-4 under the heading Map H-3.** **Our agency's direction (FSH 1909.12, Chapter 71) includes the following statement:** ***The application of the inventory criteria should rely on local knowledge and judgment regarding unique, site-specific conditions of each area being considered for placement on the inventory of potential wilderness. When delineating areas for the potential wilderness inventory; locate boundaries at prominent natural or semi-permanent human-made features to facilitate easy on-the-ground identification.*** **See response to Comment TLC-2.**
TLC-2b p. 4-5	**Comment:** The PWA methodology identifies 8,785 acres of "Other Undeveloped Lands" including the South Fork Asotin Creek roadless area described above, yet states the following at 3-184: No special or unique values in other undeveloped lands have been identified by project resource specialists in their environmental analysis for the implementation of any alternative analyzed in detail. Other undeveloped lands include soils, water, fish and wildlife habitat etc. that have not been impacted directly by past harvest and road building. So the Forest Service first applies a PWA methodology that is designed to systematically diminish the true extent of roadless areas so that they can be placed in the category of "Other Undeveloped Lands," and then unilaterally makes a non-substantiated statement that none of these areas contain any "special or unique values?" This is a biased approach and lacks scientific integrity. The South George PWA approach renders the Forest Service incapable of truly analyzing the effects to these roadless lands because the true values are not recognized in the first place. Contrast the South George approach with the following

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	statement: "Lands with values and features that often characterize inventoried roadless areas are increasingly important within developed landscapes in order to provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide areas that are important for biological diversity, dispersed outdoor recreation, and also serve as bulwarks against the spread of non-native invasive species and provide reference areas for study and research (36 CFR 294, page 3245)." All of these factors are true of the South Fork Asotin Creek Roadless Area, yet none of them are recognized in the DEIS. **<u>Response</u>:** **We respectfully disagree with this comment. The DEIS describes the process and rationale used to inventory for and identify potential wilderness areas within the South George Vegetation and Fuels Management Project, Pomeroy Ranger District, Umatilla National Forest. The inventory is based on, and consistent with our agency criteria found at Forest Service Handbook (FSH) 1909.12 Ch. 71 (DEIS, Appendix H, page H-1). Agency policy was followed.** **Each step of the inventory process is visually documented as a map (see maps in Appendix H). The Forest Service used professional judgment and local knowledge regarding unique, site-specific conditions of each area being considered for placement in the inventory of potential wilderness areas.** **Also see DEIS, Chapter 3, Table 3-81, page 3-179 for a contextual display of Wilderness and Roadless Areas in the PNW Region, Umatilla National Forest, Pomeroy Ranger District, and South George project planning area. Please note that 48% of Pomeroy Ranger District is Wilderness and 19% is Inventoried Roadless Areas.** **Other undeveloped lands have intrinsic ecological and social values because they do not contain roads and evidence of past timber harvest. These values are used as indicators of comparison to display effects between alternatives. Values and features that often characterize an inventoried roadless area (36 CFR 294) were specifically avoided as indicators of comparison to reduce confusion because other undeveloped lands are not inventoried roadless areas or potential wilderness areas and therefore are described using different indicators of comparison (DEIS, Chapter 3, page 3-182).** **See response to Comment TLC-2, and 2a.**

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TLC-2c p. 5	**Comment:** The DEIS's claim that the South Fork Asotin Creek Roadless Area has no special features or unique qualities is incorrect. The area is one of the largest contiguous roadless landscapes on the northeast side of the Wenaha-Tucannon Wilderness, and increases connectivity between the Asotin Creek and the Wenatchee Creek IRA's. The South Fork Asotin Creek Roadless Area contains important hydrological systems and contains numerous deeply incised canyons. The roadless area contains habitat for many species including black bear, bobcat, coyote, weasel, cougar, deer and elk. The South George DEIS analysis of this critically important roadless area intentionally downplays the significance of the area in order to justify further degrading it. **<u>Response</u>:** **We respectfully disagree with this comment. In addition to Appendix I (including maps) in the DEIS which considers the polygon submitted by Oregon Wild, please see Chapter 3 of the DEIS, pages 3-98 to 3-142 for environmental effects analysis for wildlife species and habitat and Findings of Consistency with the Umatilla Forest Plan, Endangered Species Act, Migratory Bird Act, and Bald and Golden Eagle Protection Act.** **Your use of the word contiguous is misleading and does not apply to the definition of the word.** **An outcome of the PWA inventory process found at FSH 1909.12, Chapter 71 was the identification of isolated polygons of other undeveloped lands (see Appendix H, Map H-5, Table H-1B, and Table H-1C showing the consideration of the four largest polygons in the project planning area). These polygons did not meet inventory criteria as potential wilderness areas and they are not inventoried roadless areas or a designated wilderness area (DEIS, Chapter 3, page 3-182).** **See response to Comment TLC-2 and 2b.**
TLC-2d p. 5	**Comment:** Solitude, the spirit of adventure and awareness, serenity, and self-reliance The DEIS states at 3-184: "Opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance are limited by the size and shape of the polygon. Distance and topographic screening are also factors. The optimum shape and location to

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	retain solitude and a sense of isolation from noise and sights of other humans and their activities would be at the center of a circle. Areas greater than or equal to 5,000 acres or about 8 square miles may have sufficient size to offer a sense of solitude yet this may vary by individual. Long narrow shapes provide less distance from noise at their midpoint. Nearby, nonconforming sights and sounds of roads and timber harvest can be heard and often seen from within 67 polygons of other undeveloped lands because they are all less than one square mile in size and none are a perfect circle in shape." The approximate boundary of the South Fork Asotin Creek Roadless Area is illustrated in the figure below. As is displayed, the general shape of the South Fork Asotin Creek Roadless Area is a large block of contiguous roadless country. This is generally regarded as a good shape for solitude due to the fact that large blocks of unroaded forests minimize the edge effect. Moreover the DEIS statement highlighted in bold above is very similar to the South Fork Asotin Creek Roadless Area which by the Forest Service's own analysis is about 7 square miles and 4,400 acres. As already described above, this underestimates the true extent of the roadless area. Finally, the roadless area encompasses deeply incised canyon country which enhances solitude and the feeling of remoteness. We disagree with the South George DEIS assertion and counter that the South Fork Asotin Creek Roadless Area is a very good shape for solitude, adventure, awareness, and self-reliance and of substantial size to promote these qualities as well. **<u>Response</u>:** **We respectfully disagree with this comment. Additional consideration and hard look was given to the four largest polygons of undeveloped lands in South George project planning area (DEIS, Chapter 3, page 3-184 and Appendix H, Table –H-1C, page H-8). Table H-1C lists our agency's inventory criteria from FSH 1909.12, Chapter 70, Section 71.1 and rationale in response to the criteria of why it was not included.** **See response to Comment TLC-2c.**
TLC-2e p. 6	**Comment:** The Forest Service should be making efforts to increase connectivity between the South Fork Asotin Creek Roadless Area and the Asotin Creek and Wenatchee Creek IRA's. Instead the action alternatives would all further fragment this critical roadless area complex. **<u>Response</u>:** **As disclosed in the DEIS Chapter 1, page 1-2 and Chapter 3, page 3-178, Asotin Creek**

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	and Wenatchee Creek Inventoried Roadless Areas (IRAs) are separated (not contiguous) from South George project planning area by existing main access forest system roads (Forest Roads (FR) 4400, 4300 and 4304). See maps in Appendix A and see maps H-2 and H-2a for locations of past harvest activity. **Also see Chapter 3, pages 3-176 to 3-182 of the DEIS for background information, definitions, Asotin Creek and Wenatchee Creek IRAs/PWAs, and potential wilderness inventory.** **See response to Comment TLC-1.**
TLC-3 p. 6	**Comment:** **C. Contrived Roadless "Potential Wilderness Inventory" Criteria and "Analysis"** The South George DEIS fails to disclose the scientific research recommendations relevant to the importance of all roadless areas and their connective habitat, inventoried or not. Instead, the Forest Service misuses the criteria it developed for "potential wilderness areas" to avoid meaningfully addressing the harmful impacts of logging, extensive heavy machinery use, and road building within environmentally significant de-facto roadless areas – regardless of whether these areas may have had some level of partially apparent management impacts in past decades. Scientific research notes that areas absent functioning roads provide important undisturbed habitat for numerous forest-dependent species of concern. The importance of such areas is not appreciably diminished by the vanishing presence of the long past evidence of limited levels of prior management. **<u>Response</u>:** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d.**
TLC-3a p. 7	**Comment:** The DEIS's "PWA" method breaks contiguous roadless forest (inventoried and uninventoried) into polygons, with each being assessed separately. This obfuscates the imperative role all of these ecologically important unroaded areas play when combined as a large expanse of contiguous roadless forest habitat and/or connective habitat, where human disturbance is minimal. In such areas natural disturbance processes are the dominant factors influencing forest succession and habitat dynamics. Scientific research well-documents the critical significance of such areas as core habitat and refugia for numerous forest dependent species of concern including ESA listed species. Most all designated wilderness contains areas where there may have been some level of past disturbance prior to its designation as

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	wilderness, be this selective logging, motorized travel, livestock grazing, and even old settler residence. The types of evident past human-caused disturbance in the unroaded portions of South George are similar to such areas now existent as part of designated wilderness. The types of limited disturbance evident in parts of South George do not significantly detract from these areas importance as unroaded more ecologically intact wildlife habitat and refugia. **Response:** **See response to Comments TLC-1, 1a, 1b, 1c, 1d, and TLC-2e.**
TLC-3b p. 7	**Comment:** As evidenced by similar areas inclusion in wilderness, when combined with the full contiguous inventoried and uninventoried roadless extent, the various "polygons" are elevated in importance and suitability as potential designated wilderness. However, the DEIS fails to disclose relevant scientific research on the importance of such areas, and instead presents an analysis that diminishes the importance of unroaded forest lands by breaking these into separate pieces despite their contiguous nature. Such "analysis" violates the scientific, meaningful, accuracy, and objective requirements of the NEPA. The EIS should properly disclose relevant scientific research and develop environmentally sound action alternatives for this project. The EIS should develop provisions and actions that protect these areas and connective habitat from logging, road building, and mechanized actions. **Response:** **We respectfully disagree with this comment. The commenter has not identified any scientific research that would be applicable to how we should follow the procedures outlined in Forest Service Handbook 1909.12, Chapter 70, Section 71. The Forest Service followed our own agency's direction related to areas with evidence of past logging and roads (DEIS, Chapter 3, pages 3-183, and Appendix H). The inventory of potential wilderness areas (PWAs) does not require scientific research; it is about following the procedures in the Forest Service Handbook 1909.12, Chapter 70, Section 71, which identifies criteria for what areas qualify for placement on the inventory of potential wilderness areas.** **See response to Comments TLC-1, 1a, 1b, 1c, 1d, and TLC-2e.**

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TLC-4 pp. 7 and 9	**Comment:** **D. The Forest Service failed to adequately disclose the environmental impacts of logging in roadless expanses** In other words, the DEIS defers to the Effects Analysis of the "Developed Areas Lands" for the various resources and does not provide any analysis specific to the resources of "Other Undeveloped Areas." Forested areas in the "Other Undeveloped Areas" have mostly never been managed and the soils have for the most part never been disturbed by mechanical management and are part of a larger roadless expanse, making them very significant and unique. What the DEIS does disclose in the Soils analysis at 3-9 is the very real effects of soil disturbance on soil productivity and the duration of adverse effects. The DEIS states at 3-9: "Logging activities would create direct effects to soils due to disturbance from harvest and yarding machinery driving over the soil and dragging of logs. Effects are primarily in the form of soil compaction, displacement of topsoil, and puddling (rutting in wet soil). Prescribed burning treatments following harvest activities would create some high burn severity where fuels levels are concentrated and burn for a long time (residence time). Another effect would be the exposure of mineral soil due to machine traffic and dragging of logs (primarily with whole-tree tractor and skyline systems), creating an erosion risk that may or may not be realized." "Soil mycorrhizal populations can be affected by harvest operations as machinery travels over the soil surface causing soil compaction, rutting or displacement affecting roots (Dumroese et al. 2009) or slash burning of large piles (Esquilin et al. 2007)." The DEIS discloses these detrimental impacts on soils from commercial logging at 3-9, 10: Tractor yarding operations typically produce exposed mineral soil surfaces on skid trails where tree bundles are dragged back to landing areas. Compaction from machinery driving over areas being harvested, with some displacement of surface soils in multiple-pass trails results in the majority of negative effects to soils. Trails average 80-100 feet apart with average-sized units in this area. The area within the trails that is detrimentally disturbed is highly variable. Downed wood and slash that is dropped in the trail and also driven over by the skidders and harvesters distributes the weight of the machinery and reduces compaction levels. Displacement of volcanic ash soils can occur when skidding operations occur during the driest parts of year and soil conditions need to be monitored to minimize dust production and loss of fine soil from this process. The unique soil conditions within the "Other Undeveloped Lands Areas" are never

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	considered and therefore the DEIS fails to take the requisite "hard-look" analysis required by NEPA at the Effects of the proposed action on the "Other Undeveloped Lands." The situation is similar for other resource issues such as Hydrology or Wildlife. The DEIS fails to disclose a single unique quality or attribute of aquatic environments within the Other Undeveloped Lands including the South Fork Asotin Creek Roadless area. This is a roadless area that contains many miles of riparian habitat and important fish-bearing streams. There is zero consideration for this special hydrologic resource within the DEIS analysis of the "Other Undeveloped Lands" that disclose the effects of the proposed action and other alternatives on this unique resource. The unique hydrological, soils, and biological conditions within the Other Undeveloped Lands are never considered and therefore the DEIS fails to take the requisite "hard-look" analysis required by NEPA at the Effects of the proposed action on Uninventoried Roadless Areas. **<u>Response</u>:** **We respectfully disagree with this comment.** **Appendix E in the DEIS, Table E-5, page E-5 to E-7, and Table E-6, pages E-8 to E-10 disclose the existing Detrimental Soil Condition and post activity Detrimental Soil Condition for every harvest and thinning unit in South George project, including units that are located in areas identified as other undeveloped lands (see maps in Appendix A, H, and I).** **The hydrologic system and the hydrologic effects of proposed actions were analyzed for National Forest System (NFS) lands by Hydrologic Unit Code (HUC) 6 Subwatershed (SWS) (DEIS, Chapter 3, page 3-15). Cumulative effect indicators including ETA are reported by HUC 6 SWS. HUC is a national level interagency map of the hydrologic system from regional scale drainage (e.g. Columbia Basin) to subwatershed level (40,000-100,000 acre) drainage. South George project planning area is made up of NFS lands in South Fork Asotin Creek and Upper George Creek subwatersheds (HUC 6) of the Asotin Watershed (HUC 5), a part of the Lower Snake Basin (see map in Appendix A). This scale of analysis includes hydrological conditions in other undeveloped lands that are within South George project planning area (DEIS, Chapter 3, page 3-20).** **The scale of analysis for Threatened, Endangered, Sensitive, and MIS aquatic species is by subwatersheds. Subwatersheds affected by the project are the South Fork Asotin Creek (HUC 6-170601030203) and Upper George Creek (HUC 6-170601030206) of the**

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	Asotin Creek Watershed (HUC 5-1706010302). These two subwatersheds cover about 47,450 acres of which an estimated 20,650 acres are within the National Forest boundary (see DEIS, Chapter 3, Table 3-5, page 3-15, in the Hydrology section and subwatershed map in Appendix A). All direct, indirect, and cumulative effects would occur in this area. **Analysis for environmental effects include all proposed activities listed for each alternative (timber harvest, activity and natural fuels treatments (including mechanical thinning in about 25 acres of RHCAs), danger tree removal, road management, landscape prescribed fire, and past, present, and future foreseeable actions (Chapter 3, pages 3-2 to 3-4) that could affect TES aquatic species (DEIS, Chapter 3, pages 3-32 to 3-46).** **Environmental effects to Wildlife Species and Habitat can be found in the DEIS, Chapter 3, pages 3-98 to 3-141.** **Also see Chapter 2, Table 2-5 for a listing of design features and management requirements that will be implemented under any action alternative to protect resources and minimize effects from management activities in the project planning area.**
TLC-4a pp. 10-11	**Comment:** Regarding "Intrinsic social values (apparent naturalness, degree of solitude, sense of remoteness ," the DEIS states at 3-186: Proposed timber harvest, mechanical fuel treatments, temporary road construction, and prescribed fire activity in other undeveloped lands would create stumps which would reduce the size of the undeveloped polygon. Lands would appear managed and developed. The sights, sounds, and changes in vegetation from timber harvest and associated activities and use would further decrease the natural integrity and sense of naturalness within harvest units and along roads. Skid trails, stumps, and landings would be evident. Stand structure would change, therefore, diversity of plant and animal communities may shift from current patterns but ecological diversity would remain (see Vegetation section this Chapter). Impacts to natural integrity and sense of naturalness would likely be evident until stumps and vegetation canopies are no longer substantially recognizable (about 75 to 100 years). The sounds of timber harvest and road building machinery from active units would reduce a sense of naturalness and solitude during project operations but would not persist in the long-term. Other impacts, such as tree marking paint and logging slash would be visible in the

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	short-term (about 5 to 10 years). Effects such as closed roads, skid trails, and tree stumps would be evident much longer. Decreasing the sense of naturalness, degrading the natural integrity, spreading the already nearly ubiquitous signs of managed and developed lands to the last undeveloped slivers of lands on our National Forest…. Put simply, the UNF proposes to degrade the qualities many recreationists are looking for on our National Forest Lands today. The DEIS clearly discloses that the intrinsic physical, biological, and social values of these undeveloped lands would be degraded and in some cases, ruined, including for portions of the South Fork Asotin Creek Roadless, which we contend is a Potential Wilderness Area. Table 3-86 on page 3-187 shows that the proposed action would result in an 8% reduction in "Other Undeveloped Lands", or 1,630 acres will be changed into "Developed Acres." **<u>Response</u>:** **We respectfully disagree with this comment.** **Approximately 67 percent of the Pomeroy Ranger District is Wilderness (48%) and Inventoried Roadless Areas (19%) (DEIS, Chapter 3, Table 3-81, page 3-179). We believe that many recreationists are enjoying these qualities on our National Forest Lands right here on Pomeroy Ranger District..** **Appendix H of the DEIS describes the methodology and rationale used to inventory and identify PWAs within South George project planning area (approximately 21,000 acres). Maps included in Appendix H show a visual progression of the inventory process, final results, proposed project activity, if any, that would occur in these areas, and a map showing inventoried roadless areas and designated wilderness areas on the entire Umatilla National Forest and other close-by forests (DEIS, Chapter 3, page 3-181).** **There were no PWAs identified within South George project planning area using the PWA inventory process as displayed in Map H-5 and Tables H-1B and H-1C located in Appendix H. An outcome of the PWA inventory process was identification of isolated polygons of other undeveloped lands, based on and consistent with agency criteria found at Forest Service Handbook (FSH) 1909.12, Chapter 71 ((DEIS, Chapter 3, page 3-181).**

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	This EIS considers the map submitted by Oregon Wild showing a polygon (approximately 3,970 acres) they identified as "South Fork Asotin Creek roadless area" in Appendix I of this document. Maps and tables in Appendix I display the locations and acres of overlap (approximately 3,485 acres) of Oregon Wild's polygon with a Forest Service inventoried polygon of other undeveloped lands. Our records show that past harvest and evidence of stumps has occurred in the remaining acres (approximately 485 acres) of the polygon presented by Oregon Wild (see Map I- OW-1 in Appendix I) (DEIS, Chapter 3, page 3-181). **Environmental effects to resources in other undeveloped lands due to the implementation of proposed project activities would be consistent with applicable laws, regulations, and Forest Plan management area standards and guidelines (DEIS, Chapter 3, page 3-186).** **Other undeveloped lands with no proposed thinning or mechanized activity would retain their intrinsic physical, biological, and social values as described in the affected environment. They would remain free of developments such as forest roads or timber harvest stumps. All 8,785 acres of other undeveloped lands within the project planning area would still not be considered PWAs, inventoried roadless areas, or a designated wilderness area (DEIS, Chapter 3, page 3-187).** **All acres of other undeveloped lands would continue to not meet inventory criteria as potential wilderness areas and would continue to not be an inventoried roadless area or a designated wilderness area (DEIS, Chapter 3, page 3-187).**
TLC-4b p. 11	**Comment:** With respect to roadless areas, the Forest Service's DEIS is legally flawed for three reasons. First, the Forest Service failed to identify that logging in the roadless expanses area is an irreversible and irretrievable commitment of resources. In fact the DEIS tries to deny this fact at 3-191 where it states: "No irreversible or irretrievable effects are anticipated from any of the alternatives. No irreversible commitments of land would occur. No unavoidable adverse effects over and above those addressed in the Forest Plan FEIS (Chapter 4, pages IV-231-233) have been identified." The Forest Service makes this claim despite the fact that the DEIS openly discloses that the proposed action would result in an 8% reduction in Other Undeveloped Lands (DEIS at 3-187). Second, the Forest Service failed to assess the inventoried and uninventoried roadless areas in combination as a single contiguous roadless expanse consistent with Ninth Circuit case law. Finally, the Forest Service failed to

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	adequately analyze the impacts to roadless expanses in the project area that will be logged. **<u>Response</u>:** **We respectfully disagree with this comment.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, 4a.**
TLC-4c p. 11	**Comment:** **a.The Forest Service has affirmative obligations under NEPA to disclose and analyze impacts to uninventoried roadless areas and roadless expanses** NEPA requires the disclosure of environmental consequences and adverse impacts, including "any irreversible and irretrievable commitment of resources which would be involved in a proposed action." **<u>Response</u>:** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, 4a, and 4b.**
TLC-4d p. 12	**Comment:** **b.The Forest Service failed to assess the inventoried and uninventoried roadless areas in combination** In the South George project the Forest Service attempts to avoid this clear requirement by reducing the significance of the uninventoried roadless area by breaking them into small, insignificant polygons of varying categories. Instead of assessing the roadless expanses, the Forest Service inventoried the lands in the project area as "potential wilderness areas" and "other undeveloped areas." Not only is this contrary to Ninth Circuit precedent requiring consideration of roadless expanses in their entirety, but it is readily apparent that the inventory itself has no purpose other than to avoid considering the significance of these roadless expanses. Pursuant to criteria in the Forest Service Handbook, 1909.12, Ch.71, the Forest Service attempts to segment and divide the roadless expanse to avoid the significance inherent in logging in the roadless expanses at issue **<u>Response</u>:** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e;**

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	TLC- 3, 3a, and 3b, and TLC-4, 4a, and 4b.
TLC-4e p. 12	**Comment:** **c.The Forest Service's application of the potential wilderness area criteria is arbitrary and capricious.** The agency rigidly applied the criteria in the Forest Service Handbook, which does not comport with the handbook itself, the Wilderness Act, or Congress' explicit direction. Here, the Forest Service used the potential wilderness criteria to exclude any areas that experienced any past harvest (DEIS at H-3): The entire planning area was overlain with Pomeroy district's GIS harvest layer which displays locations of timber harvest over the past 60 years. Past timber harvest included clear-cuts to thinning units. The past timber harvest layer also includes lands where local knowledge and field visits were utilized to verify past timber harvest (notes from field verification) can be found in the South George project record. In all cases, past timber harvest resulted in features such as stumps, skid trails etc. which are evident; therefore, all acres (approximately 6,890 acres) depicted in the map do not meet FSH 1909.12 Ch 71.11(9) inventory criteria and will be removed from the inventory in Map H-3. **Response:** **We respectfully disagree with the portion of your comment that the Forest Service rigidly applied the criteria which does not comport with the handbook itself, the Wilderness Act or Congress. The Forest Service followed agency direction as you referred to in the following paragraph at DEIS at H-3.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-4f p. 13	**Comment:** Moreover, the DEIS states at H-3 that a 300 ft. boundary was set on each side of forest roads, further eliminating potential wilderness lands (Map H-3), despite acknowledging that this criteria is inaccurate at H-3. This rigid application by the Forest Service has become known as the "purity doctrine," in which any remote sign of past logging or road building will unequivocally preclude consideration of or recommendation for wilderness designation. There is, however, no support for such a rigid doctrine. **Response:**

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	We respectfully disagree with this comment. **See response to Comment TLC-2a.**
TLC-4g p. 13	**Comment:** First, the FSH uses the permissive "may" when it states that "[a]reas may qualify for the inventory of potential wilderness even though they include the following types of areas or features: (9) Timber harvest areas where logging and prior road construction are not evident …." Forest Service Handbook, 1909.12, 71.11(9). The Forest Service, however, failed to include any area that has been subject to logging as mapped in the district's GIS harvest layer and systematically applied a 300 ft buffer around all roads. Second, the Wilderness Act does not contain language that unequivocally requires no past management activities: "with the imprint of man's work substantially unnoticeable" an "area of underdeveloped Federal Land" (as opposed to undeveloped). 16 U.S.C. § 1131(c). Third, numerous wilderness areas have been designated where past logging and other management activities are present. Finally, and perhaps most importantly, Congress has expressly asked the Forest Service to abandon the "purity doctrine." In a Senate Report from the Committee on Energy and Natural Resources regarding the Endangered American Wilderness Act of 1977, the Committee stated: "Generally, the committee believes that the so-called 'purity' concept of wilderness long adhered to by the Forest Service, is unnecessarily restrictive and should be abandoned." S.Rept. 95-490 on H.R. 3454. 95th Cong. 1st sess. October 11, 1977. As a result of the Forest Service's rigid application of PWA criteria, 12,815 acres are not assessed under the Ninth Circuit's requirement that roadless expanses are analyzed because of either "past timber harvest" or because "the boundary was set as 300 feet each side of the forest roads" (DEIS at 3-183 and Table 3-82). **<u>Response</u>:** **We respectfully disagree with this comment.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-4h p. 13	**Comment:** The South George DEIS is arbitrary and capricious because it failed to identify logging in significant roadless expanses as an irretrievable and irreversible commitment of resources; failed to assess IRAs and uninventoried roadless areas in combination as roadless expanses

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	consistent with Ninth Circuit precedent; and rigidly applied the potential wilderness criteria which resulted in the exclusion of thousands of acres of roadless areas from analysis. The DEIS admits the last point contains errors which we contend alone could account for the South Fork Asotin Creek Roadless Area being reduced to below 5000 contiguous acres. **<u>Response</u>:** **We respectfully disagree with this comment.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a**.
TLC-5 13	**Comment:** **E. Additional Roadless Issues** The DEIS analysis fails to objectively disclose the critically important role that unroaded areas provide. In fact, uninventoried roadless areas represent a number of significant irreplaceable natural habitat features include general lack of weed infestations, more natural rates of tree and species mortality, generally more intact natural disturbance patterns, better soil hydrology and water retention, better water quality in rain and snow melt runoff and localized tributaries and streams, more security and better viability for wildlife, better soil and subsurface soil community conditions and biodiversity, better botanical diversity and abundance, and generally significantly higher rates of carbon storage, etc. The Effects Analysis for PWAs does not consider any of these factors and is entirely non-substantive. **<u>Response</u>:** **We respectfully disagree with this comment.** **There are no PWAs identified in the inventory for South George project and no management activities would occur in the Asotin Creek and Wenatchee Creek IRAs/PWAs (DEIS, Chapter 3, pages 3-180 to 3-181).** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-5a p. 14	**Comment:** The Forest Service defines unroaded areas as any area without the presence of classified roads, and of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition

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	(http://roadless.fs.fed.us/documents/feis/glossary.shtml). Unroaded areas greater than about 1,000 acres, whether they have been inventoried or not provide valuable natural resource attributes that must be protected. Additionally, scientific research on roadless area size and relative importance is ongoing. Such research acknowledges variables based upon localized ecosystem types, naturally occurring geographical and watershed boundaries, and the overall conditions within surrounding ecosystems. In areas such as South George project area, where considerable past logging and management alterations have occurred, protecting relatively ecologically intact roadless areas less than 1,000 acres but over 500 acres has been shown to be of significant ecological importance. Roadless area attributes that must be protected include: water quality; healthy soils; fish and wildlife refugia; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; refugia that are relatively less at-risk from noxious weeds and other invasive non-native species, and many other significant values. See Forest Service Roadless Area Conservation FEIS, November 2000. **Response:** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-5b p. 14	**Comment:** Before proposing logging, road building, mechanized actions and other disturbance harms in any unroaded areas the agency must first consider impacts to all the values inherent in roadless areas, including: **(1)** High quality or undisturbed soil, water, and air; (2) Sources of public drinking water; (3) Diversity of plant and animal communities; (4) Habitat (including core habitat, refugia, corridor and connective habitat, and dispersal areas) for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; (5) Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation; (6) Reference landscapes; (7) Natural appearing landscapes with high scenic quality; (8) Traditional cultural properties and sacred sites; and (9) Other locally identified unique characteristics; (10) Ecological conditions, including past management cumulative impacts, in adjacent and

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	surrounding lands. 36 CFR §294.11 **Response:** **Other undeveloped lands have intrinsic ecological and social values because they do not contain roads and evidence of past timber harvest. These values are used as indicators of comparison to display effects between alternatives. Values and features that often characterize an inventoried roadless area (36 CFR 294) were specifically avoided as indicators of comparison to reduce confusion because other undeveloped lands are not inventoried roadless areas or potential wilderness areas and therefore are described using different indicators of comparison (DEIS, Chapter 3, page 3-182).**
TLC-5c p. 14	**Comment:** The NEPA analysis for this project does not adequately discuss the impacts of proposed activities on all the many significant values of roadless/unroaded areas. Nor does this analysis address the importance of the forests surrounding these unroaded areas, including the essential connectivity adjacent stands provide. The analysis fails to address or disclose the cumulative impacts that would result from management actions not only in unroaded areas but adjacent forest stands, including the diminishment of the extent of currently undisturbed habitat in the project area. **Response:** **We respectfully disagree with this comment.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-5d p. 15	**Comment:** The NEPA analysis should discuss whether the project will push the landscape toward or away from the natural range of variability for large-scale habitat. Landscape analysis based on historic disturbance patterns suggests that historically the majority of old forest and ecologically intact habitat occurred in large patches. These large patches of older forests, and connectivity between LOS patches, that native fish and wildlife species evolved with are now severely under-represented on the forest landscape and must be protected and restored. The DEIS analysis fails to sufficiently address these significant issues. **Response:**

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	This project causes no decrease in the overall amount of old forest in the approximately 21,000 acre project planning area, and maintains connectivity between LOS patches (DEIS, Chapter 3, Page 3-101).
TLC-6 P. 15	**Comment:** **F. Best available science on roadless forests** While the agency may attempt to claim it does not have an explicit legal obligation to protect these uninventoried areas (yet), the Forest Service does have a legal obligation pursuant to NEPA to accurately, scientifically, and objectively describe the environmental consequences of logging and road building in ecologically significant areas. NEPA also requires that the agency disclose all pertinent science, including ongoing scientific research and controversy. And NEPA requires the agency to develop scientifically sound environmentally protective action alternatives in its EIS. The analysis for this project, including the two developed logging alternatives that both degrade potential wilderness area characteristics, fail the requirements of the NEPA concerning these requirements, and the requisite disclosure of scientific research and recommendations pertaining to roadless and unroaded areas. **Response:** **We respectfully disagree with this comment.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-6a p. 17	**Comment:** Low impact restoration activities including but not limited to prescribed burning, mowing, precommercial thinning, fire rehab, and soil rehab, may be appropriate in roadless/unroaded areas as long as they will be substantially unnoticeable to the casual observer and leave the area suitable for future wilderness designation. The NEPA document must accurately describe the roadless/unroaded area, the roadless/unroaded values represented, and the need for, and impacts of, the proposed restoration activities. The use of "PWA" criteria for this is inappropriate, as noted above herein**.** **Response:** **We respectfully disagree with this comment.**

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TLC-6b p. 17	**Comment:** We strongly urge the Forest Service to examine wildlife connectivity needs in the project area. Approximately half of the project area is roadless, and is ecologically contiguous with the Asotin Creek and Wenatchee Creek IRA's, and therefore the Wenaha-Tucannon Wilderness. All roadless areas lands adjacent to the Asotin Creek and Wenatchee Creek IRA's that are not within the political boundary should be protected as part of this core habitat area. All other roadless areas such as uninventoried roadless areas and any areas with potential wilderness quality should be protected. **Response:** **Wildlife species and habitat are analyzed in the DEIS, Chapter 3, pages 3-98 to 3-142. Also please note the scale of analysis identified for wildlife habitat on page 3-98.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, 4a, and 4b.**
TLC-7 p. 17	**Comment:** **Purpose and Need is not based on Best Available Science and is Scientifically Controversial** The DEIS states at 1-4 that: "Based on these recommendations (from the Asotin Watershed Assessment) and the difference between the current conditions of the area and the Forest Plan's desired future conditions, the purpose of and need for action for this project is to improve forest health, vigor, and resilience to fire, insects, and disease in upland forests that are outside their historical pre-fire suppression conditions for species composition, structural diversity, stocking densities, and fuel loadings." It follows from the logic of this statement that all forests that are within the natural range of variability should not be treated. However, this project extends well into the mixed conifer moist forest types characterized by the variable-severity fire regime, and where multi-layer canopy conditions and large amounts of downed wood are within the natural range of variability. All of these areas should be dropped because they are within the range of

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	natural variability and therefore outside the scope of the Purpose and Need of the project. **Response:** **We disagree with the premise that areas falling within the range of variation for a particular attribute do not need to be treated. Perhaps a good example of this concept is the fire regime condition class (FRCC) methodology developed for analyzing how current conditions have departed from reference conditions. FRCC is a methodology utilizing similar concepts to those employed for the range of variation technique. Condition class 1 represents fire regimes that are within their historical range and, as such, their vegetation attributes are intact and functioning properly (Schmidt et al. 2002).** **The condition class 1 condition has also been termed the "ecosystem maintenance stage" (Zimmerman 2003) because existing conditions have departed by no more than 33% from reference conditions. Where appropriate, the condition class 1 areas can be maintained by using treatments such as fire use and thinning (Schmidt et al. 2002). When ecosystems have departed between 33 and 67% from reference conditions, then they exist in what is termed the "ecosystem alteration stage" (Zimmerman 2003). These condition class 2 areas represent a low to moderate amount of restoration need. When ecosystems have departed by more than 67% from reference conditions (this is condition class 3), they exist in the "ecosystem degradation stage" and represent a high level of restoration need. Treatments to return condition class 2 or 3 areas to a condition class 1 condition can be much more expensive than the treatments that are used to maintain condition class 1 areas in their relatively non-departed status. For this reason, the vegetation management program on the Umatilla NF typically represents a compromise between low-cost, relatively benign treatments designed to prevent condition class 1 areas from transitioning to condition class 2, and high-cost treatments directed toward restoration of condition class 2 and 3 areas.** **Therefore, dropping the areas falling within their range of variation would result in the Forest intentionally contributing to our vegetation management "backlog" by foregoing maintenance treatments designed to prevent condition class 1 areas from progressing to an altered (class 2) or degraded (class 3) state. Since nearly 100% of the project planning area is in condition class 2 or 3 (Chapter 3, Table 3-47 on page 3-80 of the DEIS), showing that current conditions have departed to a moderate (class 2) or high (class 3) extent from historical reference conditions, the planning area obviously has a high amount of restoration need.**

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TLC-7a pp. 17-18	**Comment:** The DEIS also states at 1-4, "In many areas fuels that would have historically been consumed during periodic wildfires have increased above historical levels. Today, fires in dry and moist forests would exhibit moderate to severe effects characterized by high fire severity and intensity on landscapes that historically had low to moderate severity." This is totally erroneous for moist forest types. Moist forests have never been characterized by periodic wildfires of low to moderate severity. Rather it is scientifically verified right here in the northern Blue Mountains that high severity fire was one of the predominant forces historically acting on these moist forest types. The entire DEIS is based on false assumptions regarding the historical fire regime in moist forest types and these errors confound the entire analysis. The South George DEIS fails to achieve one of the fundamental first steps to planning a vegetation management project; to accurately define the historical disturbance regimes. In a paper that suggests ten guiding principles to help maintain biodiversity, ecosystem function, and resilience in production landscapes (Fischer et al. 2006) state the following: **<u>Response</u>:** **See response to Comment TLC-8a.**
TLC-8 p. 18	**Comment:** **Strategy 7: Apply appropriate disturbance regimes** Landscape change often results in a change to historical disturbance regimes. Such changes can substantially alter vegetation structure and species composition (Hobbs and Huenneke 1992), and may trigger cascades that cause fundamental and potentially irreversible changes to ecosystems (Hobbs 2001). Pronounced ecological changes in production landscapes can result from changed fire regimes (including intensity, frequency, and spatial extent), changed grazing regimes, and logging (Hobbs 2001; Lindenmayer and Franklin 2002; Bowman et al. 2004). Understanding the impacts that particular disturbance regimes have on ecosystem functioning is therefore important for ecosystem management. Broadly speaking, disturbance regimes that attempt to mirror historical ones are probably a useful starting point for management (Lindenmayer and Franklin 2002; Bowman et al. 2004). Managing disturbance regimes is especially important where it is known or suspected that many species depend on particular perturbations or successional stages (such as frequent, low intensity fires or old-growth forest). The above-statement vividly illustrates why it is so critically important to correctly

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	distinguish between low elevation dry forests characterized by a low severity fire regime and mid-elevation mixed conifer moist forest types characterized by a variable-severity fire regime. What is appropriate for one type is not appropriate for the other and peer reviewed science clearly states that the complexity created by variability in fire regimes defies a one-sized fits all management prescription (Noss et al. 2006). The Purpose and Need and desired future conditions for South George however are not appropriate for moist forest types. For example, the DEIS states at1-5 for Fuels: "There is a need to manage forest stands in Condition Classes 2 and 3 to begin to restore vegetation characteristics and fire return intervals characteristic of historical fire regimes. This would decrease the probability of uncharacteristic high intensity wildfires by reducing fuel loads to levels expected under natural fire disturbance regimes." **Response:** **See response to Comment TLC-7**
TLC-8a p. 18	**Comment:** As already stated and as the attached science letter shows, this is incorrect. Moist forest types are not outside of their historical range of variability due to fire suppression and high severity fire is characteristic in this forest type. The DEIS states at 1-3 that "A majority of current forest stands originated as a result of fire disturbances occurring up to the 1930s." So these forests originated following stand replacement high intensity fires, but now somehow those same disturbances are outside the historical range of variability? This is nonsense and lacks scientific integrity **Response:** **We disagree with your characterization of the mixed-severity fire regime, particularly the statement "high severity fire is characteristic in this forest type." As its name implies, the mixed-severity fire regime features a mix of fire severities, ranging from low severity (underburns) to patches of replacement severity (crown fire in some circumstances), all occurring as an intricate mosaic within a single fire perimeter. "A single fire may create patches of several types, consuming some stands in intense crown fires, burning others with cooler surface fires, and leaving unburned islands within burned areas" (White et al. 1999).** **Five coarse-scale fire regimes have been defined for the United States by using two factors: fire frequency and fire severity (Barrett et al. 2010). Moist upland forests have a mixed-severity fire regime (Fire Regime III). At the broad scale of the United**

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	States, fire regime III includes a wide fire frequency range of 35 to 200 years (Barrett et al. 2010). At the finer scale of the Blue Mountains, fire regime III is believed to have three variants or sub-regimes: IIIa (fire frequency of 50 years or less), IIIb (fire frequency of 51 to 100 years), and IIIc (fire frequency of greater than 100 years). Historically, low-to-moderate severity fires were an important component of the mixed-severity regime (Agee 1993, Brown and Smith 2000) – these are the FR IIIa and IIIb sites. Research in the Blue Mountains portion of the interior Pacific Northwest has often shown that mixed-severity regimes have more variability in fire frequency and severity than previously thought. **When Heyerdahl studied fire regimes for four sites oriented on a broad, north-south transect traversing the entire Blue Mountains, she found that at the southern sites, most of the fire return intervals were less than 25 years, whereas only half of the intervals were less than 25 years for the northern sites. The maximum interval decreased from north to south: the Tucannon site (northernmost area) had the largest range of fire interval and the Dugout site (southernmost area) the smallest (Heyerdahl 1997). Fifteen Blue Mountain sites were sampled to survey fire frequency in stands ranging from Douglas-fir to dry grand fir associations (Maruoka 1994). Current stand structure at 80% of the sites had an overstory dominated by ponderosa pine, with Douglas-fir and grand fir as understory dominants. Pulses of Douglas-fir and grand fir establishment occurred after the last recorded fire at 53% of the sites, while establishment pulses occurred between years of recorded fires at 47% of the sites. Fire scar analyses revealed high variability in fire return intervals. Mean fire intervals at each site ranged from 9.9 years to 49 years. Individual fire return intervals ranged from 2 to 119 years, but may have been influenced by sampling limitations.** **It is incorrect to interpret the statement on page 1-3 Chapter 1, of the DEIS as implying that forest stands in the project area "originated following stand replacement high intensity fires." Stands are comprised of cohorts (Oliver and Larson 1996), and it is typical for moist-forest stands to contain several cohorts, each of which would have originated during a different time period (and therefore has a different age). The project planning area contains many old-forest stands where the upper canopy stratum is comprised of older trees having diameters greater than 21 inches dbh (generally, the upper stratum is a separate cohort with its own age class), along with younger cohorts occupying lower canopy strata. A multi-cohort stand structure can arise during normal successional processes, but it can also reflect situations where low- or moderate-intensity disturbance processes (such as low- or moderate-severity**

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	fires occurring within a mixed-severity fire regime) have killed some of the overstory trees, but not the whole cohort. As growing space is liberated during these partial disturbance events, a new tree cohort gets established, resulting in multi-cohort stand structures. **Your logic in this comment seems to follow this track – forests originated following stand replacement fires, and the DEIS states that this trend must have occurred relatively recently (by the 1930s), so existing forest conditions are within the range of variation because for ecosystems with a high-intensity fire regime, not enough time has passed (since the 1930s) for them to have missed at least one fire cycle and thereby experience fire suppression. Your contention might have merit if moist forests were assigned to fire regime IV, where the expected mortality of trees in the upper canopy layer is 75% or more (Barrett et al. 2010) and leads to a single-cohort, post-fire condition. But since moist forests are properly assigned to fire regime III (mixed severity), and the expected amount of upper-layer tree mortality is 26 to 75% (Barrett et al. 2010), this inevitably leads to multi-cohort mixed-conifer stands like those found throughout the moist-forest portion of the South George planning area. The understory reinitiation, young forest multi strata, and old forest multi strata structural stages shown in Chapter 3, Table 3-19, page 3-50 of the DEIS represent multi-cohort stand structures, and they comprise 40% of the forest vegetation affected environment. If a majority of the current forest stands originated following recent, high-intensity fire, which creates single-cohort stands, then we would expect the multi-cohort structural stages to occupy much less of the planning area than 40 percent.**
TLC-8b p. 19	**Comment:** It is important to note that Baker et al. (2007) is referring to relatively dry ponderosa pine–Douglas fir forests. The South George project area is dominated by moist upland forest types. For example, contrast a dry Ponderosa Pine-Douglas fir forest with this description from the South George DEIS at 3-49: The predominant forest cover type is grand fir (49 percent of the affected environment has grand fir as the majority or plurality tree species), followed by spruce-fir (17 percent), Douglas-fir (15 percent), and ponderosa pine (14 percent). It is completely scientifically indefensible to suggest that fuels reduction treatments are ecologically appropriate for these moist forest types. It is alarming that the Forest Service is so focused on restoring pine and larch that it would not recognize natural succession in a moist mixed conifer forest. Shall we rescue the pine and larch from competition?

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	Moreover, as Lindenmayer et al. 2009 describes, the effects of logging on fire regimes in moist conifer forest types run counter to the goals of South George (see below). The Forest Service proposal is heavily dependent upon the goal of eliminating high severity fire from the project area, and reducing native diseases to the point that cutting rare old growth moist forests are proposed. This is fixation to the point of blindness! With regards to large scale ecological disturbance, leading scientists have a different view. Lindenmayer et al. (2004): To many ecologists, natural disturbances are key ecosystem processes rather than ecological disasters that require human repair. Recent ecological paradigms emphasize the dynamic, nonequilibrial nature of ecological systems in which disturbance is a normal feature…and how natural disturbance regimes and the maintenance of biodiversity and productivity are interrelated… **<u>Response</u>:** **We agree that it is important to recognize the ecological differences between dry and moist upland forests. Note that the grand fir, Douglas-fir, and ponderosa pine cover types mentioned in the quote from page 3-49 in the DEIS can be associated with either the dry UF or the moist UF potential vegetation groups (PVG), as is clearly shown in Chapter 3, Table 3-18 on page 3-49.** **The scientific rationale for proposing vegetation management treatments for the moist UF PVG is to "move forest structure, species composition, and stand density toward their historical ranges of variability (HRV)" (DEIS, Chapter 1, page 1-4). Since disturbance processes are influenced by the biophysical environments in which they operate, it is expected that wildfire, insects, and diseases will function with a characteristic frequency, intensity, severity, return interval, and spatial distribution when species composition, forest structure, and stand density occur within their ranges of variation (Egan and Howell 2001, Holling and Meffe 1996, Kaufmann et al. 1994). This means that when pine and larch are outside their range of variation, as evaluated by PVG, then treatments designed to move them toward HRV would be expected to produce a corresponding change in the behavior of disturbance processes utilizing these types for one or more components of their "habitat." When western larch occurs within its range of variation, for example, then we would expect western larch dwarf mistletoe to occur with a characteristic frequency and severity; if western larch is outside its range of variation, then we would expect uncharacteristic effects from western larch dwarf mistletoe.**

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	The South George project has no objective of eliminating high-severity fire from the planning area (or eliminating any other native disturbance process for that matter). As described above, process and function logically follows composition, structure, and density. Disturbance processes affect and occupy forest ecosystems as their "habitat" – if forests with crown bulk density levels exceeding 0.10 kg/m^3 occur at uncharacteristic levels in the planning area (either too much or too little, as evaluated by using an HRV analysis), then we would expect uncharacteristic levels of high-severity crown fire (either too much or too little for the PVG being analyzed). **We agree that natural disturbances are key ecosystem processes, that ecosystems are dynamic and generally follow a non-equilibrium pattern, that disturbance is an intrinsic property of most ecosystem types, and that disturbance regimes are important for maintenance of biodiversity and productivity.**
TLC-8c p. 20	**Comment:** The DEIS argues that South George would allow for "natural disturbance" to return to the landscape, but this makes little sense outside of the dry, low-severity fire regime. Natural disturbance regimes cannot be imposed on the wrong biophysical environment. Obviously this would no longer constitute a natural functioning disturbance regime. Furthermore, the DEIS openly discloses that the purpose of these "treatments" are to reduce flame lengths to promote direct attack fire suppression tactics with no acknowledgement that in some forest types, flame lengths are naturally greater than what is required to support direct attack. The Forest Service only wishes to accept wildfire on its own terms, and does not mention key science that clearly illustrates the great importance of high severity fire to wildlife (Hutto et al. 2008) and forest successional development (Swanson et al. 2010) with important implications for biodiversity conservation. **<u>Response</u>:** **Your comment seems to imply that a natural disturbance regime only applies to dry, low-severity fire regime. If true, then we certainly disagree with that perspective. Each of the biophysical environments, as represented by PVGs in the South George analysis, is shaped and influenced by a suite of disturbance processes, and each process operates with a frequency, severity, return interval, and spatial distribution that varies from one biophysical environment to another (these attributes, and others, define a disturbance regime for the process). This means that the same process, such as defoliating insects (budworm, tussock moth), would have a slightly different**

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	frequency, severity, return interval, and spatial extent when occurring on the dry forest biophysical environment than when occurring on the moist forest environment. consider moist forests such as those present in the South George planning area, their primary characteristics (composition, structure, density) are shaped by a wide range of disturbance processes, including defoliating insects, dwarf mistletoes, pathogenic stem decay caused by Indian paint fungus, three primary species of root disease, mountain pine beetle in lodgepole pine forest, two primary species of mixed-conifer bark beetles (fir engraver, Douglas-fir beetle), mixed-severity wildfire, wind, non-native invasive forest pests (blister rust, balsam woolly adelgid), climate change, and timber harvest.
TLC-8d p. 20	**Comment:** Similarly, the project is premised in part on an assumption that native insects and disease need to be drastically reduced, and that logging is the answer to achieving such protection. The DEIS does not present verifiable compelling evidence that the area's forests are outside of the range of natural variability for insect, disease, and other natural pathogens and disturbances. Forest wildlife and ecological systems are well-adapted to inherent pathogenic and disturbance events and endemic fluctuating levels. Wildlife habitat is often improved by the diversity of structural conditions created by mistletoe (brooms for nesting) or Indian paint fungus (cavities in large trees). Indeed, when bark beetle insect populations rise and peak cyclically, populations of predator species from woodpeckers to small mammals to invertebrates such as arthropods and hymenoptera benefit, with an abundance of high protein forage and new habitat opportunities in the making. The analysis fails to account for the natural abundance of mistletoe and Indian Paint fungus in old growth trees and seeks to remove these trees because of impacts to the understory. However, a very real possibility is that the future trees that reach old growth size will again have mistletoe. With such an openly recognized shortage of old growth Ponderosa Pine, removal of old growth Pine to benefit the understory is very contradictory. **<u>Response</u>:** **You are correct in noting that some of the rationale for the project's purpose and need, and associated portions of the proposed action, are based on insect and disease susceptibility. We disagree that a compelling case was not made for this rationale. The DEIS states on page 3-46, Chapter 3 that "This section incorporates by reference the South George Silviculture Specialist Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report."**

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	The silviculture specialist report (incorporated by reference DEIS, Chapter 3, page 3-46) provides a detailed analysis of insects and diseases for the planning area (see pages 88-104). These 17 pages of the specialist report provides an analysis of recent insect and disease activity for the planning area (including summaries of annual area affected by four categories of insects for the time period of 1990 to 2008), a detailed analysis of existing insect and disease susceptibility for 6 agents, and an HRV analysis of susceptibility for the same 6 agents in order to put existing susceptibility into an ecological context – is existing susceptibility, as categorized by using low, moderate, and high classes, higher or lower than what would be expected if vegetation attributes (composition, structure, density) were all occurring within their historical ranges? The HRV analysis for insect and disease susceptibility, as found on pages 91-97 of the silviculture specialist report, clearly shows whether each of the susceptibility classes (high, moderate, low) is within, above, or below the historical range, and it does so for each of the six insect or disease agents individually. This susceptibility analysis is viewed as crucial for understanding insect and disease hazard (or vulnerability) because it uses the HRV analytical technique to answer the "so what" questions about insect or disease risk – is existing susceptibility more or less than what would have been expected historically, and what do existing susceptibility levels bode for the future (e.g., trends)? **We agree that insects and diseases are integral ecosystem components, and that they provide a wealth of crucial ecosystem services that provide not only wildlife habitat, but also contribute to ecosystem function and productivity (nutrient cycling, mediators of decomposition processes, etc.). The premise of the South George analysis is that just like forest attributes (composition, structure, density), insect and disease susceptibility historically occurred within characteristic levels, and that an HRV analysis, as was completed for the South George DEIS, can be used to determine if existing susceptibility levels are above, within, or below the historical levels.**
TLC-9 pp. 20-21	**Comment:** 3. Moist Forests A. Fuels reduction is not restricted to areas that are outside their historical pre-fire suppression conditions As the DEIS shows, the South George Project Area is dominated by moist upland forests. Table 3-17, shown here, displays that 78% of the project area is moist upland forest.

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Table 3-17 Potential Vegetation Groups (PVG) for Forest Vegetation Affected Environment

Potential Vegetation Group (PVG) Code	Potential Vegetation Group (PVG) Description	Acres	Percent of Total
Cold Upland Forest (UF)	Cold UF	180	1
Dry Upland Forest (UF)	Dry UF	2,950	21
Moist Upland Forest (UF)	Moist UF	10,930	78
Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands only).			

Whereas the forested areas of the South George Project area are dominated by moist forest types, the DEIS greatly oversimplifies the diversity of forest types and fire regimes and overreacts to crown fire risks, particularly in areas that are miles from any structures and characterized by the stand replacement fire regime.

Response:
We agree that the South George planning area has a predominance of moist upland forest biophysical environment (PVG). The DEIS has not oversimplified the diversity of forest types and fire regimes present in the planning area. DEIS, Chapter 3, Table 3-18, page 3-49 shows that 11 individual vegetation cover types were used for the South George analysis, and that 10 of the 11 types occur in the moist forest PVG (as compared to the dry forest PVG, where only 9 of the 11 types occur).

See our response to comment TLC-8a p. 18, for thoughts about fire regimes and how they were characterized for the planning area. Our response to that comment notes that moist forest is properly assigned to the mixed-severity fire regime, not to the stand replacement fire regime.

See response to Comment RA-20 regarding WUI.

As for crown fire potential, it is estimated that with a properly functioning disturbance regime, influenced primarily by frequent surface fire (Agee, 1998), dry forestland in the South George planning area had 40-85 percent of its acreage supporting low-density forest, 15-30 percent supporting moderate-density forest and 5-15 percent supporting high-density forest. As for mixed severity fire, moist forestland had 20-40 percent supporting low-density, 25-60 percent supporting moderate density and 15-30 percent high density (DEIS, Chapter 3, Table 3-22, page 3-51 and Silvicultural Specialist Report, page 37).

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TLC-9a p. 21 and attachment	**Comment:** The attached "Cobbler II scientist letter," signed by many of the leading scientists in the fields of forest and fire ecology in the western United States clearly substantiates the scientific controversy and inaccuracies of the South George DEIS. The biophysical environments and associated forest types that dominate the South George project area are the same as within the Cobbler II planning area, particularly the moist Grand Fir type. The recommendations outlined in this letter provide a path to bringing the South George proposal into the light of the best available science. **Response:** **The attached "Cobbler II scientist letter" makes four points. We will respond to each one here, and do so in the context of the South George analysis.** **1. The first point maintains that the mixed-severity fire regime constituting the majority of the planning area cannot be characterized as having been affected by fire suppression. As described in our response to comment "TLC-8a p. 18", we disagree with this contention for at least some portions of the mixed-severity fire regime (specifically the fire regime IIIa areas). The letter's first point also maintains that the key to maintaining structure and function "is to allow natural disturbance regimes to function." We agree that properly functioning disturbance regimes provide a wide diversity of ecosystem services. We also believe that the management strategy most likely to sustain high levels of ecosystem function for the South George planning area is emulation of natural disturbance processes. A basic premise of disturbance emulation is that silvicultural practices, prescribed fire, and other management activities should mimic the natural disturbance regime, and not just the fire characteristics but all aspects of the disturbance regime, including consideration of wind and other processes. While a safe presumption is that active management will never function as a perfect surrogate for disturbance processes, presumably because nature has tremendous inherent variability and no two successive disturbance events will ever be identical anyway, it is also true that silvicultural activities can effectively mimic certain aspects of disturbance processes. Disturbance emulation is well grounded in the scientific literature: "During the 1990s, a consensus emerged among ecologists that the most promising approach for conserving biological diversity and ecosystem function in managed forests was to emulate the disturbance processes that drive forest succession and dynamics in natural, unmanaged forests (Hunter 1993, Attiwill 1994, Christiansen et al. 1996, Bergeron and Harvey 1997, Kohm and Franklin 1997). There is broad agreement that the challenge for forest managers is to**	

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	develop techniques of resource extraction that do not cause local extinctions of species, reduce ecosystem productivity, or damage the processes that underlie the resiliency of forest ecosystems to disturbance" (Haeussler and Kneeshaw 2003). We believe that vegetation management activities included in the proposed action will effectively emulate disturbance processes affecting both dry and moist forests of the South George planning area. **2. The second point discusses high severity fire. We agree that high severity fire is certainly a component of the mixed-severity fire regime, but we do not agree that it is the primary severity class for this regime. Our response to comment "TLC-8a p. 18" notes that moist forest is properly assigned to fire regime III, where the expected mortality of upper canopy layer trees ranges between 26 and 75% (Barrett et al. 2010). Fire regime IV, which is termed the replacement regime, is characterized by upper-layer mortality of more than 75%. But since the South George planning area does not contain any fire regime IV (page 3-80 in DEIS), we would not expect any portion of the planning area to regularly experience stand-replacement tree mortality as a result of fire disturbance. However, we acknowledge that the mixed-severity fire regime has inherent variability, and even though a typical fire effect produces "moderate" levels of tree mortality, we recognize that limited amounts of high-severity fire would also be expected periodically for moist-forest areas. As noted in our response to other comments and in the context of other disturbance processes, we recognize that high-severity fire contributes to crucial ecosystem services providing wildlife habitat, and other ecosystem functions such as productivity, nutrient cycling, decomposition processes, etc.** **3. The third point discusses fuel treatments and land uses as associated with moist-forest types. We believe that Chapter 3 of the DEIS adequately discusses the potential effects of vegetation management activities, including timber harvest, on roads, landings, soil quality, fisheries, and watershed function, which are the primary areas of concern mentioned in the letter's third point.** **4. The fourth point discusses unlogged and old forests. We acknowledge that the South George planning area contains old forests, as noted in Chapter 3, Table 3-19 of the DEIS, and that old forests provide many values, including those mentioned in the letter's fourth point. We do not agree that previously unlogged forests, whether they are old or not, should be protected from fuels reduction treatments just because of their historical logging status. As discussed at length in Chapter 3 of the DEIS, there are many criteria used to determine if active management treatments might be warranted for portions of a planning area. In general,**

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	whether an area has been logged before is not used as a criterion for recommending treatment. But other criteria influencing treatment recommendations, such as road density, can probably serve as a proxy for historical logging status in some situations.
TLC-10 pp. 21-22	**Comment:** **B. Important Comprehensive Science Review on Moist Forest Logging** A review paper recently published in Conservation Letters entitled: Effects of logging on fire regimes in moist forests (Lindenmayer et al. 2009; manuscript attached) focuses primarily on logging in relatively moist forests where fires naturally occur at a lower frequency relative to dry forests, such as within the moist forests with variable severity regimes that dominate the South George Project Area. This manuscript represents a thorough a review of over 650 articles and cites too many articles that we refer to in these comments. Lindenmayer et al. (2009) identifies at least five interrelated ways that logging could influence wildfire frequency, extent and/or severity, each being relevant to the South George Project. 1. Changes in Microclimate: The removal of trees by logging creates canopy openings and this in turn alters microclimatic conditions, especially increased drying of understorey vegetation and the forest floor (Ray et al. 2005; Miller et al. 2007). As with the influence of forest edges (Harper et al. 2005), microclimate effects (including fuel drying) associated with forest harvesting can be expected to be greatest where the unmodified forest is moist. 2. Changes in stand structure and plant species composition: [Logging] changes not only microclimatic conditions as described above, but also can change stocking densities and patterns of trees, inter crown spacing, and other forest attributes such as plant species composition. Research in western North America indicates that logging related alterations in stand structure can increase both the risk of occurrence and severity of subsequent wildfires through changes in fuel types and conditions (Thompson et al. 2007). 3. Changes in fuel characteristics: Logging can alter fire regimes by changing the amount, type, and moisture content of fuels (Perry 1994; Weatherspoon & Skinner 1995; Thompson et al. 2007; Krawchuk & Cumming 2009). Large quantities of logging slash created by harvesting operations can sustain fires for longer than fuels in unlogged forest and also harbor fires when conditions are not suitable to facilitate flaming combustion or the spread of fire (Cochrane & Schulze 1999).

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	4. Change in ignition points: The road networks required for logging operations create an increased number of ignition points for wildfires. A substantial increase in ignitions and fire frequency in Russian boreal forests (Achard et al. 2006) has been attributed, in part, to roads built for logging and mining (Dienes 2004; Bradshaw et al. 2009). In Canadian mixedwood boreal forests, fire initiation following lightning strikes is more likely to occur in harvested areas because of increased fine fuels resulting from logging slash and this effect can remain for 10–30 years following logging (Krawchuk & Cumming 2009). 5. Change in the spatial pattern of stands: Logging operations change natural patterns of spatial juxtaposition of different kinds of forests stands (i.e., patterns of landscape heterogeneity) (Franklin & Forman 1987). This, in turn, can change spatial contagion in the spread of wildfire through landscapes (Whelan 1995; Bradshaw et al. 2009) with some areas traditionally characterized by an absence of fire becoming more susceptible to being burned by fires that spread from adjacent, more flammable, logged areas (Holdsworth & Uhl 1997; Perry 1998; Nepstad et al. 1999; Malhi et al. 2009). Similarly, forest edges created by logging and by logging roads can become sites for fire incursions into adjacent forests (Cochrane & Laurance 2002). **Response:** **We agree that timber harvest and associated transportation developments (roads) can change microclimatic conditions, stand structure and plant species composition, fuel characteristics, ignition points, and the spatial pattern of stands, as described in the Policy Perspective piece from the journal Conservation Letters. However, nothing in this comment raises specific concerns about where such changes might occur in the South George planning area, how the project's proposed timber harvest activities might be expected to cause them, or to contribute to their magnitude or intensity, or expected influences from harvest on wildfire frequency, extent, or severity in the planning area. Therefore, we have no response other than to agree that it is possible for harvest and roads to contribute, in some situations and under certain circumstances, to the five listed changes.**
TLC-11 p. 23	**Comment:** **C. Desired Condition is Inappropriate for Moist Forests that Sustain the Variable Severity Fire Regime, especially in Other Undeveloped Lands that should be Managed Based on Historical Conditions** Currently the moist mixed conifer undeveloped lands are closed canopy forests, highly interwoven complex ecosystems, with large amounts of downed wood that provide

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	exceptionally high quality habitat for numerous species such as lynx, peregrine falcon, marten, pileated and Lewis woodpecker, and others. The DEIS openly discloses that the proposed action would result in an 8% reduction in Other Undeveloped Lands, changing 1,630 acres from roadless "undeveloped" areas to "developed." (DEIS at 3-187). The Forest Service is threatening to drastically over-reduce stand densities, degrade areas that currently provide unique large downed wood habitat, and run tractors over rare previously unlogged forest soils. The fundamental flaw of the South George DEIS is fuels reduction treatments that contradict the biophysical environments, plant association groups, elevational and aspect driven differences in plant communities, precipitation gradients, and historical disturbance regimes. It is critically important that these rare, previously unlogged, moist mixed conifer forests are protected from logging. All units that overlap with "other undeveloped lands" should be dropped from the proposal (see scientist letter recommendations). **<u>Response</u>:** **As described in our response to comments TLC-7 p. 17; TLC-8a, p. 18; TLC-8b p. 19; TLC-8c p. 20; TLC-8d p. 20; TLC-9 pp. 20-21; and TLC-9a p. 21 and attachment, we believe the South George DEIS, and its associated assessments, models, protocols, and methodologies for analyzing vegetation conditions and proposed treatments for modifying vegetation conditions, are fully compatible with the planning area's "biophysical environments, plant association groups, elevational and aspect driven differences in plant communities, precipitation gradients, and historical disturbance regimes." Application of the project's design features and management requirements (DEIS, Chapter 2, Table 2-5, pages 2-19 to 2-25), along with similar measures described in Appendix D of the DEIS (Best Management Practices), will ensure that the project area's moist mixed-conifer forests are appropriately protected during and after timber harvest, and following implementation of other vegetation management activities such as prescribed fire.** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-12 p. 23	**Comment:** **4. The DEIS Fails to Analyze a Full Range of Scientifically-Sound Alternatives or an adequate range of alternatives** The DEIS does not include a developed range of scientifically-based developed alternatives,

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	even though it is "reasonable" to include a restoration alternative, and even though NEPA requires a full range of reasonable scientifically sound alternatives**.** **<u>Response</u>:** **We respectfully disagree with this comment. The draft EIS had been prepared in compliance with the National Forest Management Act (NMFA), the National Environmental Policy Act (NEPA), other relevant Federal and State laws and regulation, and Umatilla National Forest Land and Resource Management Plan (Forest Plan) (DEIS, Chapter 1, page 1-1).** **The EIS documents consideration of seven alternatives (see DEIS Chapter 2), including: the no action alternative; the proposed action; two other action alternative; and three alternatives considered but eliminated from detailed study. The alternatives considered but eliminated from detailed study are rightfully considered as a part of the range of alternatives considered in keeping with CEQ's guidance in their document: "40 Most Asked Questions". Question 1.a. 10 this document states:** **1a. Range of Alternatives. What is meant by "range of alternatives" as referred to in Sec. 1505.1(e)** **A. The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them. Section 1502.14. A decisionmaker must not consider alternatives beyond the range of alternatives discussed in the relevant environmental documents. Moreover, a decisionmaker must, in fact, consider all the alternatives discussed in an EIS. Section 1505.1(e).** **The Forest Service Handbook contains further discussion on the range of alternatives at FSH 1909.15; Section 14:** **As established in case law interpreting the NEPA, the phrase "all reasonable alternatives" has not been interpreted to require that an infinite or unreasonable number of alternatives be analyzed, but does require a range of reasonable alternatives be analyzed whether or not they are within Agency jurisdiction to implement (40 CFR 1502.14(c)).** **And at FSH 1909.14.4:** **The range of alternatives considered by the responsible official includes all**

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	reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm.
TLC-12a p. 24	**Comment:** The range of developed alternatives considered in the South George Project is inadequate, because the DEIS fails to develop and analyze a full range of scientifically supported action alternatives. As clearly described in these comments, it is well established in the peer-reviewed literature that application of the appropriate disturbance regime to the landscape is critical to guiding projects that aim to restore historical vegetative characteristics. The Forest Service has not presented a single alternative that limits fuels reduction treatments to the appropriate plant association groups and recognizes the well-known fact that forests characterized by the mixed severity fire regime are within the range of natural variability. Applying fuels reduction treatments to the appropriate biophysical environments characterized by the low-severity fire regime is the cornerstone of projects that propose vegetation management actions that aim to restore forest structure toward a more historical and resilient stand composition and density and to return natural disturbance to the landscape such as the South George Vegetation Management Project. Without this sideboard, the Forest Service could propose fuels reduction treatments based on fire suppression impacts anywhere on the landscape with no accountability to the actual historic characteristics of the fire regime. That South George fails to include a single alternative based on this governing principle of fuels reduction treatments is a serious failure of the NEPA process. The public has no opportunity to advocate for an alternative based on the best-available science because that alternative does not exist. **<u>Response</u>:** **As described in our response to comments TLC-9a, p. 21 and attachment" and TLC-13 pp. 24-25, we believe the vegetation management activities included in the South George project are appropriate to, and closely emulate, the disturbance regimes of the planning area. As described in our response to comments TLC-11 p. 23 and TLC-9a, p. 21 and attachment, fuels reduction and other vegetation management treatments are closely matched to appropriate plant association groups, ecological characteristics of the planning area's mixed-severity fire regime, and to the historical range of variability concept. And as described in our response to comments TLC-8a, p. 18; TLC-8b, p. 19; and TLC-8c, p. 20, fuels reduction and other active vegetation**

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	management treatments are proposed for appropriate biophysical environments as they exist and function in the planning area, and these treatments are not just proposed for the low-severity fire regime, which has limited abundance within the planning area, but for the mixed-severity fire regime as well, which comprises the majority of the planning area. If the project addressed only the low-severity fire regime portion of the planning area, it would not be possible to meet the purpose and need to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, Chapter 1, p. 1-4). Our response to comment TLC-12 p. 23 describes how the South George project considered a full and appropriate range of alternatives.
TLC-12b p. 24	**Comment:** Furthermore, all action alternatives propose commercial logging in previously unlogged roadless forests. As already described, the best available science strongly recommends protecting these "Other Undeveloped Areas" from commercial logging. There is no alternative that is based upon the best available science for roadless forests. **<u>Response</u>:** **See response to Comments TLC-1, 1a, 1b, 1c, and 1d; TLC-2, 2a, 2b, 2c, 2d, and 2e; TLC- 3, 3a, and 3b, and TLC-4, and 4a.**
TLC-12c p. 24	**Comment:** There is no alternative that adequately protect old growth forests despite the widespread public support for protection of all remaining old growth forests. **<u>Response</u>:** **Old growth forests are classified as Dedicated Old Growth, Forest Plan management area allocation C1 or Managed Old Growth management area allocation C2. There is no proposed timber harvest in management area C1 and there are no C2 acres in the project planning area.** **As described in Chapter 2 of the DEIS, Alternative D was specifically formulated to address old-forest issues and concerns. And as described in Chapter 3 of the DEIS (pages 3-58 and 3-65), none of the action alternatives (B, C, D) would result in a reduction in the old forest structural stages as a result of implementing the proposed vegetation management activities. Note, however, that timber harvest does occur in old forest, but it does not change the status of those areas from old forest to a different**

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	structural stage that is not old forest (and see our response to comment MK-5, p.1 for more information about why timber harvest in old forest does not reduce the amount of old forest following treatment).
TLC-12d p. 24	**Comment:** These serious analysis development deficiencies violate the requirements of the NEPA. All action alternatives are based upon the same controversial logging premises. **<u>Response</u>:** **All action alternatives are based on the purpose and need for action (see below):** **The Pomeroy District Ranger has determined that based upon current vegetative and fuel trends in the project planning area, and contrasting them with desired future conditions identified in Umatilla National Forest Land and Resource Management Plan (Forest Plan, pp. 4-3 to 4-14), and recommendations made in the Asotin Watershed Assessment (pages VI-1 to VI-3). The Asotin Watershed Assessment recommended the use of timber harvest to thin dense stands, reduce fir, retain pine and larch to convert to early-seral species stands, and allow fire prescriptions to reduce fuels. Based on these recommendations and the difference between the current conditions of the area and the Forest Plan's desired future conditions, the purpose of and need for action for this project is to improve forest health, vigor, and resilience to fire, insects, and disease in upland forests that are outside their historical pre-fire suppression conditions for species composition, structural diversity, stocking densities, and fuel loadings. Providing sawlogs and wood fiber products for utilization by regional and local industries is also considered a need for this project, and because the majority of acres (about 18,700 acres) in the project planning area are Forest Plan management area allocations with big game and wildlife habitat goals (C3, C3A, and C4) the District Ranger determined that there is a need to continue to provide and manage wildlife habitat and its components (cover and forage) in South George project planning area (DEIS, Chapter 1, page 1-4).**
TLC-13 pp. 24-25	**Comment:** 5. Discrepancies with NEPA's accuracy requirement, failure to consider best available and contending science. Failure to analyze true impacts of repeat entry to moist forest types a). The approximate time that the proposed fuel treatments can be expected to be effective

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	is approximately 15 years. After 15 years, new seedlings and saplings will have emerged, adding new ladder fuel components and additional forest litter and downed wood will have collected on the forest floor, adding to the ground fuel loading which would require another treatment to maintain the fuel conditions. Moreover the long-term vision to create low-severity wildfire conditions implies numerous entries to maintain these conditions. These repeat entries are controversial in the dry forest types, let alone the moist variable fire severity forest types. Lindenmayer et al. (2009) states: "we note that natural fire regimes cannot simply be replaced with regulated disturbance by logging (Hunter 2007). This is because, in part, many elements of forest flora and fauna depend on particular fire return intervals and associated habitat features (Saint-Germain et al. 2004). Logging operations also do not provide the diversity of habitats and micro site conditions found after wildfires (Haeussler & Kneeshaw 2003; Lindenmayer et al. 2008)." It is scientifically indefensible to plan these repeat entries in the moist forest types. **<u>Response</u>:** **A reason for this change in forest composition and structure is due to the decline in fire occurrence caused by changes in land use (Heyerdahl, 1997). Fire is thought to be a dominant disturbance type in the Blue Mountains prior to European settlement (Agee, 1994). These fires kept stands from becoming overstocked and ground fuels from accumulating. The low severity fires occurred frequently, usually every 1 to 25 years, and mixed severity fires occurred every 25-100 year (Hessberg et al., 2005).** **We agree with the portion of your comment noting that "many elements of forest flora and fauna depend on particular fire return intervals and associated habitat features," and we respectfully submit that this point is one reason for why your mischaracterization of moist forest fire regimes as high-severity, rather than mixed-severity, is so problematic when describing moist forests (in particular, see our response to comment TLC-8a p. 18 for more background on this fire-regime characterization issue).** **Knowing the intensity and frequency of disturbance processes is important because plant and animal species are adapted to disturbance effects (e.g., the spatial pattern of vegetation composition and structure at a landscape scale). The species diversity of an area depends on the balance between disturbance frequency and intensity, and the level of competition that exists between species (Parminter 1998). "The suppression of disturbances leads to the loss of biological diversity and may contribute to larger and**

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	more severe disturbance events later" (White et al. 1999). **Ecological principles are the foundation of an approach based on the assumption that if the effects of silvicultural treatments closely emulate those of the historical disturbance regime, then the risk of losing native species and other ecosystem components is greatly reduced (Mitchell et al. 2002, Buse and Perera 2002, DeLong and Tanner 1996, Perera et al. 2004, Rowe 1992). "The act of emulation can range from one extreme of absolute mirroring or mimicry (i.e., repeating natural disturbances exactly), to another of more learning from nature (i.e., using nature only as a guide and selecting which aspects/effects to emulate)" (Buse and Perera 2002). We designed the vegetation management treatments proposed for implementation during the South George project by using the "learning from nature" concept described here – we used nature, and natural processes, as an analog or guide for our vegetation management activities.**
TLC-13a p. 25	**Comment:** Significant degradation of critically important wildlife habitat, adversely impacting interior forest dependent wildlife species including ESA and Oregon State listed species such as bald eagles, wolves, lynx, wolverine, salmonid species, and others; regional species of concern including American marten, Northern goshawk, Neotropical migrant and native birds, and others; and management indicator species including pileated, three-toed, and other woodpeckers, great gray owls, pygmy and flammulated owls, and others. An SEIS is necessary to credibly assess direct and cumulative impacts to these many species of concern evidencing declining population and habitat loss trends, and develop action alternatives that are capable of maintaining and recovering their habitat and population abundance. **Response:** **Direct, indirect, and cumulative effects as well as findings of consistency to wildlife species and habitat were assessed and analyzed in the DEIS (Chapter 3, pages 3-98 to 3-141).** **Direct, indirect, and cumulative effects as to aquatic species were assessed and analyzed in the DEIS, Chapter 3, pages 3-32 to 3-46.**
TLC-14 P. 25	**Comment:** **b. Failure to recognize the natural and irreplaceable role of stand replacement fire** The DEIS is premised upon the objective of reducing high-intensity fire. However, based

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	on plant community types, over 80% of the project area is within fire regimes where stand replacement fire is natural and the forests are wholly adapted to high intensity wildlife. Some wildlife is adapted to high-intensity wildfire and logging coupled with fire exclusion threatens these species. The DEIS fails to recognize the irreplaceable role or high intensity fire. **Response:** **See response to Comment TLC-8a.**
TLC-15 p. 25	**Comment:** 6. The DEIS Fails to Adequately Analyze the Adverse Impacts of Further Reducing Wildland Fire, Especially High-Intensity Wildland Fire, on Wildlife Species Dependent in Whole or in Part Upon Post-fire Habitat Patches of high-intensity fire are very important ecologically, and provide some of the best wildlife habitat Despite the fact that considerable extent of the project area forests are the result of naturally occurring past mixed and high-intensity fires, the DEIS nevertheless arbitrarily treats high-intensity fire as if it is unnatural—i.e., as if it is not part of the historic range of variability (or natural range of variability). **Response:** **See response to Comment TLC-8a.** **The DEIS acknowledges that some woodpecker species would benefit from Alternative A, which may provide the best opportunity for insect outbreaks and stand replacement fires in the analysis area (DEIS, Chapter 3, page 3-125).** **Over 75,000 acres of the district burned in wildfires in 2005 and 2006 (DEIS, Chapter 3, page 3-119). Stand replacement burns are currently not at a deficit in this area.**
TLC-15a p. 27	**Comment:** Moreover, the DEIS makes the scientifically unsound and inaccurate assumption that a loss of wildlife habitat and ecosystem value is caused by wildland fires, at least where moderate-intensity or high-intensity patches occur, and that the forest ecosystems are somehow diminished because such fires occur; and the DEIS simply does not adequately analyze the adverse impacts to wildlife species from eliminating high-intensity fire. In fact, the areas of

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	high-intensity fire resulting from large, intense wildland fires create some of the best, most biodiverse, and most ecologically rich wildlife habitat, according to the current science (Hutto 2006, Noss et al. 2006, Hanson and North 2008, Swanson et al. 2010). High-intensity, or stand-transforming, fire creates ecologically-vital "snag forest habitat", which is rich with large snags, large downed logs, dense pockets of natural conifer regeneration, patches of native shrub habitat, or "montane chaparral", and large live trees. **Response:** **The DEIS acknowledges that stand-replacing fires benefit some species while temporarily removing habitat for others. Examples: DEIS, Chapter 3, page 3-125; and page 3-136. Also, effects for all action alternatives is disclosed on pages 3-126 and 3-127.**
TLC-16 p. 29	**Comment:** The Black-backed Woodpecker is the MIS species representing post-fire habitat, where high-intensity fire has occurred, or areas where most or all trees are killed by beetles. It is a bellwether species for many other wildlife species associated with post-fire habitat. The Forest Service has not addressed how the viability of the Black-backed Woodpecker will be maintained in the project area when the stated goal of the Snow Basin DEIS is to eliminate the process (high intensity fire) which creates its habitat, and degrade future habitat through thinning designed to prevent high-intensity fire. There is considerably less high-intensity fire now than there was historically (i.e., prior to fire suppression) in the eastern Cascades, with current rates around 900 years (Hanson et al. 2009, Hanson et al. 2010), and historic rates of 200-400 years (Leiberg 1900, Beaty and Taylor 2001, Bekker and Taylor 2001); and the high-intensity fire that does occur currently is often salvage logged, rendering it unsuitable for Black-backed Woodpeckers (Hutto 1995, Hutto and Gallo 2006, Hanson and North 2008, Hutto 2008). Past and recent post-fire salvage logging in the Wallowa Whitman, for example, including the Big Sheep Ridge fire where portions of the most severely burned forest were logged – combined with ongoing logging-thinning in green forests intended to minimize fire impacts – cumulatively has influenced the landscape, diminishing and degrading habitat availability for fire dependent forest species such as Black-backed woodpeckers and others. In other words, suitable habitat for this species has been greatly reduced over the past several decades, indicating a reduction in populations. Yet the Forest Service fails to identify how many Black-backed Woodpeckers, and how much Black-backed Woodpecker habitat, is needed in order to maintain viable populations of this species in the planning area, or how many Black-backed Woodpeckers and how much suitable Black-backed Woodpecker habitat there currently is in the project area.

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	Without this information, any analysis of impacts to the Black-backed Woodpecker is inadequate, and the Forest Service is failing to ensure the viability of Black-backed Woodpecker populations. **Response:** **Please note that your comment discusses and refers to the Snow Basin DEIS and past and recent logging in the Wallowa Whitman. Your comment does not mention the South George Vegetation and Fuels Management Project DEIS on the Umatilla National Forest.** **Although the black-backed woodpecker is not designated as a Management Indicator Species in the Umatilla National Forest Land and Resource Management Plan (Forest Plan), nevertheless this DEIS considers the habitat needs for this species.** **The black-backed woodpecker is one of sixteen different species of birds that are included in the group labeled "primary cavity excavators" in Umatilla Forest Plan. Primary cavity excavators , as a group are one of seven management indicator species (MIS) for Umatilla National Forest. The South George DEIS explicitly addresses the project's effects on primary cavity excavator habitat** **The viability of primary cavity excavators is accomplished by providing adequate snag and post-fire habitat forest wide. This DEIS has a lengthy discussion on snags (Chapter 3, pages 3-121 to 3-127) and addresses cumulative effects for all action alternatives. The Decayed Wood Advisor (DecAID) by Mellen-McLean et al. (2009) was used to compare dead wood availability in the South George snag analysis area to a reference condition. The Decayed Wood Advisor (DecAID) is a synthesis of published scientific literature, research data, wildlife databases, forest vegetation databases, and expert judgment and experience. DecAID is not a mathematical model or wildlife/wood-decay simulator, and does not suggest snag retention levels for individual harvest units. Also see project design criteria for the project (DEIS, Chapter 2, Table 2-5, pages 2-23 to 2-24).** **While the risk of high severity in the South George project area would be reduced, wildfire risks are not reduced throughout Umatilla National Forest. Untreated areas, patches within units, and unmanaged areas (including inventoried roadless areas and wilderness) still remain susceptible to high severity fire. These areas account for a large portion of the land area of Umatilla National Forest, leaving ample land**

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	scattered across the forest, the area on which viable populations are measures, as potential habitat for black-backed woodpecker. As mentioned in response to Comment TLC-15 - Over 75,000 acres of the district burned in wildfires in 2005 and 2006, e.g. School and Columbia Complex,(DEIS, Chapter 3, page 3-118). Stand replacement burns are currently not at a deficit in this area. **The finding of consistency for cavity excavators reads as follows in the DEIS, Chapter 3, page 3-127:** ***The project would affect less than 1 percent (.006) of the forested land on the Umatilla National Forest. The overall direct, indirect, and cumulative effects would result in a small negative habitat trend for primary cavity excavators. The amount of effect from this project is too small to cause changes to cavity excavator populations. Therefore the project is consistent with the Forest Plan and continued viability of primary cavity excavators is expected on Umatilla National Forest.*** **Black-backed woodpecker habitat has many similarities to three-toed woodpecker habitat, which is also discussed in the DEIS, Chapter 3, pages 3-118 to 3-121. Findings of consistency for Alternatives B and C read as follows:** ***The overall direct, indirect, and cumulative effects would result in a very small negative habitat trend for three-toed woodpecker. Because the proposed activities affect less than 2 percent of the three-toed woodpecker habitat on the forest, the amount of effect from this project is too small to cause changes to the population. The project is consistent with the Forest Plan and thus continued viability of three-toed woodpecker is expected on the Umatilla National Forest (*Chapter 3, page 3-119*).*** **Findings of consistency for Alternative D read as follows:** ***The overall direct, indirect, and cumulative effects would result in a very small negative habitat trend for three-toed woodpecker. Because the proposed activities affect less than 1 percent (.009) of the three-toed woodpecker habitat on the forest, the amount of effect from this alternative is too small to cause changes to the population. The project is consistent with the Forest Plan and thus continued viability of three-toed woodpecker is expected on the Umatilla National Forest*** **(Chapter 3, page 3-121).** **See other responses to comments regarding snags – TLC-17, TLS 23c,** **Letter 13 Responses to MIS (pages 3-113 to 3-127) and Snags (pages 3-122-to 3-126).**

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TLC-16a p. 30	**Comment:** The consequences of the Forest Service's stated goals of further reducing or eliminating high-intensity fire areas, and, therefore, Black-backed Woodpecker habitat, and further reducing overall fire occurrence, must be fully analyzed in light of this information. Similarly, actions that would reduce the levels of insect occurrence and impacts must be addressed in objective and accurate relation to their impacts on this and other regional species of concern. **Response:** **The goal is not to eliminate high intensity fires. The DEIS acknowledges that some woodpecker species would benefit from Alternative A, which may provide the best opportunity for insect outbreaks and stand replacement fires in the analysis area (DEIS, Chapter 3, page 3-125).** **See response to Comment TLC-16.**
TLC-17 p. 30	**Comment:** **7. Insects and Disease** **A. Mistletoe and old growth trees** How can removing rare old growth trees not eliminate important wildlife habitat? Snags are rare on the landscape and these severely diseased trees will soon create high quality snags. Removing trees over 21" is counter to the best available science, counter to the Goodman letter, and violates NEPA and NFMA. Mistletoe is part of a healthy old growth ecosystem. **Response:** **Removing trees over 21" dbh in portions of the project area is permitted by the Forest Plan and its Eastside Screens amendment, as is described in Appendix C of the DEIS (Consistency with Eastside Screens and National Forest Management Act). Information in Appendix C of the DEIS describes how South George project complies with NFMA. We are unaware of which Goodman letter is being referred to. We agree that dwarf mistletoe is part of a healthy old growth ecosystem, particularly when mistletoe parasitism levels occur within their range of variation.** **Information in the DEIS discloses that removing large diameter trees would impact some wildlife species, for example pileated woodpecker (Chapter 3, page 3-116).**

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	Average snags densities exceed Forest Plan minimum standards (DEIS, Chapter 3, pages 3-121, and Table 3-69 on page 3-122). **Having an ecologically appropriate representation of insect and disease susceptibility conditions well distributed throughout the South George project planning area is a desired future condition (DEIS, Chapter 3, page 3-70).**
TLC-18 p. 33	**Comment:** **8. Snags and Dead Wood** Despite the paucity of snags on the landscape, the South George DEIS proposed treatments threaten to remove what would eventually become high quality snags and large downed logs in an already snag deprived landscape and favor commercial characteristics such as crown ratios that homogenize the landscape at the expense of verified old growth characteristics. **Response:** **See response to Comment TLC-17 above.**
TLC-19 p. 33	**Comment:** **9. Wildlife Corridors and Ecological Connectivity Is Top Priority** Please consider the functionality of riparian areas as wildlife corridors. While not all species would be covered by this approach, the project area does have a complex aquatic system. These areas are likely natural wildlife corridors where extra large buffers or some other approach would help plan for day to day wildlife movement and dispersal needs. Ensuring a high level of landscape connectivity is also one of the best climate change adaptation strategies as many species are predicted to shift elevational ranges, and the aquatic system interconnects a large elevational gradient. Please see the news release for a very recent study that concludes that climate change, insect attacks, diseases and fire will cause many tree species across the Northwest to migrate, decline or even die out over the next few centuries (http://news.umt.edu/2011/11/110311tree.aspx). The last line of the press release states that "One of the best approaches to plan for an uncertain future, the researchers said, is to maintain "connective corridors" as much as possible so that trees can naturally migrate to new areas in a changing future and not be stopped by artificial boundaries." This is a good reminder that we are planning for connectivity of the plant community as well as wildlife.

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	Response: **Many riparian areas were included in the mapping of connectivity for the area. See DEIS Appendix C - Consistency with Eastside Screens and NFMA.**
TLC-20 p. 35	**Comment:** **10. Old Growth and Late Successional Forests** **Best Available Science Does Not Support Commercial Logging in Previously Unlogged Forests** While usually more subtle, this mindset persists in National Forests management today. The Forest Service attempts to persuade the public and itself that old-growth forests need mechanical treatment, and then once in these stands are quick to apply stand density metrics derived from the industrial crop style forestry mentality. The Forest Service openly admits removing large old-growth trees from designated old growth stands because they have a native disease such as dwarf mistletoe and Indian Paint Fungus that create wonderful wildlife habitat, especially in old-growth trees. It is the same mindset as expressed in the quote above, and over time, this practice will progressively simplify stand structure and cause depletion of old growth characteristics such as snags and downed logs. Biodiversity will be systematically lost through this approach. Furthermore, the entire mentality implies subsequent entries when the next "crop" of trees is ready to be harvested. We simply cannot maintain ecologically complete old-growth forests in this manner **Response:** **As described in Chapter 3 of the DEIS (pages 3-58 and 3-65), none of the action alternatives (B, C, D) would result in a reduction in the old forest structural stages as a result of implementing the proposed vegetation management activities. In fact, those same pages note that all of the action alternatives would result in more old forest after treatment than existed before the entry. We certainly acknowledge that timber harvest occurs in old forest, but it does not change the status of these areas from old forest to a different structural stage that is not old forest (and see our response to comment MK-5 p-1 for more information about why timber harvest in old forest does not reduce the amount of old forest following treatment). As we stated in response to several other comments (see Comment RA-1 p-2 in particular), no aspects of the project were designed from an "industrial crop style forestry mentality."** **As we have stated in response to other comments, we certainly agree that dwarf mistletoe and Indian paint fungus are important components of old forests,**

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	particularly when they occur at characteristic levels for the biophysical environment involved. The stand density metrics used for forest vegetation treatments are based on an ecological approach where residual tree density levels reflect not only the requirements of the species involved, but also the ecological site potential as represented by plant associations (Cochran et al. 1994, Powell 1999). **And as described in Table 3-43 of the DEIS (Chapter 3, pages 3-72 to 3-74), the Forest Service is concerned about the sustainability of old, large-diameter trees if climate change creates a warmer and dryer future. If such an eventuality occurs, we are not advocating removal of the large old trees (because they might not be adapted to future climates that are quite different from climatic conditions when they became established), but the stand density metrics used for understory treatments in old forest stands will properly account for stressors by removing enough of the smaller trees to improve the survivability of the large old trees.**
TLC-20a p. 36	**Comment:** Protect and Restore All of the remaining old growth forests need to be protected and restoration efforts in dry forests should be firmly based on the best available science with no compromise. Restoration of the remaining old growth forests should not have to make money, or financially hold up other parts of a timber sale project. If the Forest Service's concern for old growth forests cannot be separated from the financial demands of the commercial logging program then old growth forests are best left unmanaged. Restoration of remaining unlogged lower-elevation sites should focus on the reintroduction of fire and protection from activities that may cause degradation or loss of existing old growth. 1) Evaluate passive opportunities for introducing fire without any mechanical treatment. 2) Use the minimal amount of mechanical treatment needed to safely reintroduce fire. This will typically include trees mostly in the 3-8" in DBH range and no larger than 12" DBH. Only hand crews should be permitted to enter existing old growth and previously unlogged forests. **<u>Response</u>:** **We agree that remaining old-forest stands need to be protected, and this is one of the reasons for the proposed vegetation treatments! As stated several times now in response to a large set of comments relating to old-forest treatment (see Chapter 3 of**

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	the DEIS, pages 3-58 and 3-65, for information about treatment of old-forest stands), none of the action alternatives (B, C, D) would result in a reduction in the old forest structural stages as a result of implementing the proposed vegetation management activities. In fact, those same pages note that all of the action alternatives would result in more old forest after treatment than existed before the entry. We certainly acknowledge that timber harvest occurs in old forest, but it does not change the status of these areas from old forest to a different structural stage that is not old forest (and see our response to comment MK-5 p-1 for more information about why timber harvest in old forest does not reduce the amount of old forest following treatment). **And as stated in response to comment TLC-20 p. 35, the Forest Service is certainly concerned about the sustainability of old, large-diameter trees in response to climate change and other stressors such as insects or disease. The project's stand density metrics, as designed for understory treatments in old forest stands, will properly account for stressors by removing enough of the smaller trees to improve the survivability of the large old trees.** **As described in Chapter 3 of the DEIS, smaller trees will be preferentially removed when old-forest and understory reinitiation stands are entered for treatment, as the objective of the treatment is to retain large-diameter trees (those over 21" dbh) (page 3-58). This is one reason for why the amount of old forest increases as a result of these treatments – some, but not all, of the smaller trees are removed, and if a sufficient number of large trees remain (10 or more per acre), then the post-implementation stand would qualify as old forest when evaluated by using the current classification standards of the Blue Mountains national forests (i.e., 10 or more trees per acre whose diameter is 21 inches or more qualifies an area as old forest).**
TLC-20b p. 37	**Comment:** Old growth forests and recreation Old growth forests provide important social and cultural values to many people and are an irreplaceable part of the recreational experience to many people. Despite this well known fact, the South George DEIS doesn't acknowledge the effects on recreation from logging in old growth forests. The Forest Service must not overlook the well-verified fact that people like to hunt, view wildlife, and just be in old growth forest. The public has been calling on the Forest Service to protect our old growth forests for decades.

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	<u>Response</u>: **The recreation analysis did not address old growth because none of the action alternatives proposed to reduce the old growth structural stage in the project area. The treatments proposed within old growth would help maintain the health and vitality of the larger tree, thus improving the recreational experience within the old growth areas.** **See response to Comment TLC-12c and effects analysis to recreation DEIS, Chapter 3, pages 3-157 to 3-159.**
TLC-20c p. 37	**Comment:** **Eastside Screens** We are very concerned that the Forest Service is foreclosing future options for preserving old-growth. With the South George project the Forest Service continues the incremental degradation of the regions remaining old growth. **<u>Response</u>:** **As stated several times now in response to a large set of comments relating to old-forest treatment (see Chapter 3 of the DEIS, pages 3-58 and 3-65, for information about treatment of old-forest stands), none of the action alternatives (B, C, D) would result in a reduction of the old forest structural stages as a result of implementing the proposed vegetation management activities. In fact, those same pages note that all of the action alternatives would result in more old forest after treatment than existed before the entry. We certainly acknowledge that timber harvest occurs in old forest, but it does not change the status of these areas from old forest to a different structural stage that is not old forest. Since the effects analysis in Chapter 3 of the DEIS clearly shows that old forest will be increased as a result of the treatments, then we fail to see how options are being foreclosed – quite the contrary, an increase in old forest seems to provide more options for old forest than existed before the project.**
TLC-20d pp. 37-38	**Comment:** When it comes to old-growth, our concerns pertain directly to the Forest Service's decision to repeatedly allow commercial logging within these old growth stands. Both the law and the best available science demonstrate that commercial logging in our last few remaining old-growth stands is unacceptable.

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	The Forest Service's current approach to old-growth management is fixated on the number of acres classified as Old Forest Multi-Stratum Large Tree ("OFMS") and Old Forest Single-Stratum ("OFSS") and the need to increase OFSS. This fixation is well captured by South George DEIS's preferred approach that would target hundreds of acres of OFMS for conversion to OFSS. This discrete old-growth classification approach also has many weaknesses because both OFMS and OFSS forest structures historically existed in very close proximity to one another, in a complex mosaic with no fixed boundaries. Changes in aspect and topography, for example, historically altered the fire regime at fine scales, resulting in a patchy mosaic of forest structures across the landscape. In reality a gradient of old-growth forest structure existed between the driest old-growth single story Ponderosa Pine forest and moist mixed conifer old-growth forest. The mixed severity fire regime that defines the Blue Mountains creates a great diversity of habitat conditions that are excellent for a broad array of organisms. The UNF has proposed numerous timber sale projects that call for commercial logging in OFMS old-growth stands to convert those stands to OFSS over the past several years. The agency points to the need to increase OFSS acreage in its documentation, with no science to support that a functional change actually results due to the mechanical treatment, and despite a vast amount of science warning about furthering the spread of mechanical treatment into our last unlogged forests. The Forest Service lacks any information regarding monitoring in previously converted areas. A basic tenet of ecological restoration is that the creation of form without function does not constitute ecological restoration (Kauffman et al. 1997). The Forest Service is not following the best-available science with regard to treating old-growth forest habitat. The literature urges a precautionary approach—remove only the smaller trees so that fire can be reintroduced in dry forest types. Regarding the old growth moist forests proposed for treatments, there is no ecological justification for the proposed treatments period. However, the Forest Service proposes aggressive treatments that risk invasive weed spread, soil disturbance, increased fire risk, drier conditions, and loss of overall carbon storage; all so the amount of OFSS will be increased on paper. **<u>Response</u>:** **This comment maintains that the Forest Service is "fixated" on the "old forest multi strata" structural stage (OFMS) to the exclusion of the "old forest single stratum"**

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	structural stage (OFSS). As described in Chapters 1 and 3 of the DEIS, the Forest Service's focus is to "move forest structure, species composition, and stand density toward their historical ranges of variability" (DEIS, Chapter 1, p. 1-4). Therefore, any proposal to move OFMS to OFSS, or vice versa, is based solely on the HRV results, and our desire to respond to structural stages that are either over-represented or under-represented in the planning area. **Information presented in Chapter 3 of the DEIS does not seem to support the commenter's contention that "South George DEIS's preferred approach would target hundreds of acres of OFMS for conversion to OFSS." For alternatives B/C, the amount of OFMS decreases by 80 acres and OFSS increases by 720 acres (Chapter 3, page 3-58). Obviously, if OFMS decreases by 80 acres, but OFSS increases by 720 acres, then the vast majority of this change cannot be caused by conversion of OFMS to OFSS.** **Contrary to what this comment states, the science foundation for old-forest HRV ranges being used by Blue Mountain national forests is well established. The ranges are consistent with landscape-level studies pertaining to the Blue Mountains, and published during the last 20 years. These sources are:** **• Caraher Report (Caraher et al. 1992).** **• Eastside Forest Ecosystem Health Assessment (Lehmkuhl et al. 1994).** **• Eastside Forests Scientific Society Panel (Henjum et al. 1994).** **• Ecosystem components assessment for the interior Columbia Basin ecosystem management project (ICBEMP) (Quigley and Arbelbide 1997).** **• Landscape-level comparison of historical and current conditions for ICBEMP area (Hessburg et al. 1999).** **• Terrestrial vertebrate source habitat assessment for ICBEMP area (Wisdom et al. 2000).** **• Historical range of variability estimates for central Idaho (Morgan and Parsons 2001).** **• Analysis of pre-management era patterns of forest structure for mixed-conifer forests (Hessburg et al. 2007).** **• Sub-basin modeling for the Upper Grande Ronde River (INLAS) (Hemstrom et al. 2007).** **• Fire and fuel model scenario planning for northeastern Oregon (Wales et al. 2007).**

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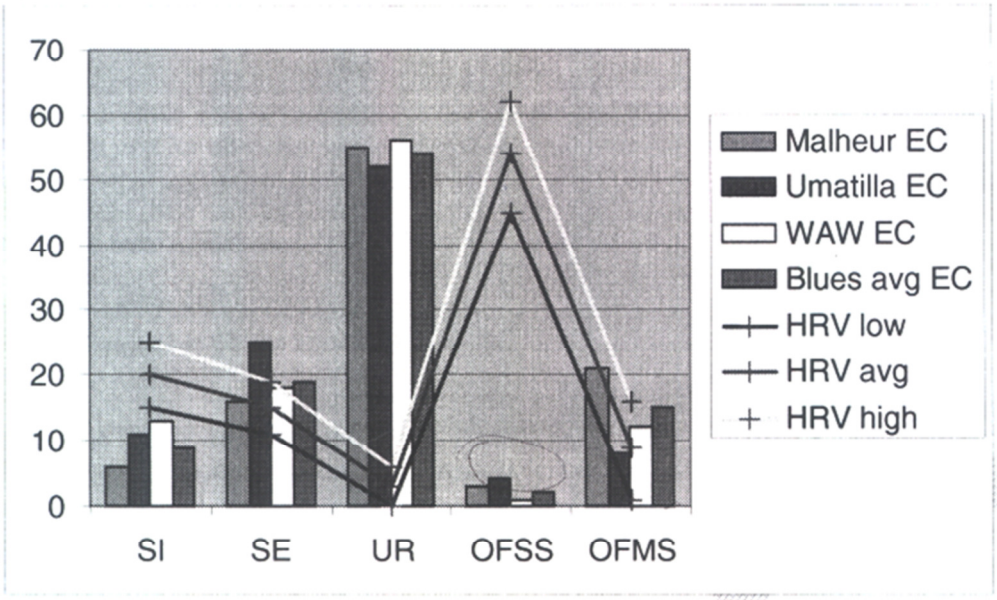
TLC-21 pp. 38-39	**Comment:** **Analysis of Existing versus Historic Conditions for Structural Stage and Potential Vegetation Groups within the Malheur, Umatilla, and Wallowa-Whitman National Forests** This section pertains to the report written by Bruce Countryman and Don Justice, updated Jan. 12th, 2009. This report provides a landscape scale view of the OFSS and OFMS situation across the entire Umatilla and neighboring national forests. Page 6 of the Countryman and Justice report states; "Dry multi-story old forest (OFMS) is within HRV at the scale of the Blue Mountains, but varies from slightly above to within HRV when viewed at the scale of the individual national forest. Dry single-story old forest (OFSS) is below HRV, both at the scale of the Blue Mountains, and for each national forest" (see figure below entitled "Figure 3. Dry Forest Existing and Historic Structural Stage Percent"). Figure 3. Dry Forest Existing and Historic Structural Stage Percent  The lack of OFSS in Figure 3 is nearly exactly matched by the excess of forest in the understory reinitiation (UR) phase. It is a historical fact that due to the accessibility of OFSS, this forest type was logged heavily across the Blue Mountains (Rainville et al.

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	2008). These previously logged OFSS areas are now in the UR phase based on general succession rates in the Blue Mountains. The definition of UR is: "a second tree layer is established under an older overstory. Overstory mortality has created growing space for new understory trees" (pg 3, Countryman and Justice). Areas in the UR structural stage contain the reservoir of lands suitable for restoration to OFSS. The Forest Service should focus efforts to increase OFSS in the UR structural stage. However, it is critical that the Forest Service revisit the stand density science so that the fine line of accelerating single-story old growth structure and helping imperiled species that need this habitat can genuinely be aspired to. Considering the realities and temptations associated with commercial logging, this will be a very challenging task. See Lindenmayer et al. (2006) for a checklist of strategies that should guide these efforts. **<u>Response</u>:** **As described in Chapter 3 of the DEIS, smaller trees will be preferentially removed when old-forest and understory reinitiation stands are entered for treatment, as the objective of the treatment is to retain large-diameter trees (those over 21" dbh) (page 3-58). This is one reason for why the amount of old forest increases as a result of these treatments – some, but not all, of the smaller trees are removed, and if a sufficient number of large trees remain (10 or more per acre), then the post-implementation stand would qualify as old forest when evaluated by using the current classification standards of the Blue Mountains national forests (i.e., 10 or more trees per acre whose diameter is 21 inches or more qualifies an area as old forest).** **Information presented in Chapter 3 of the DEIS does support the commenter's position that "Areas in the UR structural stage contain the reservoir of lands suitable for restoration to OFSS." For alternatives B/C, the amount of OFMS decreases by 80 acres and OFSS increases by 720 acres (Table 3-27, page 3-58). Obviously, if OFMS decreases by 80 acres, but OFSS increases by 720 acres, then the full change cannot be caused by conversion of OFMS to OFSS – most of the increase in OFSS, beyond what is caused by conversion of OFMS to OFSS (app. 80 acres), is related to UR treatments that are expected to result in OFSS as the post-implementation structural stage.** **With regard to Lindenmayer et al. (2006), please see response to REF. TLC-65 later in this Response to Comments.**
TLC-21a p. 39	**Comment:** The argument put forth that fire suppression has increased multi-story old forest conditions

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	beyond the historic range of variability is not supported by the data. Figure 3 illustrates that OFMS is right where it should be compared with historic conditions and that the UNF is currently on the low side of the historical range of variability for OFMS. It is imperative that the Forest Service does not take this for granted. Climate change threatens to reduce multi-story closed canopy forests more than any other forest type and when combined with logging projects, closed canopy forests could rapidly be reduced below the Natural Range of Variability (NRV) (Wales et al. 2007, report attached). Wales et al. (2007) cautions that active management approaches that reduce closed canopy forests could overshoot reductions in NRV levels. The NRV for this landscape apparently does not support high levels of closed-canopy medium and large tree forests. Management direction to maintain these habitats should take this into consideration; objectives may be established to manage for more of this forest type than could be easily sustained. **<u>Response</u>:** **We agree that for South George DEIS analysis (not for figure 3 from the Countryman and Justice (2009) report, which pertains to the Blue Mountains in its entirety and to the three Blue Mountains national forests individually), the amount of OFMS ("multi-story old forest conditions" in the comment) is not beyond the historic range of variability – Chapter 3, Table 3-20, page 3-50 in the DEIS clearly shows that OFMS for the Dry Upland Forest PVG is within HRV, and that OFMS for the Moist Upland Forest PVG is below HRV – therefore, multi-story old forest conditions are not above HRV for either of the project area's biophysical environments.** **The Wales et al. (2007) journal paper is included in the list of science that was used to inform the Blue Mountains HRV ranges (see response to comment "TLC-20d pp. 37-38" for the full list of science sources, including the Wales et al. paper).** **We believe that the HRV ranges used for the South George analysis reflect an appropriate representation of "closed-canopy medium and large tree forests." Also see Appendix J of the DEIS.**
TLC-21b p. 40	**Comment:** Additionally "Old Forest Open Canopy" is within HRV for the moist potential vegetation group (Figure 4) and "Old Forest Closed Canopy" is within HRV for the dry potential vegetation group and at or below HRV for the moist potential vegetation group (Figure 5). These graphs indicate that the Forest Service should refrain from conversion of multi-story

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	old growth to single-story old growth, and should leave all Old Forests in moist potential vegetation groups untreated, because these old growth forest types are only within the range of natural variability, not above. These conversions are not supported by the data shown here or the science and threaten to land OFMS and dependent wildlife species in the same condition as OFSS and dependent wildlife species. Applying highly experimental treatments to a forest structure that is already relatively rare and is serving a critical ecological role is unacceptable. **Response:** **We disagree slightly with this comment's characterization of the HRV results for the South George analysis; Chapter 3, Table 3-20 on page 3-50 of the DEIS clearly shows that "Old Forest Open Canopy" is above HRV (not within) for the Moist Upland Forest PVG.** **For alternatives B/C, the amount of OFMS decreases by 80 acres and OFSS increases by 720 acres (page 3-58). Obviously, if OFMS decreases by 80 acres, but OFSS increases by 720 acres, then the full change cannot be caused by conversion of OFMS to OFSS – most of the increase in OFSS, beyond what is caused by conversion of OFMS to OFSS (app. 80 acres), is related to UR treatments that are expected to result in OFSS as the post-implementation structural stage. Therefore, we believe this strategy represents a good example of "refraining from conversion of multi-story old growth to single-story old growth" because most of the OFSS increase is unrelated to OFMS treatments.**
TLC-22 p. 41	**Comment:** **The EIS Fails to Identify the "Best Available Science" That Supports Logging in LOS Stands That are Barely Within HRV to Convert Multi-Storied Old Growth Forest to Single Storied Stands** The National Forest Management Act's (NFMA) implementing regulations require the consideration of the "best available science" for all site-specific projects. 36 CFR § 219.11 (2008); 36 CFR § 219.35(d)(2000). Under the applicable NFMA regulations, this requires documenting "how the best available science was taken into account in the planning process within the context of the issues being considered" and "that the science was appropriately interpreted and applied." 36 CFR § 219.11(a). The EIS does not objectively present scientific research including contending research and fails to impartially identify what the "best available science" is or entails, with respect to the Forest Service's decision to log multi-story old growth stands, which are only barely within the HRV threshold for that

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	forest type, in order to convert those stands to a slightly more deficient forest type. The EIS must demonstrate how the "best available science" standard was objectively considered with regards to this proposal. Numerous courts, including the Ninth Circuit have held Forest Service decisions to be arbitrary and capricious where there was insufficient evidence in the record that objectively explained what "best available science" entails or how it was considered comparative to contending science in developing aspects of the challenged timber sales. Bark, 2007 U.S. Dist. LEXIS 21272 at *19-20; Forest Watch v. U.S. Forest Serv., 410 F.3d 115, 117 (2nd Cir. 2005); Ecology Ctr., Inc. v. U.S. Forest Serv., 451 F.3d 1153, 1191, 1195 (10th Cir. 2006). **<u>Response</u>:** **Chapter 3 of the DEIS incorporates, by reference, the South George Silviculture Specialist Report (Chapter 3, page 3-46 of DEIS). Page 74 of the Silviculture Specialist Report has a section entitled "Consideration of Best Available Science." This section of the specialist report describes how best available science (BAS) was identified for the Forest Vegetation portion of the South George analysis, how it was documented (both in a stand-alone report called "Review of Best Available Science for Forest Vegetation: South George Vegetation Management Project" (Powell 2009), and in the Literature Cited section of the specialist report), and how it was used to inform the methodologies, models, and procedures used for the South George vegetation analysis. As described in the specialist report BAS section, Forest Service consideration of BAS is informed by national direction provided in a 1920/1950 memorandum, dated June 20, 2007, on the subject of: "Clarification of May 2nd, 2007, Advice on Documenting 'Best Available Science'" (Dillard 2007). The memo notes that "What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, See 40 CFR, 1502.9 (b), 1502.22, 1502.24." Also see FEIS, Appendix L.** **The Forest Vegetation specialist report identifies methods used for the silviculture analysis, and it references the scientific sources relied on for the analysis (in conjunction with the 109-page BAS report cited in the specialist report and DEIS as Powell 2009). The DEIS process, particularly this "Appendix K: Comments on DEIS and Forest Service Response," discusses responsible opposing viewpoints and discloses**

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	incomplete or unavailable information (especially for information that might be viewed as incomplete or unavailable in the context of the Forest Service's response to public comments on the DEIS). **The Forest Service memo of June 20, 2007 also states that "The project record should reference all scientific information considered: papers, reports, literature reviews, review citations, peer reviews, science consistency reviews, results of ground-based observations, and so on. The specialists report in the record should include a discussion substantiating that consideration of the aforementioned material was a consideration of the best available science." As described above, the Forest Vegetation specialist report includes a specific section (page 74) describing consideration of BAS for the South George Forest Vegetation analysis.**
TLC-23 p. 41	**Comment:** **The EIS Failed to Thoroughly Discuss the Scientific Uncertainties Associated with Logging in LOS Stands to Convert Multi-Storied Old Growth Forest to Single Storied Stands** The Forest Service's attempt to approximate some historic condition may not be appropriate for this environment due to overall changes across the Forest as a result of past logging and other management; other variables, such as continued fire suppression, may impact treatment outcomes; and treating old growth is fundamentally different from and may disrupt natural processes. As a recent study from the PNW Research Station points out, "[w]hile historical information offers insight into one resilient forest condition, there may be other equally resilient targets that managers may choose, particularly given the fact that the future climate may not resemble the past." Youngblood, PNW Research Station, Science Findings (September 2008). **<u>Response</u>:** **We agree that HRV, as an analytical technique for evaluating whether existing forest vegetation components (composition, structure, density) have departed from their historical ranges and, if so, by how much, could be problematic as climate change unfolds in the future. This concern has been discussed in much recent scientific literature, as exemplified by this quote: "Climate change suggests that planning must not depend on expectations that the past will provide a template for the future. But if not the past, then what? For the present, no one seems to know. Like the often-quoted investment advice, it now seems that past performance is no guarantee of future results" (deBuys 2008). We agree with deBuys (2008) that at the present time, no one has come up with a viable alternative for HRV when considering climate change.**

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	Continuing with the HRV approach, however, may still be the best option, as described here: "Some feel that HRV may no longer be a viable concept for managing lands in the future because of expected climate warming and increasing human activities across the landscape. Today's climates might change so rapidly and dramatically that future climates will no longer be similar to those climates that created past conditions. Climate warming is expected to trigger major changes in disturbance processes, plant and animal species dynamics, and hydrological responses to create new plant communities and alter landscapes that may be quite different from historical analogs" (Keane et al. 2009:1033-1034). **"At first glance, it may seem obvious that using historical references may no longer be reasonable in this rapidly changing world. However, a critical evaluation of possible alternatives may indicate that HRV, with all its faults and limitations, might be the most viable approach for the near-term because it has the least amount of uncertainty" (Keane et al. 2009:1034), particularly as compared to the uncertainty associated with the magnitude, timing, scale, and spatial extent of climate change impacts.** **"Given the uncertainties in predicting climatic responses to increasing CO2 and the ecological effects of this response, we feel that HRV time series derived from the past may have significantly lower uncertainty than any simulated predictions for the future. We suggest it may be prudent to wait until simulation technology has improved to include credible pattern and process interactions with regional climate dynamics and there has been significant model validation before we throw out the concept and application of HRV. In the meantime, it is doubtful that the use of HRV to guide management efforts will result in inappropriate activities considering the large genetic variation in most species and the robustness inherent in regional landscapes that display the broad range of conditions inherent in HRV projections" (Keane et al. 2009:1034). We agree with Keane and his colleagues that it is doubtful that continued use of the HRV concept in the near term would result in inappropriate management activities.** **Other research perspectives continue to recognize the value of considering reference conditions, even in the context of a rapidly changing climate. "Historical reference conditions remain useful to guide management because forests were historically resilient to drought, insects, pathogens, and severe wildfire. Adaptation of reference information to future climates is logical: historical characteristics from lower,**

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	southerly, and drier sites may be increasingly relevant to higher, northerly, and currently wetter sites" (Fulé 2008). "The study of past forest change provides a necessary historical context for evaluating the outcome of human-induced climate change and biological invasions. Retrospective analyses based on fossil and genetic data greatly advance our understanding of tree colonization, adaptation, and extinction in response to past climatic change" (Petit et al. 2008). **Note that the Forest Vegetation analysis in Chapter 3 of the DEIS provides a climate change analysis (pages 3-71 to 3-75), along with Appendix D of the Silviculture Specialist Report (pages 111-130) providing a climate change and carbon accounting analysis, and both analyses describe the expected compatibility of proposed vegetation management activities with predictions of future climate change for the project area.**
TLC-23a p. 41	**Comment:** The EIS fails to sufficiently acknowledge and adequately discuss the high level of uncertainty with respect to the long-term ecological consequences of this management prescription for LOS stands. This discussion is essential in order for the Forest Service to demonstrate that it took the requisite "hard look" at the environmental consequences of its proposed action under NEPA. **Response:** **Four sections of the DEIS describe proposed vegetation management activities for the South George project area: Chapter 1 (Purpose and Need) provides the ecological rationale for the proposed activities; Chapter 2 (Alternatives) describes the activities in detail and how they would be implemented (including varying implementation amounts, by alternative); Chapter 3 (Affected Environment and Environmental Consequences) describes expected environmental effects associated with implementation of the activities; and Appendix J (NFMA Analysis; Existing and Historical Vegetation) characterizes historical and existing vegetation conditions for the entire project planning area (approximately 21,000 acres).** **The logic track for the South George vegetation analysis (DEIS) is this: Appendix J provides an overall context by examining existing conditions for the entire project planning area, and how they compare with historical conditions; Chapter 1 uses results from the landscape-scale NFMA analysis to identify the purpose of, and need for, a South George Vegetation and Fuels Management Project; Chapter 2 describes the proposed actions in detail; and Chapter 3 discloses how implementation of the proposed vegetation management activities would affect the South George**

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	environment. **Throughout this process, any uncertainties associated with the vegetation management activities are acknowledged. Here is an example from Chapter 1, page 1-3 in the DEIS: forest ecosystems are recognized as being complex, and one reason for using the HRV technique is to explicitly acknowledge that ecosystems experienced a range of conditions across which processes are resilient and self-sustaining. Evaluating forest composition, structure, and density by using ranges (15-55% of dry forest in the OFSS structural stage, for example) is a more ecologically appropriate acknowledgment of inherent ecosystem uncertainty than comparing existing conditions against a single numerical value (35% of dry forest in the OFSS structural stage, for example).** **Note that the conceptual basis described in this response, including consideration of uncertainty, was used for all aspects of the forest vegetation analysis, not just for any particular "management prescription for LOS stands."**
TLC-23b p. 42	**Comment:** We may or may not doubt the severe deficiency in single-story old growth or the proposition that stands that were historically single-story may have shifted to more multi-storied conditions due to past management and fire suppression. Regardless, what is unconvincing remains whether logging in LOS stands that in this case are barely within HRV in order to convert multi-storied old-growth forest to single-story stands is the appropriate solution. The Forest Service has been taking this management approach on a piecemeal, project-by-project basis, and when coupled with unknown future climatic changes, admittedly gives rise to significant uncertainties in terms of broad-scale, long-term ecological consequences. The NEPA process is intended to ensure "that important environmental consequences will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." North Buckhead Civic Ass'n v Skinner, 903 F.2d 1533, 1539-40 (11th Cir. 1990). **<u>Response</u>:** **As described in our responses to numerous other comments about old forest or LOS stands, we believe the DEIS makes a compelling case for the proposed vegetation management activities in old forest stands.** **See response Comments for: TLC-9a, p. 21 and attachment; TLC-10 pp. 21-22; TLC-12c p. 24; TLC-20 p. 35; TLC-20a p. 36; TLC-20c p. 37; TLC-20d pp. 37-38; TLC-21**

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	pp. 38-39; TLC-21a p. 39; TLC-21b p. 40; TLC-22 p. 41; TLC-23 p. 41; TLC-23a p. 41; and TLC-23b p. 42 for more of our response on this issue.
TLC-23c pp. 44-45	**Comment:** The Forest Service is so determined to convert existing old-growth forest structure to SSLT that it is failing to follow the recommendations of the best-available science. In many areas, passive restoration involving introduction of fire without mechanical treatment may be possible. There is currently a significant deficit of large snags (dead trees) in Eastside forests relative to the minimum habitat needs of many native cavity-nesting wildlife species. The Donnegan et al. 2008 study, based upon thousands of field plots, concluded that large (over 20 inches in diameter) snags are "currently uncommon" in eastern Oregon (at only 1 per acre presently), and determined that "management may be necessary to produce a greater density of large snags" (Donnegan et al. 2008 [pp. 47-48]). While we cannot change the snag deficit due to past logging, it is imperative that we recognize that the mature trees in the South George Project area are the future old-growth trees, large snags, and large downed wood. The mature, early-successional trees are priceless in this regard; they can be likened to an investment in future forest health, regardless of disturbance (disturbance doesn't remove the biological legacies). The South George proposal will drastically change these old-growth stands by removing mature trees that are currently showing old-growth characteristics. See Appeal App. 2. No ecologically based prescription should target these mature, early-successional trees. **<u>Response</u>:** **We share your admiration for "mature, early-successional trees" and their potential contributions to future forest health. For this reason and others, restoration of historically appropriate amounts of early-seral species (ponderosa pine, lodgepole pine, western larch, primarily) was included in the project's Purpose and Need (Chapter 1 of DEIS), particularly when an HRV analysis (Chapter 3 of DEIS) identified instances where the existing composition has historically inappropriate amounts of late-seral species (grand fir, subalpine fir, Engelmann spruce, primarily).** **For the South George project, reference to Tables 3-18 (DEIS, Chapter 3, page 3-49) and 3-26 (for Alternatives B/C, page 3-57) indicate that implementing the preferred alternative would result in reasonable progress on species composition objectives**

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	(ponderosa pine increases, and grand fir decreases, for the Dry UF biophysical environment; western larch increases, and grand fir and spruce-fir decrease, for the Moist UF biophysical environment). **The current density of snags and potential effects to snags in the project planning area is provided in Chapter 3 of the DEIS, pages 3-121 to 3-127.** **See response to Comment "TLC-22 p. 41" for information about the Forest Service's consideration and use of Best Available Science.**
TLC-24 p. 46	**Comment:** **vi.The EIS Fails to Objectively and Accurately Identify the "Best Available Science" That Supports the Level and Extent of Planned Commercial Logging in Old-growth Forests.** The DEIS neither objectively, nor accurately identifies what the "best available science" fully represents or recommends with respect to the Forest Service's desire to log extensively in rare LOS forest habitat. The DEIS fails to demonstrate that the "best available science" supports the agency's plans to log century and older mature trees, and to extensively degrade important ground vegetative cover needed by associated old forest species and prey species. The EIS fails to objectively disclose the contending "best available science" that recommends strongly against the project's plans for extensive logging within LOS forests and the removal of mature trees. **<u>Response</u>:** **As described in our responses to numerous other comments about old forest or LOS stands, we believe the DEIS makes a compelling case for the proposed vegetation management activities in old forest stands.** **See response to Comments for: TLC-9a, p. 21 and attachment; TLC-10 pp. 21-22; TLC-12c p. 24; TLC-20 p. 35; TLC-20a p. 36; TLC-20c p. 37; TLC-20d pp. 37-38; TLC-21 pp. 38-39; TLC-21a p. 39; TLC-21b p. 40; TLC-22 p. 41; TLC-23 p. 41; TLC-23a p. 41; and TLC-23b p. 42 for more of our response on this issue.** **Note, however, that timber harvest occurring in old forest does not change the status of those areas from old forest to a different structural stage that is not old forest. As described in the DEIS for alternatives B/C (Chapter 3, page 3-58): "Although some of the existing old-forest stands (OFMS and OFSS) would be affected by proposed**

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	silvicultural activities in these alternatives, the overall amount of old forest is expected to increase after implementation because: **(1) Only improvement cutting is proposed for existing old-forest stands, and the post-treatment structural stage remains old forest because improvement cutting does not remove large-diameter trees.** **(2) Improvement cutting is used to transform certain stands of stem exclusion or understory reinitiation to old forest when they have a sufficient number of large-diameter trees (10 or more per acre that are 21-inches or larger in diameter) to qualify as old forest after treatment."** **One reason that harvest in old-forest stands does not change their status as old forest is that in general, large mature trees are not being removed by the treatment (as described in item (1) in the list above this response).** **See response to Comment TLC-22 p. 41 for information about the Forest Service's consideration and use of Best Available Science.**
TLC-25 p. 46	**Comment:** The DEIS fails to sufficiently and accurately demonstrate how the "best available science" standard was objectively considered and employed with regard to this analysis and decision. Numerous courts, including the Ninth Circuit have held Forest Service decisions to be arbitrary and capricious where there was nothing in the record that objectively and accurately explained what "best available science" entails or how it was considered in developing aspects of the challenged timber sales. Bark, 2007 U.S. Dist. LEXIS 21272 at *19-20; Forest Watch v. U.S. Forest Serv., 410 F.3d 115, 117 (2nd Cir. 2005); Ecology Ctr., Inc. v. U.S. Forest Serv., 451 F.3d 1153, 1191, 1195 (10th Cir. 2006). **<u>Response</u>:** **We respectfully disagree with this comment. Resource specialists incorporated scientific research, considered to be the best available science, in their environmental effects analysis (DEIS, Chapter 3 and Literature Citations, pages L-1 to L-L-39). The Forest Service reviewed exhibits presented by the public in their comments (this appendix).** **Some commenters provided lists of what they deemed scientific papers which disputed the scientific reports that we have used. We reviewed the submitted papers, some were newspaper editorials or opinion papers not documenting any research, and which cannot be considered scientific sources. Others were papers and reports we**

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	have used, but were interpreted differently than how the paper intended. Lastly, some were scientific papers, but they were done in different climatic or geographic areas from the Blue Mountains or were for post-fire logging. I found the scientific literature that the Forest Service specialists used to be the best available and most applicable science for this specific project being proposed at this specific time and at this specific location.
TLC-26 p. 47	**Comment:** The DEIS fails to demonstrate consistency with all the forest plan wildlife habitat standards and guidelines relevant to old growth, dead and down tree habitat, nongame wildlife habitat, riparian areas, big game, and big game winter range. This is necessary for ensuring the amounts and distribution of habitat that will maintain viable populations of management indicator species and TES species. **<u>Response</u>:** **We respectfully disagree with this comment. Consistency with the Forest Plan is evaluated in multiple sections of the wildlife section (DEIS, Chapter 3, pages 3-97 to 3-141). Findings of Consistency (DEIS, Chapter 3, pages 3-141 and 3-142) disclose that all action alternatives are consistent with Umatilla Forest Plan, Endangered Species Act, Migratory Bird Act, and Bald and Golden Eagle Protection Act. See also Appendix C, Consistency with Eastside Screens and NFMA.**
TLC-26a p. 48	**Comment:** The Ninth Circuit Court of Appeals has ruled that, in order for the FS to demonstrate it is ensuring viable populations of wildlife, as NFMA requires, the FS "must both describe the quantity and quality of habitat that is necessary to sustain the viability of the species in question and explain its methodology for measuring this habitat." (Lands Council v. McNair). Here, the DEIS fails to describe the quantity and quality of habitat necessary to sustain the viability of the species in question and it does not explain its methodology for measuring this habitat. The DEIS fails to demonstrate sensitive and management indicator wildlife species reasonably expected to be found in the project area are a part of viable populations. Please disclose the scientific research and other documents ("best science") that the UNF used to support its habitat management strategies for old growth and mature forest wildlife, including the standards, guidelines, and the MA C1 and MA C2 amounts and distribution.

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	Response: **Descriptions of available habitats and the degree to which species in the project area contribute to viable populations are found in the DEIS, Chapter 3, pages 3-99 to 3-123 in the Scale of Analysis and Affected Environment sections.** **Determinations for sensitive wildlife species can also be found in Chapter 3, pages 3-137 to 3-141.** **Literature and documents used to support these determinations are found within the above sections as well as in the Literature Cited (DEIS pages L35-L38).** **MA C1 and C2 information is on pages 3-98 and 3-99. Eastside Screens information is in Appendix C. See also response to comment TLC-27 below.**
TLC-27 p. 48	**Comment:** Please disclose the inventory that demonstrates consistency with the Forest Plan Standard that states, "A thorough, field verifiable inventory of existing old growth stands will be conducted and tracked through time during the plan implementation." **Response:** **This standard originally related to the network of Dedicated Old Growth areas, Management Area C1. The Eastside Screens (Umatilla National Forest Plan Amendment #11) guide our current efforts to track old forest across the landscape. See DEIS Chapter 3, pages 3-46 to 3-70 and pages 3-98 to 3-103; see also Appendix C.**
TLC-28 p. 48	**Comment:** Please disclose which MIS are utilized by the UNF to represent, or be the "indicator" for each of the TES species **Response:** **MIS species were not designated to represent specific TES wildlife species in the Umatilla Forest Plan. For a list of MIS wildlife species see DEIS Chapter 3, page 3-103, Table 3-64.** **Redband trout are an unclassified form of rainbow trout found east of the Cascade Mountains in Oregon and Washington, in northern California, and in eastern British**

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	Columbia. Steelhead trout (anadromous) and rainbow trout (resident redband) are the designated aquatic Management Indicators Species (MIS) for the Umatilla National Forest (DEIS, Chapter 3, pages 3-37 to 3-41).
TLC-29 p. 48	**Comment:** **11. Soil Productivity** The DEIS does not demonstrate how its cited soil assessment methodology results in reliable and accurate data and predictions of detrimental soil conditions (DSC) as defined in the Forest Plan. **<u>Response</u>:** **The original report used as the basis of this analysis was conducted in 2009. Data collection was based on the Forest Soil Disturbance Monitoring Protocol Volume I: Rapid Assessment Gen. Tech. Report WO-82a (2009).**
TLC-29a p. 49	**Comment:** The DEIS does not disclose if the analysis considered areas with known landslide potential in the project area. **<u>Response</u>:** **The proposed activity units were compared with known landslides. Below is a copied section from the original soils report by Craig Busskoh (May 2010)** ***Despite the steep terrain in the steep sideslope areas, the rock type is quite stable with relatively little mass movement activity- events generally are limited to shallow debris slides from buildup of rock fragments. There are no mapped areas of land slump (deep-seated soil and rock movement) indicated in the Umatilla Soil Resource Inventory nor any indicated from the LTA layer.*** **The final report used for this EIS was based on this original document and its analysis.**
TLC-29b p. 49	**Comment:** Please disclose the scientific research and other documents ("best science") that the UNF used to support its Forest Plan assumption that acceptable soil productivity potential can be properly defined as: •a less than 20 percent increase in soil bulk density in volcanic-ash derived soils •a less than 15 percent increase in soil bulk density in other Forest soils

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	•soil displacement of less than 50 percent of the topsoil or humus enriched A1 and/or AC horizons from an area of 100 sq. ft or more which is at least 5 feet in width; •molding of soil in vehicle tracks and rutting to a 6-inch depth or more; •as severely burned soils that have the top layer of mineral soil significantly changed in color (usually to red), and the next one-half inch blackened from organic matter charring **<u>Response</u>:** **All of the mentioned topics are encompassed by FSM 2520.3, Supplement 50, 6/87. In addition each of the mentioned topics are research related to the comments is as follows:** **<20% increase in soil bulk density & < 15% increase in bulk density in other forest soils Dickerson, B.P. Soil Compaction after tree-length skidding in northern Mississippi. Soil Science Society American Journal. 40: 965-966; 1976** **Froelich, H.A. The effect of soil compaction by logging on forest productivity. Final report to U.S. Bureau of Land Management for contact 53500-CT4-5 (N) Corvallis, OR: Oregon State University, School of Forestry; 1976A Steinbrenner, E.C. and Gessel, S.P. The effect of tractor logging on physical properties of some forest soils in southwestern Washington. Soil Science American Proc. 19:372-376; 1955** **Johnson M.G. and Beschta, R.L. Logging, infiltration capacity and surface erodibility in western Oregon. Journal of Forestry 78: 334-337; 1980** **Tackle, D. Infiltration in a western larch-Douglas-fir stand following cutting and slash treatment. Res. Note No. 89 (Place of publication unknown) U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station; 1962**
TLC-29c p. 49	**Comment:** The DEIS states, "Not all soil disturbance is detrimental. Exceeding certain threshold values triggers characterization of that disturbance as detrimental. For example, compaction is considered detrimental if bulk density is increased more than 20 percent for ash soils." Is the FS saying that soil disturbance that does not cross the "detrimental" threshold do not affect soil productivity? **<u>Response</u>:** **It should be recognized that an increase in soil bulk density, soil displacement, soil**

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	erosion or severely burned soils are detrimental to the area of impact. However for the purposes of stand determination as it may relate to detrimental soil conditions some threshold must be used. The Forest Service uses by FSM 2520.3, Supplement 50, 6/87. Which states that a quantity of detrimental impacts in an activity area in excess of 20% is a lost to the stand soil productivity.
TLC-29d p. 49	**Comment:** The DEIS states that only 80 acres of DSC exists in the activity units, which seems low given the amount of past logging in the project area. It does not disclose if field surveys were taken for each unit. **<u>Response</u>:** **Field surveys were taken using the criteria set forth in the following document.** **Forest Soil Disturbance Monitoring Protocol Volume I: Rapid Assessment** **Gen. Tech. Report WO-82a (2009)**
TLC-29e p. 49	**Comment:** The DEIS and soil report do not provide the basis for making the estimates of DSC from project activities. The DEIS does not cite adequate monitoring to validate the estimates, or validate the assumptions that disturbed soils can be restored so that sites do not meet the definition of DSC. **<u>Response</u>:** **See response to Comment TLC-29c p. 49.**
TLC-29f p. 49	**Comment:** The DEIS states: Hydrologic function and condition would improve over the existing condition and over Alternatives B and D as road and trail decommissioning was accomplished. These improvements would be related to improved infiltration on nearly 100 acres of currently compacted lands, decreased risks of erosion and soil damage. Reductions in hydrologic connectivity would reduce risks associated with sedimentation and drainage network expansion. However, the DEIS does not disclose estimates of the full acreage of compacted surfaces in the project area, including temporary or permanent roads, recreational trails, previous log landings, skid trails, livestock-affected areas, or other management-induced compaction. If

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	compaction is hydrologically relevant for those specific sites mentioned in the DEIS passage above, then compaction is hydrologically relevant for all sites in the project area compacted by management activities. (Also see, e.g., Kuennen et al. 2000; Johnson, 1995; USDA Forest Service, 2005b; USDA Forest Service, 2007c.) **Response:** **All alternatives are evaluated using the Hydrologic Function indicators which are identified on page 3-15 (DEIS, Chapter 3).**
TLC-30 p. 50	**Comment:** 12. Scientific Integrity We must raise the issue of potential bias in FS decisionmaking and therefore potential NEPA requirements for scientific integrity. NEPA documents such as this EIS must be judged as to the reliability of the data and modeling methodology used to support analyses. Huck (2000) states: The basic idea of reliability is summed up by the word consistency. Researchers can and do evaluate the reliability of their instruments from different perspectives, but the basic question that cuts across these various perspectives (and techniques) is always the same: "To what extent can we say the data are consistent?" …(T)he notion of consistency is at the heart of the matter in each case. (Emphases added.) The next level of scientific integrity relates to the notion of "validity" (Huck, 2000). The degree of "content validity" or accuracy of the model or methodology is established by utilizing other experts. This, in turn, demonstrates the necessity for utilizing the peer review process. The validity of the various models utilized in the EIS's analyses have, by and large, not been established for the uses the FS employs them, simply because the FS has not utilized the expert peer review process to establish their content validity. **Response:** **We respectfully disagree with this comment. The analysis conducted for the South George project was conducted by journey level resource specialists, working as an interdisciplinary team, using up to date information and the best applicable scientific information available. This work is documented in the project file, in specialists' reports, and throughout the DEIS. The Forest Service is well aware of the NEPA requirements and of the President's Memorandum on Scientific Integrity.**

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	The fact that certain groups do not want any management in this area does not make the decision to manage the area in accordance with the Forest Plan inaccurate, unreasonable, or lacking in scientific integrity.
TLC-31 p. 50	**Comment:** 13. More Cumulative Effects The DEIS fails to rigorously analyze the cumulative effects of the previous FS timber sales and the planned logging activities associated with the action alternatives. **Response:** **We respectfully disagree with this comment. Please see Chapter 3 of the DEIS under the heading Environmental Consequences for disclosure of cumulative effects by resource.** **We followed CEQ regulations and June 24, 2005 letter on Guidance on the Consideration of Past Action in Cumulative Effects Analysis for this project.**
TLC-32 p. 51	**Comment:** 14. Fire Planning, Fire Policy, and Fire Suppression A premise of the project is that the ecological impacts of fire suppression have been significant. The DEIS did not adequately consider the spatial and temporal ecological economic cumulative impacts of the FS's fire suppression management regime for the project area. Nor does the DEIS explore the economic implications of the FS's fire management. The UNF Forest Plan does not disclose the forestwide cumulative effects of its present fire suppression policies. Does the Forest Plan require the level of suppression currently emphasized in the project area? Did the Forest Plan ROD authorize the level of suppression currently emphasized in the project area? Did the Forest Plan EIS analyze the environmental impacts of the level of suppression currently emphasized in the project area? **Response:** **The economic analysis presented in South George DEIS is in accordance with the Forest Service manual and handbook guidance to complete a financial analysis for timber sales (FSH 2409.18). The economic analysis (Chapter 3, pages 3-171 to 3-175)**

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	documented in the DEIS identifies financial monetary measures for timber and the financial costs of removing the timber. Other non-timber resources affected by the project are not measured using monetary values. The costs and benefits associated with these resources are described using other quantitative and qualitative measures in accordance with Forest Service policy. **Cumulative effects for fuels are disclosed on pages 3-86 to 3-97 in Chapter 3 of the DEIS.** **Umatilla Forest Plan does require the level of suppression currently emphasized in the project area. Wildfires that threaten life, property, public safety, improvements, or investments will receive aggressive suppression action using an appropriate suppression strategy (Forest Plan, page 4-87).** **All wildfire will require a timely suppression response with appropriate forces and strategy of either one, or a combination of the alternatives of confinement, containment, or control (Forest Plan, page 4-87).** **For moderate to high intensity wildfire (flame length over 2 ft) emphasis should be on the appropriate response (strategy) by management areas as follows :** **A6 – Control (Forest Plan, page 4-120)** **C1- Control (Forest Plan, page 4-146)** **C3(timber), C3(grass) – All strategies (Forest Plan, page 4-154)** **C3A – All strategies (Forest Plan, page 4-157)** **C4 – All strategies (Forest Plan, page 4-161)** **C5 – Control and Contain (Forest Plan, page 4-165)** **Unplanned ignitions may be used as prescribed fire if (a) a prescribed fire plan has been prepared and approved, and (b) a fire is burning within prescription in management areas that allow prescribed fire which include management areas C1, C3, C3A, C4 and C5. In management areas C3, and C3A under appropriate fire prediction conditions, wildfire may be permitted to play a natural role to meet big game habitat objectives. For moderate to high intensity wildfires (average flame lengths over 2 ft) in C3 and C3A, wildfire suppression strategies may be emphasized (Forest Plan pages 4-154 and 4-157).**

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TLC-32 p. 51	**Comment:** 15. Climate Change and Forest Management The DEIS did not considered the effects of human-induced climate change, including what humans can do to offset our previous actions, and new scientific information on all relevant changes away from historic conditions—and in the forestwide context of Forest Plan Revision. **<u>Response</u>:** **As described in our response to comment TLC-23 p. 41, a detailed Climate Change and Carbon Accounting Analysis was completed during the Forest Vegetation portion of the South George project planning process (results are described in Appendix D of the Silviculture Specialist Report, pages 111-130).** **A synthesis of the longer climate change analysis was included in Chapter 3 of the DEIS on pages 3-71 to 3-75. Table 3-43, and the Summary section on pages 3-74 and 3-75 of the DEIS, provide some thoughts about how the proposed South George vegetation management activities contribute either to resistance or adaptation strategies in response to predicted climate change effects (i.e., addressing what humans can do in response to our previous actions).** **Appendix D of the Silviculture Specialist Report provides an analytical context for the South George climate change assessment.**
TLC-32a p. 53	**Comment:** The DEIS also fails to analyze and disclose how climate change is already, and is expected to be even more in the future, influencing forest ecology. This has vast ramifications as to whether or not the forest in the project area will respond as the FS assumes **<u>Response</u>:** **The Climate Change and Carbon Accounting Analysis completed for the South George project (Appendix D of the Silviculture Specialist Report, pages 111 to 130) discloses how some effects of climate change are already apparent, and it describes how The Nature Conservancy's web-based tool called the Climate Wizard was used to evaluate possible temperature and precipitation departures for the planning area for the period of 2070-2099 (see figure D1 in Appendix D of specialist report).**

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TLC-32b p. 54	**Comment:** In a literature review, Simons (2008) states, "Restoration efforts aimed at the maintenance of historic ecosystem structures of the pre-settlement era would most likely reduce the resilient characteristics of ecosystems facing climate change (Millar 1999)." The project area and UNF have been fundamentally changed, so the agency must consider how much native forest it has fundamentally altered compared to historic conditions forestwide before pursuing "treatments" here. And that includes considering the effects of human-induced climate change. Essentially, this means considering new scientific information on all kinds of changes away from "historic conditions." **<u>Response</u>:** **As described in our response to comment TLC-23 p. 41,a detailed Climate Change and Carbon Accounting Analysis was completed during the Forest Vegetation portion of the South George project planning process (results are described in Appendix D of the Silviculture Specialist Report, pages 111-130). Our long response to comment TLC-23 p. 41 provides our response to some recent scientific literature questioning the future validity of the HRV concept in light of expected changes associated with climate change. Our response provides countervailing literature suggesting that changes away from the current HRV methodology, perhaps leading ultimately to a "future range of variation" protocol, may be needed at some point in the future, but that making such a transition now would be premature because our current level of knowledge and modeling methodology does not permit a suitable substitute for HRV.** **A synthesis of the Silviculture Specialist Report (Appendix D) climate change analysis was included in Chapter 3 of the DEIS on pages 3-71 to 3-75. Table 3-43, and the Summary section on pages 3-74 and 3-75 of the DEIS, provide some thoughts about how the proposed South George vegetation management activities contribute either to resistance or adaptation strategies in response to predicted climate change effects (i.e., addressing what humans can do in response to our previous actions).**
TLC-32c p. 54	**Comment:** It is clear that the management of the Earth's forest is a nexus for addressing the vast crisis of our times, climate change. Yet the DEIS fails to utilize the best scientific information available to consider these facts in its analyses. **<u>Response</u>:** **We agree completely that any effective and enduring response to climate change must**

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	incorporate forest considerations. We disagree that the DEIS, and its associated Silviculture Specialist Report, has failed to utilize the best available science relating to forest ecosystems, their ecosystem services, and projected effects from a changing climate.

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• **This table shows a listing of reference as presented** • **This compilation of research, reports, etc…does not reference site-specific elements, site-specific statements, or site-specific questions that are to be considered with South George project.** • **References referring to post-fire logging and Northern Spotted Owls were not considered because this project does not propose any post-fire salvage logging and is not a Northern Spotted Owl Forest.** • **References identifying specific geographical areas and references that are opinion pieces were not considered.**	
Reference Number	**Reference and Forest Service Response**
REF. TLC-1	Agee, J.K. (2003) Monitoring postfire tree mortality in mixed conifer forests of Crater Lake, Oregon, USA. Natural Areas Journal, 23, 114–120. **Response:** **N/A THIS IS NOT A POST-FIRE SALVAGE LOGGING PROJECT.**
REF. TLC-2	Altman, B., and R. Sallabanks. 2000. Olive-sided flycatcher (Contopus cooperi). In A. Poole and F. Gill, editors. The birds of North America, number 502. The Birds of North America,

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	Philadelphia, Pennsylvania, USA. **Response:** **N/A THIS IS NOT A POST-FIRE SALVAGE LOGGING PROJECT.**
REF. TLC-3	Baker, W.L. 2009. Fire ecology in Rocky Mountain landscapes. Island Press, Oxford. **Response:** **This reference refers to a book that we do not have a copy of in our library. A web search gives this description of the book "*Fire Ecology in Rocky Mountain Landscapes* brings a century of scientific research to bear on improving the relationship between people and fire.** **In recent years, some scientists have argued that current patterns of fire are significantly different from historical patterns, and that landscapes should be managed with an eye toward reestablishing past fire regimes. At the policy level, state and federal agencies have focused on fuel reduction and fire suppression as a means of controlling fire.** **Geographer William L. Baker takes a different view, making the case that the available scientific data show that infrequent episodes of large fires followed by long interludes with few fires led to naturally fluctuating landscapes, and that the best approach is not to try to change or control fire but to learn to live with it. In *Fire Ecology in Rocky Mountain Landscapes*, Baker:** • **reviews functional traits and responses of plants and animals to fire at the landscape scale** • **explains how scientists reconstruct the history of fire in landscapes** • **elaborates on the particulars of fire under the historical range of variability in the Rockies** • **considers the role of Euro-Americans in creating the landscapes and fire situations of today**

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	In the end, the author argues that the most effective action is to rapidly limit and redesign people-nature interfaces to withstand fire, which he believes can be done in ways that are immediately beneficial to both nature and communities. **Part of the Purpose and Need for South George project is to reintroduce fire into the landscape. There is about 3,000 acres of landscape prescribed fire proposed for implementation in all the action alternatives. This treatment is proposed for areas that historically experienced low and mixed severity fire. The majority of the proposed landscape fire areas are in Fire Regime 1 and the drier portions of Fire Regime III.**
REF. TLC-4	Baker, W.L., T.T. Veblen, and R.L. Sheriff. 2007. Fire, fuels and restoration of ponderosa pine-Douglas fire forests in the Rocky Mountains, USA. Journal of Biogeography 34: 251-269. **Response:** **This journal paper states that "in the US Rocky Mountains, research on fire history and forest structure, and early historical reports, suggest the low-severity model may only apply in limited geographical areas." It also notes that "low-severity fires were common, but high-severity fires also burned thousands of hectares. Tree regeneration increased after these high-severity fires, and often attained densities much greater than those reconstructed for southwestern ponderosa pine forests." As we noted in response to comment "TLC-8a p. 18", fire history research indicates that some of the dry-forest areas in the Blue Mountains may have had historical fire regimes that were also more variable than those described for the southwestern United States. However, the Blue Mountains studies (Heyerdahl 1997, Marouka 1994, Olson 2000, Williamson 1999) do not indicate that dry forests burned in high-severity fires, or that high-severity fire was a common occurrence for dry forests of the Blue Mountains. This paper concludes that a restoration strategy for dry-forest areas should attempt to restore variability of fire, and to reverse changes brought about by historical levels of livestock grazing and selective timber harvest. We agree with these restoration points, and believe the South George project was designed to address them as well.**

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REF. TLC-5	Beaty, R.M., and A.H. Taylor. 2001. Spatial and temporal variation of fire regimes in a mixed conifer forest landscape, Southern Cascades, USA. Journal of Biogeography 28: 955-966. **Response:** **See response to Comment TLC-16 and TLC-16a.**
REF. TLC-6	Bekker, M.F., and A.H. Taylor. 2001. Gradient analysis of fire regimes in montane forests of the southern Cascade range. Plant Ecology 155: 15-28. **Response:** **See response to Comment TLC-16 and TLC-16a.**
REF. TLC-7	Bennetts RE, White GC, Hawksworth FG, Severs SE. 1996. The influence of dwarf mistletoe on bird communities in Colorado ponderosa pine forests. Ecol. Appl. 6:899 – 909. **Response:** **N/A – GEOGRAPHICAL REFERENCE we don't have *ponderosa pine dwarf mistletoe* in this area, however, we do not deny that mistletoe is an integral part of forest ecology and is used by several wildlife and invertebrate species.**
REF. TLC-8	Beschta, R.L., J.J. Rhodes, J.B. Kauffman, R.E. Gresswell, G.W. Minshall, J.R. Karr, D.A. Perry, E.R. Hauer, and C.A. Frissell. 2004. Postfire management on forested public lands of the western USA. Conservation Biology 18: 957-967. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-9	Bock, C.E. and J.F. Lynch. 1970. Breeding bird populations of burned and unburned conifer forest in the Sierra Nevada. Condor 72: 182-189.

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	Response: **N/A – GEOGRAPHICAL AREA REFERENCE**
REF. TLC-10	Bond, M.L., D.E. Lee, C.M. Bradley, and C.T. Hanson. 2009. Influence of pre-fire tree mortality on fire severity in conifer forests of the San Bernardino Mountains, California. The Open Forest Science Journal 2: 41-47. **Response:** **This journal article notes that "High tree mortality due to drought and insects often is assumed to increase fire severity once ignition occurs. In 2002-2003, coniferous forests in the San Bernardino Mountains, California experienced a significant tree mortality event due to drought and an outbreak of western pine beetles (*Dendroctonus brevicomis*). In October 2003, fire burned approximately 5,860 ha of conifer forest types in many beetle- and drought-affected stands where most pre-fire dead trees had retained needles. We used pre- and post-fire GIS data to examine how fire severity was affected by pre-fire tree mortality, vegetation characteristics, and topography. We found no evidence that pre-fire tree mortality influenced fire severity. These results indicate that widespread removal of dead trees may not effectively reduce higher-severity fire in southern California's conifer forests. We found that sample locations dominated by the largest size class of trees (≥61 cm diameter at breast height (dbh)) burned at lower severities than locations dominated by trees 28-60 cm dbh. This result suggests that harvesting larger-sized trees for fire-severity reduction purposes is likely to be ineffective and possibly counter-productive."** **It is unclear if this article was cited in a specific comment, so we are unaware of the specific context to which it applies. This reference pertains to the San Bernardino Mountains of southern California. The study reports tree mortality-fire severity interactions for mixed-species stands exposed to large, human-caused fires and Santa Ana wind conditions. The tree species involved were ponderosa pine, Jeffrey pine, Coulter pine, white fir, sugar pine, incense cedar, black oak, canyon live oak, and bigcone Douglas-fir. Of these 9 tree species, only ponderosa pine occurs in the South George planning area. This**

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	study lacks relevance to the project because the South George planning area does not occur in southern California and its associated climatic conditions (including Santa Ana winds), it only contains one of the nine tree species included in the study, and South George is not a post-fire project.
REF. TLC-11	Bond, M.L., D.E. Lee, R.B. Siegel, and J.P. Ward. 2009. Habitat use and selection by California spotted owls in a postfire landscape. Journal of Wildlife Management 73: 1116-1124. **Response:** **N/A –THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-12	Brown, P.M., and T.W. Swetnam. 1994. A cross-dated fire history from coast redwood near Redwood National Park, California. Canadian Journal of Forest Research 24: 21-31. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-13	Brown, R. T., J. K. Agee, and J. F. Franklin. 2004. Forest Restoration and Fire: Principles in the Context of Place. Conservation Biology. 18: 903-912 **Response:** **This article was not cited in a comment, so we are unaware of the specific context to which it applies. This article concludes that "We propose that low thinning is the most appropriate type of thinning practice. Treating surface fuels, reducing ladder fuels, and opening overstory canopies generally produce fire-safe forest conditions, but large, fire-resistant trees are also important components of fire-safe forests. The context of place is critical in assigning priority for the limited resources that will be available for restoration treatments. Historical low-severity fire regimes, because of their current high hazards and dominance by fire-resistant species, are the highest priority for treatment. Mixed-severity fire regimes are of intermediate priority, and high-severity fire regimes are of lowest**

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	priority. Classification systems based on potential vegetation will help identify these fire regimes at a local scale." **We agree with many of the points made in this article. Low thinning, which the article states is the most appropriate type of thinning practice, is one of the proposed actions for accomplishing the silviculture portion of the project's purpose and need (see Chapter 2, page 2-7 to 2-11 of the DEIS for a description of how low thinning would be used for the South George project). In a philosophical context, we recognize that mixed-severity fire regimes have intermediate treatment priority, but the fire regime condition class analysis for the South George planning area (Chapte 3, Table 3-47, page 3-80 in the DEIS) suggests that those areas have a need for active management, and that the need may be as great there as it is for the low-severity regime. We agree that potential vegetation provides the best conceptual framework for determining fire regimes, and that is the approach used for the South George analysis.**
REF. TLC-14	Campbell, John L, Mark E Harmon, and Stephen R Mitchell, 2011. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Front Ecol Environ 2011; doi:10.1890/110057 **Response:** **This article was not cited in a comment, so we are unaware of the specific context to which it applies.** **This "review reveals high C [carbon] losses associated with fuel treatment, only modest differences in the combustive losses associated with high-severity fire and the low-severity fire that fuel treatment is meant to encourage, and a low likelihood that treated forests will be exposed to fire. Although fuel-reduction treatments may be necessary to restore historical functionality to fire-suppressed ecosystems, we found little credible evidence that such efforts have the added benefit of increasing terrestrial C stocks." The context of this review article is "semi-arid, fire-prone conifer forests of the western US, which are largely**

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	composed of pine, true fir (*Abies* spp.), and Douglas fir." This context describes the same biophysical environment as the low-severity fire regime (FR I) of the South George planning area. **This opinion piece is a literature and modeling review designed to synthesize the basic relationships of carbon cycling processes, namely growth, decomposition, harvest, and combustion. Since the article does not report results from original research, it is highly dependent upon which literature the authors decided to review, and underlying assumptions influencing the conclusions they draw from the literature. However, many of the assumptions, such as their premise that "forest wildfires primarily consume leaves and small branches" (surface fuels), are not supported by other work with relevance to the South George analysis.** **For much of the interior Columbia River basin, for example, there has been a large increase in the proportion of closed, mid-age forest, including on the warmer and drier portion of the moist-forest biophysical environment (the fire regime IIIa and IIIb sites). For ecosystems that evolved with occasional, fine-scale, replacement fire severity, the recent exclusion of low and mixed severity fires may lead to increased frequency, and perhaps most importantly, more spatially contiguous replacement fire than was experienced historically (Hessburg et al. 2007, Quigley et al. 1996). "A detailed study of the entire inland portion of the northwestern United States also concluded that areas historically under a nonlethal or mixed-severity fire regime have now shifted toward stand replacement regimes (Morgan et al. 1998; Quigley et al. 1996)" (Arno et al. 2000, p. 227).** **These works (and others not cited here) describe a dramatic increase in the amount of high-severity fire occurring in the western US over the past 20 years, and because much of this high-severity burning occurs on sites that historically burned with low- or mixed-severity, then it is disingenuous to compare the carbon emissions typically produced by benign, low-severity fires (e.g., the characteristic fire effects associated with historical conditions) with contemporary fuel-reduction treatments for the same sites.**

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	Since all of the fire regime I sites in the South George planning area are moderately or highly departed from historical reference conditions (DEIS, Chapter 3, Table 3-47, page 3-80) and since this would result in a very high proportion of crown fire (Table 3-50, page 3-86) during a future fire event, and because crown fire would consume fuels to a much greater extent than the "leaves and small branches" assumption used by the authors for fire regime I sites, then a more realistic carbon comparison would involve the carbon emissions produced by uncharacteristically intense fires on fire regime I sites with the corresponding carbon emissions associated with contemporary fuel reduction treatments, particularly since the treatments are designed to return these areas to their historical, condition class 1 status.
REF. TLC-15	Carey, H., and M. Schumann. 2003. Modifying Wildfire Behavior - The Effectiveness of Fuel Treatments. National Community Forestry Center, Working Paper 2, Forest Guild, Santa Fe, NM. **Response:** **This reference was not cited in a comment so we are unaware of the specific context to which it applies. This working paper studied fuel treatments such as prescribed burning, mechanical thinning, mechanical thinning and burning and commercial timber harvest and effects to fire behavior. It concludes that prescribed burning was effective at altering wildfire behavior by reducing crown scorch and tree mortality, as well as fire severity. The results from mechanical thinning were variable and depended on resulting slash. The results from mechanical thinning and burning were not consistent and could not be linked statistically to reductions in tree density (Pollet and Omi 2002), and there was an absence of literature that addresses commercial logging as a method for reducing wildland fuels. However, this paper sites that there is substantial evidence that supports the effectiveness of prescribed fire in reducing fire behavior. We agree with the assertion that prescribed fire reduces fire behavior and have proposed 3000 of landscape prescribed fire in the South George project planning area. The primary goal of any fuel reduction project is to change**

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	the structure of the fuel bed and of the standing woody vegetation to increase resistance to stand-replacement wildfire (McIver and Fettig 2010). Fielder et al. (2010) demonstrates that the combination of thinning, promoting individual tree growth while reducing canopy cover and crowning hazard, and burning reducing torching hazard and increasing height to live crown, is the most effective way to increase stand resistance to wildfire. In Agees and Skinner's "Basic principles of forest fuel reduction treatments," they took a look at the effectiveness of fuel treatments after the Hayfork Fire on the Shasta-Trinity National Forest, Tyee Fire on the Wenatchee National Forest, Megram Fire on the Shasta-Trinity and Six Rivers National Forest, Hayman Fire on the Pike-San Isabel National Forest and Cone Fire on the Black's Mountain Experimental Forest within the Lasses National Forest. Their conclusions were 1)reduce surface fuels, 2)increase height to live crown, 3)decrease crown density and 4)keep big trees of resistant species to promote fire resilient forests. They also took a look at the spatial scale at fuel treatments in relationship to their effectiveness. If fuel treatments are small and scattered, or a long time has elapsed since treatment, they will be less effective (Agee and Skinner 2005).
REF. TLC-16	Christensen, G.A., S.J. Campbell, and J.S. Fried, tech eds. 2008. California's forest resources, 2001-2005: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-763. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 183 p. **Response:** **N/A – GEOGRAPHIC REFERENCE**
REF. TLC-17-	Clark, D.A. 2007. Demography and habitat selection of northern spotted owls in post-fire landscapes of southwestern Oregon. Masters Thesis, Oregon State University. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-18-	Collins, B.M., and S.L. Stephens. 2010. Stand-replacing patches within a "mixed severity" fire regime: quantitative characterization using recent fires in a long-established natural fire area.

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	Landscape Ecology doi: 10.1007/s10980-010-9470-5. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. See response to comment TLC-8 for our response to mix-severity fire regimes.**
REF. TLC-19	Collins, B.M., J.D. Miller, A.E. Thode, M. Kelly, J.W. van Wagtendonk, and S.L. Stephens. 2009. Interactions among wildland fires in a long-established Sierra Nevada natural fire area. Ecosystems 12: 114-128. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-20	Committee of Scientists, 1999. Sustaining the People's Lands. Recommendations for Stewardship of the National Forests and Grasslands into the Next Century. March 15, 1999 **Response:** **This long (193 pages) report provides a wide gamut of perspectives about sustainable management of public lands, with a particular emphasis on national forest management. We believe that the South George project has been prepared in such a way that it is compatible with many of the recommendations from this report, including these items:** • **"acknowledge the dynamic nature of ecological systems;** • **acknowledge the significance of natural processes;** • **acknowledge the uncertainty and inherent variability of ecological systems;** • **acknowledge cumulative effects;** • **preserve options;** • **conserve habitat for native species and productivity of ecological systems;** • **reduce uncertainty through adaptive management and continuous learning;** • **recognize the interdependence of forests and grasslands with economies and communities;**

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	• **recognize the rights of American Indian tribes;** • **search for strategies and actions that provide for human use in ways that contribute to long-term sustainability;** • **recognize the special role that national forests and grasslands play in regional landscapes;** • **establish collaborative relationships that provide opportunities and incentives for people to work together;** • **conduct operational planning for small landscapes;** • **keep decisions close to the planning area;** • **recognize the role of timber harvest in achieving sustainability;** • **develop flexible regeneration requirements that allow for natural seeding;** • **select the silvicultural system to promote sustainability; and** • **focus timber-harvest planning and monitoring on desired conditions."**
REF. TLC-21	Crist, M.R., T.H. DeLuca, B. Wilmer, and G.H. Aplet. 2009. Restoration of Low- Elevation Dry Forests of the Northern Rocky Mountains: A Holistic Approach. Washington, D.C.: The Wilderness Society. **Response:** **This report contends that the prevailing "model used for restoration [of dry forests in the western United States] was derived from the ecology of ponderosa pine forests in the southwestern US, which are characterized by open, park-like stands that historically experienced surface fire under short term intervals. By contrast, the northern Rockies dry forests historically varied in their stand density and experienced mixed-severity fires, described as different levels of fire severity that burn hot in places and hardly at all in others on a varying time interval." They go on to "argue that successful forest restoration strategies for the Northern Rockies must take into account the specific ecology of forests in this region, as well as the history of land management activities in a particular place."** **As noted in our response to item "REF. TLC-4," which is similar in concept to this item, we**

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	acknowledge that dry forest fire regimes had some amount of historical variability (but not a significant or consistently recurring proportion of high-severity fire effects), and we agree that the fire history associated with dry forests from the southwestern US is not necessarily a good template for Blue Mountain ecosystems. We agree that restoration strategies should account for the local ecology and land management history of an area, along with existing vegetation conditions, in order to be successful. We believe that the South George project accomplishes this recommendation appropriately.
REF. TLC-22	Depro, B.M, B.C. Murray, R.J. Alig, and A. Shanks. 2008. Public land, timber harvests, and climate mitigation: Quantifying carbon sequestration potential on U.S. public timberlands. Forest Ecology and Management 255: 1122-1134. **Response:** **This journal article concludes that "Our analysis found that a "no timber harvest" scenario eliminating harvests on public lands would result in an annual increase of 17-29 million metric tonnes of carbon (MMTC) per year between 2010 and 2050 – as much as a 43% increase over current sequestration levels on public timberlands and would offset up to 1.5% of total U.S. GHG [greenhouse gas] emissions. In contrast, moving to a more intense harvesting policy similar to that which prevailed in the 1980s may result in annual carbon losses of 27-35 MMTC per year between 2010 and 2050. These losses would represent a significant decline (50-80%) in anticipated carbon sequestration associated with the existing timber harvest policies. If carbon sequestration were valued in the marketplace as part of a GHG offset program, the economic value of sequestered carbon on public lands could be substantial relative to timber harvest revenues."** **Appendix D of the South George Silviculture Specialist Report provides a relatively detailed discussion of climate change and carbon sequestration considerations for the South George project. The Depro et al. (2008) journal article examines carbon relationships for the US in the context of one disturbance process – timber harvest – by using relatively simplistic "harvest/no harvest" scenarios. Appendix D of the South George report examines**

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	not only the carbon sequestration implications of timber harvest, but it also describes the possible consequences of another disturbance process with more potential influence on the South George planning area – wildfire – as described here: **"Forests in the United States sequester about 10% of the annual anthropogenic CO2 emissions (Woodbury et al. 2007). Wildfires are increasing both in size and severity (Miller et al. 2009, Westerling et al. 2006) and they produce large direct CO2 emissions on the order of 4-6% of annual U.S. anthropogenic CO2 emissions (Spracklen et al. 2007, Wiedinmyer and Neff 2007). As the amount of burned acreage increases, fire suppression costs routinely exceed $1 billion a year and this is causing managers to consider a policy where some fires would be allowed to burn when doing so would provide ecosystem benefits (such as Fire Use for Resource Benefit) and reduced suppression costs (Donovan and Brown 2005, 2007, 2008)."** **"Since wildfires represent a substantial potential source of future CO2 emissions, much of the recent forest management emphasis is directed at either reducing fire susceptibility or improving fire resistance (Sohngen and Haynes 1997). One of the objectives of using mechanical thinning, prescribed fire, or a combination of both activities to reduce fuel loadings is to produce relatively small carbon releases now in an effort to preclude or minimize large CO2 wildfire emissions in the future (Canadell and Raupach 2008). And because climate change research suggests that the area burned by wildfire could increase 78% by 2100, with much of the increase due to a 44% increase in lightning ignitions (Price and Rind 1994), implementing silvicultural activities expected to increase forest resilience to wildfire (improvement cutting and low thinning, in particular) provide important C sequestration benefits."** **This Depro et al. (2008) journal article is viewed as not having much relevance to the South George analysis because it considers carbon only in the context of a single disturbance process (timber harvest), it involves a very large geographical area many orders of magnitude greater than the South George planning area (the entire United States), and it lacks consideration of wildfire, a disturbance process with more influence on carbon sequestration relationships for the interior Pacific Northwest than timber harvest.**

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REF. TLC-23	Donato, D.C., J.B. Fontaine, J.L. Campbell, W.D. Robinson, J.B. Kauffman, and B.E. Law. 2006. Post-wildfire logging hinders regeneration and increases fire risk. Science 311: 352. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-24	Donnegan, J., S. Campbell, and D. Azuma, tech. eds. 2008. Oregon's forest resources, 2001-2005: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-765. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. 186 p. **Response:** **The reference is used in the context of the future of large snags and large downed wood over a large geographic area. The current density of snags and potential effects to snags in the project planning area is provided in Chapter 3 of the DEIS, pages 3-121 to 3-127.** **Note that this reference is specific to Oregon, while the South George project is in Washington.**
REF. TLC-25	Fischer, J., D. B. Lindenmayer, and A. D. Manning. 2006. Biodiveristy, ecosystem function, and resilience: ten guiding principles for commodity production landscapes. Front. Ecol. Environ., 4(2): 80-86. **Response:** **See response to Comment TLC-8b.**
REF. TLC-26	Frissell, C.A. and D. Bayles, 1996. Ecosystem Management and the Conservation of Aquatic Biodiversity and Ecological Integrity. Water Resources Bulletin, Vol. 32, No. 2, pp. 229-240. April, 1996 **Response:**

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	South George project is exactly what was expressed by Frissell and Bayes in 1996 as the future needed for aquatic ecosystem management. The aquatic habitat was fragmented by previous logging and vegetation management and suffered the malaise from a population standpoint. In 1996 PACFISH Interim Guidelines were instituted because of the number of TES species reaching the point of dangerous decline. Since that determination almost twenty years has passed and nearly thirty years since a major entry into this area. Entry into this area will protect the aquatic habitats with PACFISH standards, now permanent, reducing the fragmentation and destruction of habitat described in "Frissell and Bayes" and continuing the "reverse deterioration of aquatic ecosystems" ensuring the quality habitat natural variability observed today.
REF. TLC-27	Geils B. W., and F. G. Hawksworth. Damage, Effects, and Importance of Dwarf Mistletoes. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-98. 2002 **Response:** **This Chapter from a longer work was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that depending on management objectives and priorities, the ecological and evolutionary effects of dwarf mistletoe parasitism are interpreted as positive, negative, or usually of mixed consequences. We agree with this conclusion.**
REF. TLC-28	Gelbard, J.L., and S. Harris. 2005. Invasibility of roadless grasslands: an experimental study of yellow starthistle. Ecological Applications 15(5):1570-1580. **Response:** **Experimental study of yellowstar thistle in roadless habitat. Design features (Chapter 2, Table 2-5, pages 2-22 and 2-23), such as inspecting activity areas and haul routes before and during activities is expected to reduce any increase in weed infestations caused by the spreading of new seed, even if prevention measures are not 100 percent effective. These prevention measures would not affect spread of any older seed that may be present in the**

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	soil seedbank in the vicinity of pre-existing populations (DEIS, Chapter 3, page 3-147).
REF. TLC-29	Hanson C. 2010. The Myth of "Catastrophic" Wildfire. A New Ecological Paradigm of Forest Health. Report available at **http://www.johnmuirproject.org/documents/Hanson%20White%20Paper%2029Jan10%20Final.pdf.** **Response:** **The DEIS acknowledges that some woodpecker species would benefit from Alternative A, which may provide the best opportunity for insect outbreaks and stand replacement fires in the analysis area (DEIS, Chapter 3, page 3-125).** **Over 75,000 acres of the district burned in wildfires in 2005 and 2006 (DEIS, Chapter 3, page 3-119). Stand replacement burns are currently not at a deficit in this area.**
REF. TLC-30	Hanson, C.T. 2007a. Post-fire management of snag forest habitat in the Sierra Nevada. Ph.D. dissertation, University of California at Davis. Davis, CA. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-31	Hanson, C.T. 2007b. Expert Report. United States v. Union Pacific Railroad Company, No. 2:06-CV-01740 FCD/KJM. **Response:** **N/A – COURT CASE**
REF. TLC-32	Hanson, C.T., and M.P. North. 2008. Postfire woodpecker foraging in salvage-logged and unlogged forests of the Sierra Nevada. The Condor 110: 777-782.

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	Response: **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-33	Hanson, C.T., D.C. Odion, D.A. DellaSala, and W.L. Baker. 2009. Overestimation of fire risk in the Northern Spotted Owl Recovery Plan. Conservation Biology 23: 1314-1319. **Response:** **N/A – THIS IS NOT A NORTHERN SPOTTED OWL FOREST**
REF. TLC-34	Hanson, C.T., D.C. Odion, D.A. DellaSala, and W.L. Baker. 2010. More-comprehensive recovery actions for Northern Spotted Owls in dry forests: Reply to Spies et al. Conservation Biology 24: 334-337. **Response:** **N/A – THIS IS NOT A NORTHERN SPOTTED OWL FOREST**
REF. TLC-35	Harmon, Mark E, William K. Ferrell, and Jerry F. Franklin. 1990. Effects on carbon storage of conversion of old-growth forest to young forests. Science 247: 4943: 699-702 **Response:** **This journal paper was not cited in a comment, so we are unaware of the specific context to which it applies. It uses computer simulation modeling to examine the carbon storage implications of converting old-growth forests to young stands. The modeling and associated results in this paper pertain to west-side forests of Douglas-fir and western hemlock. For this reason, the results are not comparable to east-side mixed-conifer forests similar to those found in the South George planning area. The carbon concepts and principles used in this paper are also not applicable to east-side ecosystems because the prevailing disturbance regimes, and their associated characteristics such as frequency and intensity, vary substantially between west-side and east-side ecosystems (west-side forests tend to have long, stand-replacing disturbance regimes operating on multi-century cycles, whereas**

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	east-side forests have shorter, mixed-severity disturbance regimes functioning on multi-decadal cycles).
REF. TLC-36	Harmon, Mark E. & Barbara Marks, 2002. Effects of silvicultural practices on carbon stores in Douglas-fir - western hemlock forests in the Pacific Northwest, U.S.A.: results from a simulation model, 32 Canadian Journal of Forest Research 863, 871 Table 3 (2002). **Response:** **This journal paper was not cited in a comment, so we are unaware of the specific context to which it applies. It reports results from another computer simulation modeling exercise to examine the carbon storage implications of forest management activities. The modeling and associated results in this paper pertain to west-side forests of Douglas-fir and western hemlock. For this reason, the results are not comparable to east-side mixed-conifer forests similar to those found in the South George planning area. The carbon concepts and principles used in this paper are also not applicable to east-side ecosystems because the prevailing disturbance regimes, and their associated characteristics such as frequency and intensity, vary substantially between west-side and east-side ecosystems. [Table 3 on page 871 was referenced specifically for this item, but it is not viewed as being applicable to the South George project because the list of treatment effects on carbon stores still applies to a west-side Douglas-fir/western hemlock ecosystem type.]**
REF. TLC-37	Harmon, Mark E. 2001. Carbon Sequestration in Forests: Addressing the Scale Question, 99:4 Journal of Forestry 24, 24-25, 29 (2001) (citing C.F. Cooper, Carbon Storage in Managed Forests, 13:1 Canadian Journal of Forest Research 155-66 (1983); Harmon et al., infra n. 34, at 699-702; R.C. Dewar, Analytical model of carbon storage in trees, soils and wood products of managed forests, 8:3 Tree Physiology 239-58 (1991); and E.D. Schulze et al., Managing Forests after Kyoto, 289 Science 2058-59 (2000)). **Response:** **This journal article was not cited in a comment, so we are unaware of the specific context to**

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	which it applies. It concludes with this observation: "One conclusion from the preceding discussion is that there is no single correct scale to assess the effect of forestry practices on carbon sequestration. To judge the effectiveness of a practice it is best to examine it over a range of scales. The mechanisms explaining a behavior often lie at a finer level of resolution, whereas the consequences of a behavior are generally found at a broader level of resolution. Another general conclusion is that just because a behavior occurs at a finer scale (i.e., shorter time, smaller space, more fundamental process) does not mean this behavior translates directly into a broader level of scale. This is because other processes may alter or limit that behavior. Despite these caveats the long-term, landscape scale is a particularly useful one to examine forest carbon policy. Policies are likely to be carried out at this scale, and it is at this level that many seemingly contradictory behaviors are resolved. Although assessments of "leakage" effects will require one to move beyond the landscape level to see if changes in one landscape have unintended negative consequences on another, an assessment at the landscape level will usually reveal whether a policy has the potential to increase or decrease the carbon stores of forests." **We agree with this conclusion, and believe that the South George analysis is an appropriate example of its application because the landscape scale (a 21,000-acre planning area) was used to assess the carbon storage and sequestration implications of the proposed silvicultural activities, including an assessment of post-treatment carbon stocks in comparison to a carbon baseline representing historical (reference) conditions (see Appendix D in the South George Silviculture Specialist Report: Climate Change and Carbon Accounting Analysis).**
REF. TLC-38	Harmon, Mark E. 2009. Testimony Before the Subcommittee on National Parks, Forests, and Public Lands of the Committee of Natural Resources for an oversight hearing on "The Role of Federal Lands in Combating Climate Change", March 3, 2009. Mark E. Harmon, PhD, Richardson Endowed Chair and Professor in Forest Science, Department of Forest Ecosystems and Society, Oregon State University.

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	Response: **This reference item was not cited in a comment, so we are unaware of the specific context to which it applies. It consists of testimony offered to a Congressional subcommittee by a forest science professor from Oregon State University. He provides viewpoints about how carbon sequestration could be analyzed, and which carbon management strategies might be successful. From our perspective, this reference does not provide science information opposing the methodologies, models, or analytical procedures used for the South George project.**
REF. TLC-39	Healey, S. P., W. B. Cohen, T. A. Spies, M. Moeur, D. Pflugmacher, M. G. Whitley, and M. Lefsky. 2008. The Relative Impact of Harvest and Fire upon Landscape-Level Dynamics of Older Forests: Lessons from the Northwest Forest Plan. Ecosystems. 11: 1106-1119. **Response:** **This journal article was not cited in a comment, so we are unaware of the specific context to which it applies. It examines trends in old forest for the geographical area covered by the Northwest Forest Plan (NFP). This article has no direct relevance to the South George planning area because the Umatilla NF, which contains the planning area, is not included within the NFP area. The article makes this summary conclusion: "increased losses of LDF [large-diameter forests] to fire outweighed reductions in LDF harvest across large areas of the region. Elevated fire levels in the western United States have been correlated to changing climatic conditions, and if recent fire patterns persist, preservation of older forests in dry ecosystems will depend upon practical and coordinated fire management across the landscape." We agree with this conclusion, and the fire and climate change interactions mentioned in this passage were also addressed in the South George Climate Change and Carbon Accounting Analysis (see appendix D of the Silviculture Specialist Report).**
REF. TLC-40	Henjum, M.G., J.R. Karr, D.L. Bottom, D.A. Perry, J.C. Bednarz, S.G. Wright, S.A. Beckwitt, and E. Beckwitt. 1994. Interim protection for late successional forests, fisheries and watersheds:

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	national forests east of the Cascade crest, Oregon and Washington. The Wilderness Society, Bethesda, Maryland. **Response:** **This report was not cited in any of the specific comments, so the context for which it was presumed to apply is not known. It provides 12 specific recommendations in the Executive Summary, of which three are directly pertinent to forest vegetation. These three items, and our responses to them, are: (1) Do not log late-successional forests. We addressed this item in our many responses to similar comments from these commenters (our response to comments TLC-9a, p. 21 and attachment; TLC-10 pp. 21-22; TLC-12c p. 24; TLC-20 p. 35; TLC-20a p. 36; TLC-20c p. 37; TLC-20d pp. 37-38; TLC-21 pp. 38-39; TLC-21a p. 39; TLC-21b p. 40; TLC-22 p. 41; TLC-23 p. 41; TLC-23a p. 41; and TLC-23b p. 42 provides more detail about this issue); (2) cut no trees of any species older than 150 years or with a diameter at breast height of 20 inches or greater. This item is addressed by the Eastside Screens amendment to the Forest Plan, which has a requirement in the Wildlife Screen specifically addressing retention of large-diameter trees (Appendix C of the DEIS describes consistency of the South George project with the Eastside Screens); and (3) prohibit logging of dominant or codominant ponderosa pine from any forest, regardless of whether the stand meets the criteria for LS/OG. This item is also addressed by the Wildlife Screen portion of the Eastside Screens amendment to the Forest Plan.** **Henjum et al., (the Eastside Scientific Panel) summarized in twelve recommendations designed to protect the remaining resources until a long-term strategy of protection and restoration could be developed, especially in the aquatic diversity area. Three of those recommendations were specific to riparian condition.** **Number 3 in those recommendations is "Do not log, build new roads, or mine in aquatic diversity areas (ADAs)." PACFISH was instituted two years after this paper was written and uses buffers to protect "Riparian Habitat Conservation Areas (RHCAs)". These protection buffers are the "cornerstone" serving as the protection for the at-risk stocks**

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	described. **Number 5 "Establish protected corridors along stream, river, lakes and wetlands. Restrict timber harvest, road construction, grazing and cutting of fuelwood within these corridors". Again, PACFISH guidelines must be addressed in every project activity. This is not a total restriction and in certain cases small entries in the RHCA (25 acres described in S.Geo) may be made if the justification is valid. South George project is such a justification with less than five acres of RHCA impacted with adequate mitigation measures applied.** **Number 8 "Permit livestock grazing in riparian areas only under strictly defined conditions that protect those riparian areas from degradation". This is a concern shared in the BEs for this project. Since 1993 cattle have been strictly kept from accessing fish sensitive RHCAs and protection measures mitigated potential damages. This access protection has been reviewed during this process and consulted with by the regulatory agencies. There is concern that opening some timber stands may encourage access to the riparian from grazing livestock. Pond development and grass seeding plans hopefully will detour cattle by promoting the habitat away from RHCAs. Mitigation measures (terms and conditions of permit) in place since 1993 require riparian trespass cattle to be removed from the pasture if found in the RHCA.** **This 1994 paper laid the groundwork for the "Eastside Screens" and the later adoption of PACFISH into the Land and Resource Management Plans of the eastside forests. The aquatic recommendations are now included in the Umatilla Land and Resource Management Plan and form the core of design criteria. The watershed and aquatic recommendations are integrated into the proposed projects in South George.**
REF. TLC-41	Hessburg, P.F., R.B. Salter, and K.M. James. 2007. Re-examining fire severity relations in pre-management era mixed-conifer forests: inferences from landscape patterns of forest structure. Landscape Ecology 22: 5-24.

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	Response: **This journal article was not cited in a comment, so we are unaware of the specific context to which it applies. It describes an effort to use "forest structure to predict pre-management era fire severity across three biogeoclimatic zones in eastern Washington State." It concludes that "Mixed severity fires were most prevalent, regardless of forest type. The structure of mixed conifer patches, in particular, was formed by a mix of disturbance severities. In moist mixed conifer, stand replacement effects were more widespread in patches than surface fire effects, while in dry mixed conifer, surface fire effects were more widespread by nearly 2:1. However, evidence for low severity fires as the primary influence, or of abundant old park-like patches, was lacking in both the dry and moist mixed conifer forests. The relatively low abundance of old, park-like or similar forest patches, high abundance of young and intermediate-aged patches, and widespread evidence of partial stand and stand-replacing fire suggested that variable fire severity and non-equilibrium patch dynamics were primarily at work."** **For our response to this reference, see our response to "REF. TLC-4," particularly its reference to fire history and fire ecology studies that pertain specifically to the Blue Mountains (Heyerdahl 1997, Marouka 1994, Olson 2000, Williamson 1999). The Hessburg et al. (2007) paper pertains to eastern Washington, and while ecosystems there share some similarities with ecosystems of the Blue Mountains, the South George analysis relied primarily on fire ecology and history references pertaining specifically to the Blue Mountains province.**
REF. TLC-42	Heyerdahl, E. K., L. B. Brubaker, and J. K. Agee. 2001. Spatial Controls of Historical Fire Regimes: A Multiscale Example from the Interior West, USA. Ecology. 82: 660-678. **Response:** **This specific article by Heyerdahl et al was not cited in a comment, so we are unaware of the specific context to which it applies. We do however use much of Heyerdahl research in our analysis because much of it is specific to the Blue Mountains. This article surmises that changes as a result of fire exclusion, the associated change in fire frequency has affected**

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	forest composition and structure in the Blue Mountains (Heyerdahl et al 2001) This change has shifted the fire regime from frequent, low severity fires to infrequent, high severity fires that kill large areas, especially in dry forests (Heyerdahl et al 2001). This has resulted in the US Forest Service to institute a nationwide policy of ecosystem management (Everett et al 1994, Heyerdahl 2001). (See DEIS, Literature Cited, page L-20).
REF. TLC-43	Homann, Peter S., Mark Harmon, Suzanne Remillard, & Erica A.H. Smithwick, 2005. What the soil reveals: Potential total ecosystem C stores of the Pacific Northwest region, USA, 220 Forest Ecology and Management. 270, 281 (2005). **Response:** **This article offers a potential way to quantify Total Ecosystem Carbon (TEC) by looking at the soil mapped for a given area. Furthermore in the conclusion of this article it is suggested that "the Pacific Northwest region is currently at less than half potential TEC, indicating a substantial prospect to sequester C across the region…" When reading the entire document, it should be assumed that this thinning proposal will over time trend trees toward the forest condition promoted by the article; thus increasing stored carbon in the PNW region.**
REF. TLC-44	Huck, Schuyler W., 2000. Reading Statistics and Research (3rd Edition). New York: Longman, 2000. **Response:** **This item appears to refer to a textbook showing consumers of research how to read, understand, and critically evaluate the statistical information and research results contained in technical research reports. According to background information from the internet, it is "written for students in non-thesis Master's Programs but also perfectly suitable for students in upper-level undergraduate statistics courses, doctoral students who must conduct dissertation research, and independent researchers who want a better handle on how to decipher and critique statistically-based research reports."**

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	We do not have this textbook; it was cited twice in response to Scientific Integrity comments "TLC-30 p. 50."
REF. TLC-45	Hudiburg, T., B. Law, D.P. Turner, J. Campbell, D. Donato, and M. Duane. 2009. Carbon dynamics of Oregon and northern California forests and potential land-based carbon storage. Ecological Applications 19(1): 163-180. **Response:** **This is another carbon storage and sequestration reference. It was not cited in a comment, so we are unaware of the specific context to which it applies. The whole state of Oregon is included in the analysis, including the Oregon portion of the Blue Mountains, but the Washington portion of the Blue Mountains containing the South George planning area was not included in their analysis area, so this reference lacks geographical relevance to the South George analysis. Also see other responses to carbon storage and sequestration references (REF. TLC-14, TLC-22, TLC-35, TLC-36, and TLC-37).**
REF. TLC-46	Hurteau, M., and M. North. 2009. Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios. Frontiers in Ecology and Environment 7: 409-414. **Response:** **This is a carbon storage and sequestration reference. It was not cited in a comment, so we are unaware of the specific context to which it applies. This journal paper notes that "Forests are viewed as a potential sink for carbon (C) that might otherwise contribute to climate change. It is unclear, however, how to manage forests with frequent fire regimes to maximize C storage while reducing C emissions from prescribed burns or wildfire. We modeled the effects of eight different fuel treatments on tree-based C storage and release over a century, with and without wildfire. Model runs show that, after a century of growth without wildfire, the control stored the most C. However, when wildfire was included in the model, the control had the largest total C emission and largest reduction in live-tree-based C stocks. In model runs including wildfire, the final amount of tree-based C sequestered**

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	was most affected by the stand structure initially produced by the different fuel treatments. In wildfire-prone forests, tree-based C stocks were best protected by fuel treatments that produced a low-density stand structure dominated by large, fire-resistant pines." **We agree with many of the conclusions reached in this article. This reference was cited on page 123 in the South George Silviculture Specialist Report, when it was used in this context: "A recent study found that significant increases in fire resistance can be achieved by removing only smaller ladder fuels (vegetation structure providing vertical fuel continuity between the forest floor and overstory tree crowns) and fire-sensitive intermediate trees without reducing the majority of the live-tree C pool associated with intermediate pines and large trees of all species. This study concluded that thinning and prescribed fire have a positive influence on forest development by redirecting tree growth resources and C storage into large-diameter trees, a more stable C stock, and large trees are more resistant to mortality and other potentially detrimental fire effects (Hurteau and North 2009, North et al. 2009)."**
REF. TLC-47	Hutto, R. L. 2008. The Ecological Importance of Severe Wildfires: Some Like it Hot. Ecological Applications, 18(8); 1827-1834. **Response:** **Not a scientific paper but the views of the author were considered in wildlife analysis; we acknowledge that some wildlife species benefit from wildfire.**
REF. TLC-48	Hutto, R.L. 1995. Composition of bird communities following stand-replacement fires in northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology 9: 1041-1058. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-49	Hutto, R.L. 2006. Toward meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Conservation Biology 20: 984-993.

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REF. TLC-50	Hutto, R.L., and C.T. Hanson. 2009. Letter to U.S. Forest Service Regional Foresters defining suitable black-backed woodpecker habitat. University of Montana, Missoula, Montana, July 6, 2009. 6 pp. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-51	Hutto, R.L., and S.M. Gallo. 2006. The effects of postfire salvage logging on cavity-nesting birds. The Condor 108: 817-831. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-52	Johnson, Steve, 1995. Factors Supporting Road Removal and/or Obliteration, Memo from Kootenai Forest Hydrologist, February 6, 1995 **Response:** **Unable to find this reference. PNW GTR reference found on-line is inaccurate.**
REF. TLC-53	Karr, J.R., J.J. Rhodes, G.W. Minshall, F.R. Hauer, R.L. Beschta, C.A. Frissell, and D.A. Perry. 2004. Postfire salvage logging's effects on aquatic ecosystems in the American West. BioScience 54: 1029-1033. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**

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REF. TLC-54	Kauffman, J.B., R.L. Beschta, N. Otting, and D. Lytjen. 1997. An ecological perspective of riparian and stream restoration in the western United States. Fisheries 22:12-24. **Response:** **This article suggests passive restoration; i.e. cessation of activities causing degradation as the most important first step in restoration. Although the South George project is not a restoration project, its alternatives propose road and trail improvements that would lead to reductions of harmful activities.**
REF. TLC-55	Keeling, E.G., A. Sala, T.H. DeLuca. 2006. Effects of fire exclusion on forest structure and composition in unlogged ponderosa pine/Douglas-fir forests. Forest Ecology and Management, 237, pp. 418-428. **Response:** **This journal paper was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "seven sites across a broad region of Idaho and Montana were selected for study. Within each site, understory and overstory community structure and composition were surveyed in 2-4 stands exposed to different numbers of fires during the 20th century. Student's t-tests were used to test differences between the most fire-excluded ("unburned") and the most frequently burned ("burned") stands across the entire study. Multivariate analyses were used to characterize successional changes resulting from lack of fire. Understory community composition varied from site to site and was not related to fire exposure. However, species richness was higher in unburned stands. Overall tree densities and densities of shade-tolerant tree species increased with the absence of fire. There was a marginally significant association between xeric understories and ponderosa pine dominated overstories and mesic understories and Douglas-fir or grand fir dominated overstories. Our multivariate analysis suggests that while general trajectories of succession with absence of fire may be predictable, the structure and composition of ponderosa pine/Douglas-fir communities across complex landscapes may be difficult to relate to specific exposure to fire or time-since-fire. This study highlights the importance of natural**

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	variability and heterogeneity in ponderosa pine/Douglas-fir forests of the inland Northwest, and supports other recent research calling for cautious approaches to restoration in these forests." **For our response to this reference item, see our response to "REF. TLC-4," particularly our description of fire history and fire ecology studies pertaining specifically to the Blue Mountains (Heyerdahl 1997, Marouka 1994, Olson 2000, Williamson 1999). The Keeling et al. (2006) paper pertains to Idaho and Montana, and while ecosystems there are somewhat similar to ecosystems of the Blue Mountains, the South George analysis relied primarily on fire ecology and fire history references developed from research conducted in the Blue Mountains. And as noted in our response to "REF. TLC-4", the local fire history research indicates that some of the dry-forest (dry mixed-conifer areas dominated by ponderosa pine and Douglas-fir) areas in the Blue Mountains may have had variable and heterogeneous fire regimes.**
REF. TLC-56	Keith, H., B.G. Mackey, and D.B. Lindenmayer. 2009. Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests. Proceedings of the National Academy of Sciences 106: 11635-11640. **Response:** **This article includes "a framework for identifying forests important for carbon storage based on the factors that account for high biomass carbon densities, including (i) relatively cool temperatures and moderately high precipitation producing rates of fast growth but slow decomposition, and (ii) older forests that are often multiaged and multilayered and have experienced minimal human disturbance. Our results are relevant to negotiations under the United Nations Framework Convention on Climate Change regarding forest conservation, management, and restoration. Conserving forests with large stocks of biomass from deforestation and degradation avoids significant carbon emissions to the atmosphere, irrespective of the source country, and should be among allowable mitigation activities. Similarly, management that allows restoration of a forest's carbon sequestration potential also should be recognized."**

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	This is another carbon storage and sequestration reference. It was not cited in a comment, so we are unaware of the specific context to which it applies. The "high biomass carbon density" areas referred to in this article include western Oregon, western Washington, and northwestern California. These west-side areas have existing carbon storage that is at least one order of magnitude greater than carbon storage for Blue Mountains forests such as those in the South George planning area, so this reference lacks geographical and contextual relevance to the South George analysis. **The South George project also does not include deforestation, which is defined as a situation where forest land is converted to a "permanent" non-forest use such as housing or commercial development. This is in contrast to "reforestation," a practice included in the South George project, where tree cover is temporarily removed and then quickly replaced by using artificial or natural regeneration practices. Since deforestation is not included, the South George project is compatible with this reference's recommendation to avoid deforestation as a carbon conservation or mitigation activity. Also see other responses to carbon storage and sequestration references (REF. TLC-14, TLC-22, TLC-35, TLC-36, and TLC-37).**
REF. TLC-57	Klenner, W., R. Walton, A. Arsenault, and L. Kremsater. 2009. Dry forests in the southern interior of British Columbia: historic disturbances and implications for restoration and management. Forest Ecology and Management 256: 1711-1722. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-58	Kotliar, N.B., S.J. Hejl, R.L. Hutto, V.A. Saab, C.P. Melcher, and M.E. McFadzen. 2002. Effects of fire and post-fire salvage logging on avian communities in conifer-dominated forests of the western United States. Studies in Avian Biology 25: 49-64. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**

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REF. TLC-59	Krawchuk, M.A., M.A. Moritz, M. Parisien, J. Van Dorn, and K. Hayhoe. 2009. Global pyrogeography: the current and future distribution of wildfire. PloS ONE 4: e5102. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Climate change is expected to alter the geographic distribution of wildfire, a complex abiotic process that responds to a variety of spatial and environmental gradients. How future climate change may alter global wildfire activity, however, is still largely unknown. As a first step to quantifying potential change in global wildfire, we present a multivariate quantification of environmental drivers for the observed, current distribution of vegetation fires using statistical models of the relationship between fire activity and resources to burn, climate conditions, human influence, and lightning flash rates at a coarse spatiotemporal resolution (100 km, over one decade). We then demonstrate how these statistical models can be used to project future changes in global fire patterns, highlighting regional hotspots of change in fire probabilities under future climate conditions as simulated by a global climate model. Based on current conditions, our results illustrate how the availability of resources to burn and climate conditions conducive to combustion jointly determine why some parts of the world are fire-prone and others are fire-free. In contrast to any expectation that global warming should necessarily result in more fire, we find that regional increases in fire probabilities may be counter-balanced by decreases at other locations, due to the interplay of temperature and precipitation variables. Despite this net balance, our models predict substantial invasion and retreat of fire across large portions of the globe. These changes could have important effects on terrestrial ecosystems since alteration in fire activity may occur quite rapidly, generating ever more complex environmental challenges for species dispersing and adjusting to new climate conditions. Our findings highlight the potential for widespread impacts of climate change on wildfire, suggesting severely altered fire regimes and the need for more explicit inclusion of fire in research on global vegetation-climate change dynamics and conservation planning."**

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	The South George DEIS notes in the climate change section, pages 3-71 to 3-75, that a change in certain disturbance processes is expected in response to a warmer and dryer future. One of the expected changes is an increase in fire occurrence and severity, and one of the objectives for the proposed vegetation management activities is to increase forest resistance and resilience to future fire effects. This reference states that climate change may cause changes in fire activity to occur quite rapidly, which suggests that the South George project's proposal to adjust existing conditions so they are more resilient to future climatic and fire trends is well grounded, and that these adjustments should occur as quickly as possible, particularly when considering the Pomeroy Ranger District's recent experience with large, uncharacteristically-intense wildfires (such as the 2005 School Fire).
REF. TLC-60	Kuennen, Lou; Henry Shovic, Bill Basko, Ken McBride, Jerry Niehoff, and John Nesser, 2000. Soil Quality Monitoring: A Review of Methods and Trends in the Northern Region. May 2000. **Response:** **This document has provided the basis for more recent soil monitoring documents. This shows the cited paper is still valued, but is not the most recent of best available science. The below statement was copied from the cited paper. "All the transect methods are based on Howes, Hazard, and Geist (1983) The Howes, Hazard and Geist 1983 work is also part of the literature cited in the most recent GTR on measuring soil disturbance.** **Forest Soil Disturbance Monitoring Protocol Volume I: Rapid Assessment Gen. Tech. Report WO-82a (2009)**
REF. TLC-61	Kutsch, Werner L. Michael Bahn and Andreas Heinemeyer, Editors, 2010. Soil Carbon Dynamics: An Integrated Methodology. Cambridge University Press 978-0-521-86561-6 – **Response:** **This reference refers to a book, and we do not have a copy in our library. A web search indicates that this book covers the following topics: "Carbon stored in soils represents the largest terrestrial carbon pool and factors affecting this will be vital in the understanding of**

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	future atmospheric CO2 concentrations. This book provides an integrated view on measuring and modeling soil carbon dynamics. Based on a broad range of in-depth contributions by leading scientists it gives an overview of current research concepts, developments and outlooks and introduces cutting-edge methodologies, ranging from questions of appropriate measurement design to the potential application of stable isotopes and molecular tools. It includes a standardised soil CO2 efflux protocol, aimed at data consistency and inter-site comparability and thus underpins a regional and global understanding of soil carbon dynamics. This book provides an important reference work for students and scientists interested in many aspects of soil ecology and biogeochemical cycles, policy makers, carbon traders and others concerned with the global carbon cycle." **This book was not cited in a comment, so we are unaware of the specific context to which it applies. It appears to be a reference book designed for policy makers, carbon traders, and others concerned about the global carbon cycle. Since the South George project, and its predicted carbon storage or sequestration effects, do not have a global scope, and because the project does not include proposals for carbon trading, this book is believed to have limited relevance to the South George DEIS.**
REF. TLC-62	Lambin, E. F., and D. Ehrlich (1996), The surface temperature-vegetation index space for land cover and land-cover change analysis, Int. J. Remote Sens., 17, 463-487. **Response:** **This is a remote sensing reference. It was not cited in a comment, and we are definitely unaware of the specific context to which it applies. The article notes that "We investigate the biophysical justification for such a combination [thermal infrared radiation (e.g., land brightness temperature, Ts) and vegetation indices (VI)], using 10 years of Advanced Very High Resolution Radiometer (AVHRR) global area coverage (GAC) data over the African continent. First, we review recent findings on the biophysical interpretation of the TS-VI space. Second, we analyse the seasonal time trajectories of different biomes in the TS-NDVI space. Third, we measure the relative role of multi-temporal NDVI and Ts data in the discrimination of land cover classes for land-cover mapping. Fourth, we analyse**

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	trajectories of land-cover change in the TS-NDVI space for study sites in three different environments. We illustrate the usefulness of the ratio between Ts and VI as an index to perform measurements in the Tj-NDVI space. **Without context, it is impossible to speculate about how this article describing a remote-sensing analytical technique, and its application to the African continent, might apply to the South George project.**
REF. TLC-63	Leiberg, J.B. 1900. Cascade Range Forest Reserve, Oregon, from township 28 south to township 37 south, inclusive; together with the Ashland Forest Reserve and adjacent forest regions from township 28 south to township 41 south, inclusive, and from range 2 west to range 14 east, Willamette Meridian, inclusive. In: 21st Annual Report of the U.S. Geological Survey, Part V. Government Printing Office, Washington, D.C. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-64	Leiberg, J.B. 1902. Forest conditions in the northern Sierra Nevada, California. U.S. Geological Survey, Professional Paper No. 8. Government Printing Office, Washington, D.C. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-65	Lindenmayer, D.B. J.F. Franklin, & J. Fischer. 2006. General management principles and a checklist of strategies to guide forest biodiversity conservation. Biological Conservation, 131, 433-445. **Response:** **This article was cited in comment "TLC-21 pp. 38-39," which deals with treatment of existing old forest stands, and with other structural stages (such as UR) that could be cultured to provide additional old-forest structure. It "presents a checklist of measures for**

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	forest biodiversity conservation that reflects the multi-scaled nature of conservation approaches on forested land. At the regional scale, management should ensure the establishment of large ecological reserves. At the landscape scale, off-reserve conservation measures should include: (1) protected areas within production forests; (2) buffers for aquatic ecosystems; (3) appropriately designed and located road networks; (4) the careful spatial and temporal arrangement of harvest units; and (5) appropriate fire management practices. At the stand level, off-reserve conservation measures should include: (1) the retention of key elements of stand structural complexity (e.g., large living and dead trees with hollows, understorey thickets, and large fallen logs); (2) long rotation times (coupled with structural retention at harvest); (3) silvicultural systems alternative to traditional high impact ones (e.g., clearcutting in some forest types); and (4) appropriate fire management practices and practices for the management of other kinds of disturbances." **In our estimation, the South George project has been carefully designed, and its Project Design Features and Management Requirements (Chapter 2 of DEIS), in conjunction with similar measures described in appendix D of the DEIS (Best Management Practices), are well aligned with most of the suggestions contained in this reference (use of buffers, road design criteria, provision of snags and down wood, etc.). We also believe that a central tenet used for planning and design of the South George project is to modify existing vegetation conditions in such a way as to allow the native disturbance regime to return to a properly-functioning condition after project implementation.**
REF. TLC-66	Lindenmayer, D.B. J.F. Franklin, & J. Fischer. 2006. General management principles and a checklist of strategies to guide forest biodiversity conservation. Biological Conservation, 131, 433-445. **Response:** **Same as REF. TLC-65.**
REF. TLC-67	Lindenmayer, D.B., and J.F. Franklin. 2002. Conserving forest biodiversity. Washington, DC: Island Press.

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	Response: **This reference refers to a book, and we do not have a copy in our library. A web search indicates that this book covers the following topics (from the Island Press website): "While most efforts at biodiversity conservation have focused primarily on protected areas and reserves, the unprotected lands surrounding those area—the "matrix"—are equally important to preserving global biodiversity and maintaining forest health. In Conserving Forest Biodiversity, leading forest scientists David B. Lindenmayer and Jerry F. Franklin argue that the conservation of forest biodiversity requires a comprehensive and multi-scaled approach that includes both reserve and non-reserve areas. They lay the foundations for such a strategy, bringing together the latest scientific information on landscape ecology, forestry, conservation biology, and related disciplines as they examine:** **the importance of the matrix in key areas of ecology such as metapopulation dynamics, habitat fragmentation, and landscape connectivity;** **general principles for matrix management;** **using natural disturbance regimes to guide human disturbance;** **landscape-level and stand-level elements of matrix management;** **the role of adaptive management and monitoring; and** **social dimensions and tensions in implementing matrix-based forest management.** **In addition, they present five case studies that illustrate aspects and elements of applied matrix management in forests. The case studies cover a wide variety of conservation planning and management issues from North America, South America, and Australia, ranging from relatively intact forest ecosystems to an intensively managed plantation. Conserving Forest Biodiversity presents strategies for enhancing matrix management that can play a vital role in the development of more effective approaches to maintaining forest biodiversity. It examines the key issues and gives practical guidelines for sustained forest management, highlighting the critical role of the matrix for scientists, managers, decisionmakers, and other stakeholders involved in efforts to sustain biodiversity and ecosystem processes in forest landscapes."** **This book was cited several times in a comment relating to application of**

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	appropriate disturbance regimes (TLC-8 p. 18), so we are aware of a specific context in which it was used.
REF. TLC-68	Lindenmayer, D.B., D.R. Foster, J.F. Franklin, M.L. Hunter, R.F. Noss, F.A. Schmiegelow, and D. Perry. 2004. Salvage harvesting policies after natural disturbance. Science 303: 1303. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-69	Lindenmayer, D.B., M. L. Hunter, P. J. Burton, and P. Gibbons. 2009. Effects of logging on fire regimes in moist forests. Conservation Letters. 2: 271-277. **Response:** **This article examines one particular question, and does so in the context of moist forest. "Does logging affect the fire proneness of forests? This question often arises after major wildfires, but data suggest that answers differ substantially among different types of forest. Logging can alter key attributes of forests by changing microclimates, stand structure and species composition, fuel characteristics, the prevalence of ignition points, and patterns of landscape cover. These changes may make some kinds of forests more prone to increased probability of ignition and increased fire severity. Such forests include tropical rainforests where fire was previously extremely rare or absent and other moist forests where natural fire regimes tend toward low frequency, stand replacing events. Relationships between logging and fire regimes are contingent on forest practices, the kind of forest under consideration, and the natural fire regime characteristic of that forest. Such relationships will influence both the threat of fire to human life and infrastructure and biodiversity conservation. We therefore argue that conservation scientists must engage in debates about fire and logging to provide an environmental context to guide considered actions."** **A Lindenmayer et al. (2009) citation was used in several comments, including TLC-8b p. 19 and TLC-10 pp. 21-22, and our response to those comments also pertains to this response. In addition to our responses to "TLC-8b p. 19 and TLC-10 pp. 21-22," we would also note that the context of moist forest in this reference seems to refer to ecosystems that**

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	are much moister than those in the South George project area, i.e., tropical rainforests, and moist forest having a low-frequency, stand-replacing disturbance regime, such as coastal Douglas-fir/western hemlock forests in western Oregon and Washington.
REF. TLC-70	Lutz, J.A., et al. 2009. Climate, lightning ignitions, and fire severity in Yosemite National Park, California, USA. International Journal of Wildland Fire 18: 765-774. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-71	Luyssaert, S., E. Detlef Schulz, A. Borner, A. Kohl, D. Hessenmoller, B.E. Law, et al. 2008. Old-growth forests as global carbon sinks. Nature 455:213-215. **Response:** **This reference was cited in the South George Silviculture Specialist Report (page 121), when it was used as one of two literature citations for the statement that "old forests tend to be less common than young or mid-age stands, even in unmanaged landscapes (Lesica 1996, Luyssaert et al. 2008)." The reason for citing Luyssaert et al. (2008) as support for this statement in the Specialist Report is this observation from the journal article: "Because the cumulative probability of disturbances is higher in stands with high above-ground biomass, old stands are rarer than young stands, even in unmanaged landscapes" (Luyssaert et al. 2008: p. 214).** **This is another carbon storage and sequestration reference. It was not cited in a comment, so we are unaware of the specific context to which it applies. The abstract notes that "Here we report a search of literature and databases for forest carbon-flux estimates. We find that in forests between 15 and 800 years of age, net ecosystem productivity (the net carbon balance of the forest including soils) is usually positive. Our results demonstrate that old-growth forests can continue to accumulate carbon, contrary to the long-standing view that they are carbon neutral. Over 30 per cent of the global forest area is unmanaged primary forest, and this area contains the remaining old-growth forests. Half of the**

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	primary forests (6×10^8 hectares) are located in the boreal and temperate regions of the Northern Hemisphere. On the basis of our analysis, these forests alone sequester about 1.3 ± 0.5 gigatonnes of carbon per year. Thus, our findings suggest that 15 per cent of the global forest area, which is currently not considered when offsetting increasing atmospheric carbon dioxide concentrations, provides at least 10 per cent of the global net ecosystem productivity. Old-growth forests accumulate carbon for centuries and contain large quantities of it. We expect, however, that much of this carbon, even soil carbon, will move back to the atmosphere if these forests are disturbed." **As noted in our response to several other references (REF. TLC-61, for example), the South George project, and its predicted carbon storage or sequestration effects, do not have a global scope, and therefore these references pertaining to global or hemispheric carbon analyses are believed to have limited relevance to the South George DEIS.**
REF. TLC-72	MA (Millennium Ecosystem Assessment). 2005. Ecosystems and human well-being. Synthesis. Washington, DC: Island Press. **Response:** **"Humans have changed ecosystems more rapidly and extensively in the last 50 years than in any comparable period of human history. We have done this to meet the growing demands for food, fresh water, timber, fiber, and fuel. While changes to ecosystems have enhanced the well-being of billions of people, they have also caused a substantial and largely irreversible loss in diversity of life on Earth, and have strained the capacity of ecosystems to continue providing critical services. Among the findings:** • **Approximately 60% of the services that support life on Earth are being degraded or used unsustainably. The harmful consequences of this degradation could grow significantly worse in the next 50 years.** • **Only four ecosystem services have been enhanced in the last 50 years: crops, livestock, aquaculture, and the sequestration of carbon.** • **The capacity of ecosystems to neutralize pollutants, protect us from natural disasters, and control the outbreaks of pests and diseases is declining significantly.**

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	• **Terrestrial and freshwater systems are reaching the limits of their ability to absorb nitrogen.** • **Harvesting of fish and other resources from coastal and marine systems is compromising their ability to deliver food in the future.** **Richly illustrated with maps and graphs, this reference provides an assessment of Earth's ability to provide twenty-four distinct services essential to human well-being. These include food, fiber, and other materials; regulation of the climate and fresh water systems; underlying support systems such as nutrient cycling; and the fulfillment of cultural, spiritual, and aesthetic values. The volume pays particular attention to the current health of key ecosystems, including inland waters, forests, oceans, croplands, and dryland systems, among others."** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. Although it provides a detailed and compelling assessment of the current status of Earth's ecosystem services, it is difficult to determine its relevance, if any, to the South George project without additional context.**
REF. TLC-73	McIver J. & L. Starr. 2001. Restoration of degraded lands in the interior Columbia River basin: passive vs. active approaches. Forest Ecology and Management. Vol 153: 15-28. **Response:** **The abstract for this reference notes that "Evidence for success of passive and active restoration is presented for interior conifer forest, sagebrush steppe, and riparian ecosystems, with a focus on the Columbia River basin. Passive restoration, defined as removal of the stresses that cause degradation, may be most appropriate for higher elevation forests, low-order riparian ecosystems, and for sagebrush steppe communities that are only slightly impaired. More active approaches, in which management techniques such as planting, weeding, burning, and thinning are applied, have been successful in forests with excessive fuels and in some riparian systems, and may be necessary in highly degraded sagebrush steppe communities. There is general agreement that true restoration requires not only reestablishment of more desirable structure or composition, but of the processes needed to sustain these for the long term. The challenge for the restorationist is to**

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	find a way to restore more desirable conditions within the context of social constraints that limit how processes are allowed to operate, and economic constraints that determine how much effort will be invested in restoration." **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It declares that passive restoration is appropriate for "higher elevation forests, low-order riparian ecosystems, and for sagebrush steppe communities," none of which occur in the South George planning area, or at least they don't occur in any abundance. Note that the "higher elevation forests" is assumed to apply to forest ecosystems in the subalpine vegetation zone, all of which are assigned to the cold upland forest potential vegetation group, and as described in the DEIS, all of the forested biophysical environments in the South George planning area occur in either the dry or moist upland forest PVGs.** **This reference also observes that more active approaches "have been successful in forests with excessive fuels and in some riparian systems," and both situations occur in the South George project – Chapter 3 of the DEIS describes how conditions classes were determined by fire regime; nearly 100% of the planning area is in condition class 2 or 3 (table 3-47 on page 3-80 of the DEIS), showing that current conditions have departed to a moderate (class 2) or high (class 3) extent from historical reference conditions. One generally consistent characteristic of areas assigned to condition class 2 or 3 is that they have "excessive fuels." The South George project also includes a proposal to implement fuels reduction treatments on a 25-acre portion of a riparian habitat conservation area, and it is hoped this will serve as a prototype or case study for adopting an active approach in these biophysical environments when it is clear that existing conditions have deviated substantially from reference conditions.**
REF. TLC-74	McKenzie, D., Z. Gedalof, D.L. Peterson, and P. Mote. 2004. Climatic change, wildfire, and conservation. Conservation Biology 18: 890-902. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to**

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	which it applies. It concludes that "Although current fire management focuses on fuel reductions to bring fuel loadings back to their historical ranges, at the regional scale extreme fire weather is still the dominant influence on area burned and fire severity. Current forecasting tools are limited to short-term predictions of fire weather, but increased understanding of large-scale oceanic and atmospheric patterns in the Pacific Ocean (e.g., El Niño Southern Oscillation, Pacific Decadal Oscillation) may improve our ability to predict climatic variability at seasonal to annual leads. Associations between these quasi-periodic patterns and fire occurrence, though evident in some regions, have been difficult to establish in others. Increased temperature in the future will likely extend fire seasons throughout the western United States, with more fires occurring earlier and later than is currently typical, and will increase the total area burned in some regions. If climatic change increases the amplitude and duration of extreme fire weather, we can expect significant changes in the distribution and abundance of dominant plant species in some ecosystems, which would thus affect habitat of some sensitive plant and animal species. Some species that are sensitive to fire may decline, whereas the distribution and abundance of species favored by fire may be enhanced. The effects of climatic change will partially depend on the extent to which resource management modifies vegetation structure and fuels." **In general, we agree with the conclusions of this reference. We certainly agree that ENSO and PDO can have important influences on regional periods of extreme fire weather, and the Silviculture Specialist Report cited at least five references describing this phenomenon for the interior Pacific Northwest region containing the South George planning area. These references are:** **Heyerdahl, E.K. 1997. Spatial and temporal variation in historical fire regimes of the Blue Mountains, Oregon and Washington: the influence of climate. Ph.D. dissertation. Seattle, WA: University of Washington, College of Forest Resources. 224 p.** **Heyerdahl, E.K.; Brubaker, L.B.; Agee, J.K. 2001. Spatial controls of historical fire regimes: a multiscale example from the interior west, USA. Ecology. 82(3): 660-678. doi:10.1890/0012-9658(2001)082[0660:SCOHFR]2.0.CO;2** **Heyerdahl, E.K.; Brubaker, L.B.; Agee, J.K. 2002. Annual and decadal climate**

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	forcing of historical fire regimes in the interior Pacific Northwest, USA. Holocene. 12(5): 597-604. doi:10.1191/0959683602hl570rp **Heyerdahl, E.K.; McKenzie, D.; Daniels, L.D.; Hessl, A.E.; Littell, J.S.; Mantua, N.J. 2008. Climate drivers of regionally synchronous fires in the inland Northwest (1651-1900). International Journal of Wildland Fire. 17(1): 40-49. doi:10.1071/WF07024** **Heyerdahl, E.K.; Morgan, P.; Riser, J.P. II. 2008. Multi-season climate synchronized historical fires in dry forests (1650-1900), northern Rockies, USA. Ecology. 89(3): 705-716. doi:10.1890/06-2047.1** **We also agree that climate change could potentially have important influences on the future species composition and distribution for the planning area, and that "effects of climatic change will partially depend on the extent to which resource management modifies vegetation structure and fuels." We believe that appendix D of the South George Silviculture Specialist Report provides a relatively detailed discussion of climate change and carbon sequestration considerations for the South George project, including potential changes in future species composition, vegetation structure, and fuel loading.**
REF. TLC-75	Medler, M. (abstract), 3rd International Fire Ecology & Management Congress (http://emmps.wsu.edu/firecongress), San Diego, CA, USA, November 13-17, 2006. **Response:** **This reference does not provide enough information to formulate a response. The website address (URL) provided in the reference is invalid; a web link to the conference proceedings, as provided on a web page for the 3rd International Fire Ecology & Management Conference (http://www.fire.uni-freiburg.de/course/meeting/2006/meet2006_03.htm), also does not work, so it was not possible to determine if an abstract by Medler was available; and the reference was not cited in a comment, so there is no way to know the specific context to which it applies.**
REF.	Meigs, G.W., D.C. Donato, J.L. Campbell, J.G. Martin, and B.E. Law. 2009. Forest fire impacts

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Reference Number	Reference and Forest Service Response
TLC-76	on carbon uptake, storage, and emission: the role of burn severity in the eastern Cascades, Oregon. Ecosystems 12: 1246-1267. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "This study quantifies the short-term effects of low-, moderate-, and high-severity fire on carbon pools and fluxes in the Eastern Cascades of Oregon. We surveyed 64 forest stands across four fires that burned 41,000 ha (35%) of the Metolius Watershed in 2002 and 2003, stratifying the landscape by burn severity (overstory tree mortality), forest type (ponderosa pine [PP] and mixed-conifer [MC]), and prefire biomass. Stand-scale C combustion ranged from 13 to 35% of prefire aboveground C pools (area – weighted mean = 22%). Across the sampled landscape, total estimated pyrogenic C emissions were equivalent to 2.5% of statewide anthropogenic CO2 emissions from fossil fuel combustion and industrial processes for the same 2-year period. From low- to moderate- to high-severity ponderosa pine stands, average tree basal area mortality was 14, 49, and 100%, with parallel patterns in mixed-conifer stands (29, 58, 96%). Despite this decline in live aboveground C, total net primary productivity (NPP) was only 40% lower in high- versus low-severity stands, suggesting strong compensatory effects of non-tree vegetation on C uptake. Dead wood respiratory losses were small relative to total NPP (range: 10–35%), reflecting decomposition lags in this seasonally arid system. Although soil C, soil respiration, and fine root NPP were conserved across severity classes, net ecosystem production (NEP) declined with increasing severity, driven by trends in aboveground NPP. The high variability of C responses across this study underscores the need to account for landscape patterns of burn severity, particularly in regions such as the Pacific Northwest, where non-stand-replacement fire represents a large proportion of annual burned area."** **This is another carbon storage and sequestration reference. It pertains to the eastern Cascade Mountains of central Oregon. Although the study area involves ecosystems that are somewhat similar to the Blue Mountains, the South George analysis relied upon a carbon analysis pertaining specifically to the Blue Mountains and the planning area (see appendix D of the South George Silviculture Specialist Report, which provides a relatively**

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	detailed discussion of climate change and carbon sequestration considerations for the South George project). This reference also reports carbon dioxide emissions and carbon sequestration findings in the context of four forest fires in the Metolius Watershed of central Oregon – this study lacks relevance to the project because the planning area does not occur in central Oregon, and South George is not a post-fire project.
REF. TLC-77	Mildrexler, D. J., M. Zhao, and S. W. Running (2006), Where Are the Hottest Spots on Earth? EOS, Transactions, 87, 461, 467. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "The location of the hottest spot on the Earth's surface has long been a source of interest and curiosity. With images of blazing desert landscapes, several places have proudly claimed the title of 'hottest place on Earth'; Death Valley, California, the hottest place in North America, held the world record air temperature of 56.7°C from 1913 to 1922, until the current world record air temperature of 58.0°C was recorded in 1922 in El Azizia, Libya. Until recently, only point-based air temperature measurements in scattered locations were available to researchers trying to understand maximum temperatures. This incomplete picture, based largely on the locations of weather stations, clearly suggested that hotter air temperatures were occurring, but measurements on the scale needed to locate the hottest place simply were not practical."** **While we find it interesting that El Azizia, Libya has apparently wrested the "hottest place on Earth" title away from Death Valley, California, it is difficult to determine its relevance, if any, to the South George project without additional context.**
REF. TLC-78	Mildrexler, D. J., Zhao, M., & Running, S.W. 2009. Testing a MODIS Global Distrubance Index across North America. Remote Sensing of Environment, 113, 2103-2117. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to**

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	which it applies. It notes that "Large-scale ecosystem disturbances (LSEDs) have major impacts on the global carbon cycle as large pulses of CO2 and other trace gases from terrestrial biomass loss are emitted to the atmosphere during disturbance events. The high temporal and spatial variability of the atmospheric emissions combined with the lack of a proven methodology to monitor LSEDs at the global scale make the timing, location and extent of vegetation disturbance a significant uncertainty in understanding the global carbon cycle. The MODIS Global Disturbance Index (MGDI) algorithm is designed for large-scale, regular, disturbance mapping using Aqua/Moderate Resolution Imaging Spectroradiometer (MODIS) Land Surface Temperature (LST) and Aqua/MODIS Enhanced Vegetation Index (EVI) data. The MGDI uses annual maximum composite LST data to detect fundamental changes in land-surface energy partitioning, while avoiding the high natural variability associated with tracking LST at daily, weekly, or seasonal time frames. Here we apply the full Aqua/MODIS dataset through 2006 to the improved MGDI algorithm across the woody ecosystems of North America and test the algorithm by comparison with confirmed, historical wildfire events and the windfall areas of documented major hurricanes. The MGDI accurately detects the location and extent of wildfire throughout North America and detects high and moderate severity impacts in the windfall area of major hurricanes. We also find detections associated with clear-cut logging and land-clearing on the forest–agricultural interface. The MGDI indicates that 1.5% (195,580 km2) of the woody ecosystems within North America was disturbed in 2005 and 0.5% (67,451 km2) was disturbed in 2006. The interannual variability is supported by wildfire detections and official burned area statistics." **This is another remote sensing reference. It pertains to what is termed "large-scale ecosystem disturbances (LSEDs)," which are characterized as large wildfire, hurricanes, and disturbance events operating at a similarly-large scale. Since the South George project does not respond to a large-scale ecosystem disturbance event such as a wildfire or hurricane, it is difficult to determine the relevance of this reference, if any, to the South George project, at least without additional context.**
REF.	Mildrexler, D. J., Zhao, M., Heinsch, F. A., & Running, S.W. 2007. A new satellite-based

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Reference Number	Reference and Forest Service Response
TLC-79	methodology for continental scale disturbance detection. Ecological Applications, 17, 235–250. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "The timing, location, and magnitude of major disturbance events are currently major uncertainties in the global carbon cycle. Accurate information on the location, spatial extent, and duration of disturbance at the continental scale is needed to evaluate the ecosystem impacts of land cover changes due to wildfire, insect epidemics, flooding, climate change, and human-triggered land use. This paper describes an algorithm developed to serve as an automated, economical, systematic disturbance detection index for global application using Moderate Resolution Imaging Spectroradiometer (MODIS)/Aqua Land Surface Temperature (LST) and Terra/MODIS Enhanced Vegetation Index (EVI) data from 2003 to 2004. The algorithm is based on the consistent radiometric relationship between LST and EVI computed on a pixel-by-pixel basis. We used annual maximum composite LST data to detect fundamental changes in land–surface energy partitioning, while avoiding the high natural variability associated with tracking LST at daily, weekly, or seasonal time frames. Verification of potential disturbance events from our algorithm was carried out by demonstration of close association with independently confirmed, well-documented historical wildfire events throughout the study domain. We also examined the response of the disturbance index to irrigation by comparing a heavily irrigated poplar tree farm to the adjacent semiarid vegetation. Anomalous disturbance results were further examined by association with precipitation variability across areas of the study domain known for large interannual vegetation variability. The results illustrate that our algorithm is capable of detecting the location and spatial extent of wildfire with precision, is sensitive to the incremental process of recovery of disturbed landscapes, and shows strong sensitivity to irrigation. Disturbance detection in areas with high interannual variability of precipitation will benefit from a multiyear data set to better separate natural variability from true disturbance."** **This is another remote sensing reference. It examines the use of remote sensing to evaluate land-cover changes caused by natural and human-caused disturbance factors.**

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	Since the South George project does not respond to recent disturbance events caused by wildfire, insect epidemics, flooding, climate change, or human-triggered land use, although it is certainly designed to reduce susceptibility or vulnerability to future wildfires, insect outbreaks, and climate change effects, it is difficult to determine the relevance of this reference, if any, to the South George project, at least without additional context.
REF. TLC-80	Miller J. D. & A. E. Thode. 2007. Quantifying burn severity in a heterogeneous landscape with a relative version of the delta Normalized burn ratio (dNBR). Remote Sensing of Environment 109: 66-80. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-81	Miller, J.D., H.D. Safford, M. Crimmins, and A.E. Thode. 2009. Quantitative evidence for increasing forest fire severity in the Sierra Nevada and southern Cascade Mountains, California and Nevada, USA. Ecosystems 12: 16-32. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-82	Minnich, R. A., M. G. Barbour, J. H. Burk & J. Sosa-Ramirez, 2000. Californian mixed-conifer forests under unmanaged fire regimes in the Sierra San Pedro Martir, Baja California, Mexico. Journal of Biogeography 27: 105-129. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-83	Mitchell, S.R., M.E. Harmon, and K. E. B. O'Connell. 2009. Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems. Ecological Applications 19: 642-655.

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	Response: **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Two forest management objectives being debated in the context of federally managed landscapes in the U.S. Pacific Northwest involve a perceived trade-off between fire restoration and carbon sequestration. The former strategy would reduce fuel (and therefore C) that has accumulated through a century of fire suppression and exclusion which has led to extreme fire risk in some areas. The latter strategy would manage forests for enhanced C sequestration as a method of reducing atmospheric CO2 and associated threats from global climate change. We explored the trade-off between these two strategies by employing a forest ecosystem simulation model, STANDCARB, to examine the effects of fuel reduction on fire severity and the resulting long-term C dynamics among three Pacific Northwest ecosystems: the east Cascades ponderosa pine forests, the west Cascades western hemlock–Douglas-fir forests, and the Coast Range western hemlock–Sitka spruce forests. Our simulations indicate that fuel reduction treatments in these ecosystems consistently reduced fire severity. However, reducing the fraction by which C is lost in a wildfire requires the removal of a much greater amount of C, since most of the C stored in forest biomass (stem wood, branches, coarse woody debris) remains unconsumed even by high-severity wildfires. For this reason, all of the fuel reduction treatments simulated for the west Cascades and Coast Range ecosystems as well as most of the treatments simulated for the east Cascades resulted in a reduced mean stand C storage. One suggested method of compensating for such losses in C storage is to utilize C harvested in fuel reduction treatments as biofuels. Our analysis indicates that this will not be an effective strategy in the west Cascades and Coast Range over the next 100 years. We suggest that forest management plans aimed solely at ameliorating increases in atmospheric CO2 should forgo fuel reduction treatments in these ecosystems, with the possible exception of some east Cascades ponderosa pine stands with uncharacteristic levels of understory fuel accumulation. Balancing a demand for maximal landscape C storage with the demand for reduced wildfire severity will likely require treatments to be applied strategically throughout the landscape rather than indiscriminately treating all stands."**

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	This is another carbon storage and sequestration reference. It pertains to three ecosystem types: the east Cascades ponderosa pine forests, the west Cascades western hemlock–Douglas-fir forests, and the Coast Range western hemlock–Sitka spruce forests; only the first of these types (east Cascades ponderosa pine forests) has any applicability to the South George project because the planning area also contains dry forests with a predominance of ponderosa pine. Although this study involves one ecosystem type that is somewhat relevant to the Blue Mountains, the South George project relied upon a carbon analysis pertaining specifically to the Blue Mountains and the planning area (see appendix D of the South George Silviculture Specialist Report, which provides a relatively detailed discussion of climate change and carbon sequestration considerations for the South George project).
REF. TLC-84	Morrison, P.H. and H.M. Smith IV. 2005. Fire Regime Condition Classes and Forest Stewardship Planning on the Mt. Hood National Forest. Pacific Biodiversity Institute, Winthrop, WA. 33 p. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-85	Mote, P.W. 2003. Trends in temperature and precipitation in the Pacific Northwest during the twentieth century. Northwest Science 77: 271-282. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Documenting long-term trends or persistent shifts in temperature and precipitation is important for understanding present and future changes in flora and fauna. Carefully adjusted datasets for climate records in the USA and Canada are combined and used here to describe the spatial and seasonal variation in trends in the maritime, central, and Rocky Mountain climatic zones of the Pacific Northwest. Trends during the 20th century in annually averaged temperature (0.7°C-0.9°C) and precipitation**

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	(13%-38%) exceed the global averages. Largest warming rates occurred in the maritime zone and in winter and at lower elevations in all zones, and smallest warming rates occurred in autumn and in the Rockies. Largest increases in precipitation (upwards of 60% per century) were observed in the dry areas in northeast Washington and south central British Columbia. Increases in precipitation were largest in spring, but were also large in summer in the central and Rocky Mountain climatic zones. These trends have already had profound impacts on streamflow and on certain plant species in the region (Cayan et al. 2001), and other important impacts remain to be discovered. The warming observed in winter and spring can be attributed partially to climatic variations over the Pacific Ocean, and the buildup of greenhouse gases probably also plays an important role." **This reference was cited in the South George Silviculture Specialist Report (pages 23-24), when it was used as a literature citation for the statement that "Temperature began increasing during the 20th century (Mote 2003), but the magnitude of temperature increases are expected to increase during the 21st century (Mote and Salathé 2010); the species and spacing of tree seedlings consider predicted effects of climate change on forest vegetation conditions for the interior Pacific Northwest."** **Although its geographical context is much wider than just the interior Pacific Northwest, including the Blue Mountains and the South George planning area, this Mote (2003) reference provides an important summary of climatic trends during the 20th century, and for that reason, it was cited in the South George Silviculture Specialist Report.**
REF. TLC-86	Mutch, L.S., and T.W. Swetnam. 1995. Effects of fire severity and climate on ring-width growth of Giant Sequoia after burning. In: Brown, J.K., R.W. Mutch, C.W. Spoon, and R.H. Wakimoto, tech. coords. 1995. Proceedings: symposium on fire in wilderness and park management, March 30-April 1, 1993, Missoula, MT. Gen. Tech. Rep. INT-GTR-320. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It refers to a poster presentation made at a fire in wilderness and park**

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	management symposium in Missoula, Montana in April of 1993. It describes a study completed in the early 1990s where large giant sequoia trees were monitored following prescribed fires conducted by the US Park Service in Sequoia National Park and Kings Canyon National Park. **This reference does not have relevance to the South George project because although prescribed fire is a proposed action, the project area does not include giant sequoia trees (or white fir, red fir, sugar pine, Jeffrey pine, or incense cedar, other dominant trees in the California study sites) and the planning area has conditions substantially different than those found on the west slope of the Sierra Nevada Mountains in northern California.**
REF. TLC-87	Nagel, T.A., and A.H. Taylor. 2005. Fire and persistence of montane chaparral in mixed conifer forest landscapes in the northern Sierra Nevada, Lake Tahoe Basin, California, USA. Journal of the Torrey Botanical Society 132: 442-457. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-88	Nemani, R. R., L. L. Pierce, and S. W. Running (1993), Developing satellite derived estimates of surface moisture status, J. Appl. Meteorol., 32, 548−557. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Recent research has shown that the combination of spectral vegetation indices with thermal infrared observations may provide an effective method for parameterizing surface processes at large spatial scales. In this paper, we explore the remotely sensed surface temperature (Ts)/normalized difference vegetation index (NDVI) relationship regarding a) influence of biome type on the slope of Ts/NDVI, b) automating the definition of the relationship so that the surface moisture status can he compared with Ts/NDVI at continental scales. The analysis was carried out using 1) NOAA Advanced Very**

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	High Resolution Radiometer (AVHRR) data over a 300-km × 300-km area in western Montana under various land-use practices (grass, crops, and forests), 2) Earth Resources Observations Systems Data Center continental United States biweekly composite AVHRR data. **A strong negative relationship was observed between NDVI and Ts over all biome types. The similarity of the Ts/NDVI relationships over different biomes indicated that fraction of vegetation cover has strong influence on the spatial variability of Ts. A substantial change in the Ts/NDVI relationship was observed over forests between wet and dry days. In comparison, no change was observed over irrigated crops.** **Results from the automated approach agreed well with those using manual selection. At continental scales, the slope of Ts/NDVI is strongly correlated to crop-moisture index values indicating that Ts/NDVI relation is sensitive to surface moisture conditions. Upon further development, this relationship may be useful for parameterizing surface moisture conditions in climate models, decomposition studies, and fire weather monitoring."** **This is another remote sensing reference. It examines the use of remote sensing to evaluate crop moisture and the moisture status of forests between wet and dry days. Although the authors speculate that the analytical techniques described in this reference may have future utility for climate modeling, decomposition studies, or fire weather monitoring, it is difficult to determine the relevance of this reference, if any, to the South George project, at least without additional context.**
REF. TLC-89	Nemani, R. R., S. W. Running, R. A. Pielke, and T. N. Chase (1996), Global vegetation changes from coarse resolution satellite data, J. Geophys. Res., 101, 7157-7162. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Land cover plays a key role in various biophysical processes related to global climate and terrestrial biogeochemistry. Although global land cover has dramatically changed over the last few centuries, until now there has been no consistent way of quantifying the changes globally. In this study we used long-term climate and soils**

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	data along with coarse resolution satellite observations to quantify the magnitude and spatial extent of large-scale land cover changes attributable to anthropogenic processes. Differences between potential leaf area index (LAI), derived from climate-soil-leaf area equilibrium, and actual leaf area index obtained from satellite data are used to estimate changes in land cover. Further, changes in LAI between potential and actual conditions are linked to climate by expressing them as possible changes in radiometric surface temperatures (T r) resulting from changes in surface energy partitioning. As expected, areas with high population densities, such as India, China, and western Europe showed large reductions in LAI. Changes in global land cover expressed as summer, midafternoon T r, ranged from -8° to +16°C. Deforestation resulted in an increase in T r, while irrigated agriculture reduced the T r. Many of the current general circulation models (GCMs) use potential vegetation maps to represent global vegetation. Our results indicate that there are widespread changes in global land cover due to deforestation and agriculture below the resolution of many GCMs, and these changes could have a significant impact on climate. Potential and actual LAI data sets are available for climate modelers at 0.5° × 0.5° resolution to study the possible impacts of land cover changes on global temperatures and circulation patterns." **This is another remote sensing reference. It examines the use of remote sensing to evaluate changes in land cover at a global scale. Since the scale of this reference is global (specific findings at the scale of India, China, and western Europe are mentioned), it is difficult to determine the relevance of this reference, if any, to the South George project, at least without additional context.**
REF. TLC-90	Noss, R.F., and A.Y. Cooperrider. 1994. Saving nature's legacy: protecting and restoring biodiversity. Island Press, Washington D.C **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. Noss and Cooperrider prepared this book for Defenders of Wildlife, an environmental organization. The book reflects the viewpoints of Defenders of Wildlife in**

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	certain respects. It contains the following sections: biodiversity and its value; biodiversity: creation and destruction; conservation strategies – past, present, and future; selecting reserves; designing reserve networks; managing forests; managing rangelands; managing aquatic ecosystems; monitoring; and the task ahead. **Since no context is provided for this 416-page book by citing it in a comment, it is difficult to know how it might relate to the South George project or its planning area.**
REF. TLC-91	Noss, R.F., J.F. Franklin, W.L. Baker, T. Schoennagel, P.B. Moyle. 2006. Managing fire-prone forests in the western United States. Frontiers in Ecology and Environment 4: 481-487. **Response:** **"The management of fire-prone forests is one of the most controversial natural resource issues in the US today, particularly in the west of the country. Although vegetation and wildlife in these forests are adapted to fire, the historical range of fire frequency and severity was huge. When fire regimes are altered by human activity, major effects on biodiversity and ecosystem function are unavoidable. We review the ecological science relevant to developing and implementing fire and fuel management policies for forests before, during, and after wildfires. Fire exclusion led to major deviations from historical variability in many dry, low-elevation forests, but not in other forests, such as those characterized by high severity fires recurring at intervals longer than the period of active fire exclusion. Restoration and management of fire-prone forests should be precautionary, allow or mimic natural fire regimes as much as possible, and generally avoid intensive practices such as post-fire logging and planting."** **This journal article was cited in two comments (TLC-8 p. 18, TLC-15a p. 27). We disagree with its characterization of fire-prone forests (which we define to be those assigned to fire regime I or IIIa in a classification framework) as having a "huge" range of fire frequency and severity (Chapter 3 of the DEIS provides a detailed discussion of the prevailing fire frequency and severity for these fire regimes). We agree that fire exclusion has spawned profound changes for dry, low-elevation forests (fire regime I), and many aspects of the South George purpose and need (Chapter 1) are designed to address that**

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	specific issue. We agree that forest restoration activities should emulate native disturbance regimes as much as possible, and we described how the South George project accomplishes that objective in our response to comment "TLC-13 pp. 24-25." Since the South George project does not involve post-fire activities, the portions of this reference dealing with post-fire response (i.e., avoid post-fire logging and planting, etc.) are irrelevant.
REF. TLC-92	Noss, Reed F. 2001. Biocentric Ecological Sustainability: A Citizen's Guide. Louisville, CO: Biodiversity Legal Foundation. 12pp. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It refers to a special report issued by the Biodiversity Legal Foundation. Without additional context, we will not speculate about the possible relevance of this report to the South George project. But, as we have noted in our response to numerous comments and references, we believe many aspects of the South George project were designed in such a way as to be compatible with, or actually promote, biodiversity (such as use of biophysical environments to appropriately incorporate ecological settings, use of the historical range of variability concept to appropriately account for ecosystem variation, etc.).**
REF. TLC-93	Odion, D. C., M. A. Moritz & D. A. DellaSala, 2009. Alternative community states maintained by fire in the Klamath Mountains, USA. Journal of Ecology, doi: 10.1111/j.1365-2745.2009.01597.x. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-94	Odion, D.C., and C.T. Hanson. 2006. Fire severity in conifer forests of the Sierra Nevada, California. Ecosystems 9: 1177-1189. **Response:**

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REF. TLC-95	Odion, D.C., and C.T. Hanson. 2008. Fire severity in the Sierra Nevada revisited: conclusions robust to further analysis. Ecosystems 11: 12-15. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-96	Odion, D.C., E.J. Frost, J.R. Strittholt, H. Jiang, D.A. DellaSala, and M.A. Moritz. 2004. Patterns of fire severity and forest conditions in the Klamath Mountains, northwestern California. Conservation Biology 18: 927-936. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-97	Parisien, M., and M.A. Moritz. 2009. Environmental controls on the distribution of wildfire at multiple spatial scales. Ecological Monographs 79: 127-154. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. This article is about predicting wildfires and therefore is not within the scope of the project.**
REF. TLC-98	Pesklevits, A., P. A. Duinker, and P. G. Bush. 2011. Old-growth Forests: Anatomy of a Wicked Problem. Forests, 2, 343-356. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Old-growth forest is an often-used term that seems to be intuitively understood by ecologists and forest managers, and the wide-ranging discussion**

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	of its social and ecological values suggests it has currency among the general public as well. However, a decades-long discourse regarding a generally acceptable definition of old-growth, in both conceptual and practical terms, has gone largely unresolved. This is partially because old-growth is simultaneously an ecological state, a value-laden social concept, and a polarizing political phenomenon, each facet of its identity influencing the others in complex ways. However, the public, scientific, and management discourse on old-growth has also suffered from simplifying tendencies which are at odds with old-growth's inherently complex nature. Such complexity confounds simple or rationalistic management approaches, and the forest management arena has witnessed the collision of impassioned and contradictory opinions on the 'right way' to manage old-growth forests, ranging from strict preservationism to utilitarian indifference. What is clear is that management approaches that circumvent, trivialize, eliminate, or ignore old-growth's inherent complexity may do so at the expense of the very characteristics from which old-growth derives its perceived value. We explore the paradoxes presented by the various approaches to old-growth description and definition and present some plausible paths forward for old-growth theory and management, with a particular focus on managed forests." **As described in our responses to numerous comments about old forest or LOS stands, we believe the DEIS makes a compelling case for the proposed vegetation management activities in old forest stands. See our comments for: TLC-9a, p. 21 and attachment; TLC-10 pp. 21-22; TLC-12c p. 24; TLC-20 p. 35; TLC-20a p. 36; TLC-20c p. 37; TLC-20d pp. 37-38; TLC-21 pp. 38-39; TLC-21a p. 39; TLC-21b p. 40; TLC-22 p. 41; TLC-23 p. 41; TLC-23a p. 41; and TLC-23b p. 42 for more of our response on this issue.**
REF. TLC-99	Pierce, J.L., G.A. Meyer, and A.J.T. Jull. 2004. Fire-induced erosion and millennial-scale climate change in northern ponderosa pine forests. Nature 432: 87-90. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Western US ponderosa pine forests have recently suffered extensive stand-replacing fires followed by hillslope erosion and sedimentation. These fires**

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	are usually attributed to increased stand density as a result of fire suppression, grazing and other land use, and are often considered uncharacteristic or unprecedented. Tree-ring records from the past 500 years indicate that before Euro-American settlement, frequent, low-severity fires maintained open stands. However, the presettlement period between about ad 1500 and ad 1900 was also generally colder than present, raising the possibility that rapid twentieth-century warming promoted recent catastrophic fires. Here we date fire-related sediment deposits in alluvial fans in central Idaho to reconstruct Holocene fire history in xeric ponderosa pine forests and examine links to climate. We find that colder periods experienced frequent low-severity fires, probably fuelled by increased understory growth. Warmer periods experienced severe droughts, stand-replacing fires and large debris-flow events that comprise a large component of long-term erosion and coincide with similar events in subalpine forests of Yellowstone National Park. Our results suggest that given the powerful influence of climate, restoration of processes typical of presettlement times may be difficult in a warmer future that promotes severe fires." **We agree with this reference's contention that restoration of forest ecosystems may be more difficult in a warmer and dryer future. We also agree that climate change could potentially have important influences on the future species composition and distribution for the planning area. We believe that appendix D of the South George Silviculture Specialist Report (Climate Change and Carbon Accounting Analysis; 20 pages) provides a relatively detailed discussion of climate change and carbon sequestration considerations for the South George project, including potential changes in future species composition, vegetation structure, and other factors contributing to ecosystem restoration potential.**
REF. TLC-100	Pimentel, D., L. Westra, and R.F. Noss (eds.). 2000. Ecological integrity: integrating environment, conservation, and health. Washington D.C.: Island Press. **Response:** **This reference refers to a book, and we do not have a copy in our library. A web search indicates that this book covers the following topics: "This study is based on the findings of the Global Integrity Project, and brings together scientists and thinkers from around the**

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	world to examine the combined problems of threatened and unequal human wellbeing, degradation of the ecosphere and unsustainable economies. The book: examines the history, philosophy, economics and ethics of the concept and practice of ecological integrity; explores how integrity can be measured; and offers recommendations for reversing ecological degradation while promoting social and economic justice and welfare. The contributors argue that there is an urgent need for rapid and fundamental change in the ecologically destructive patterns of collective human behavior if society is to survive and thrive in coming decades." **Without additional context, we will not speculate about the possible relevance of this report to the South George project.**
REF. TLC-101	Purcell, K.L., A.K. Mazzoni, S.R. Mori, and B.B. Boroski. 2009. Resting structures and resting habitat of fishers in the southern Sierra Nevada, California. Forest Ecology and Management doi: 10.1016/j.foreco.2009.09.041. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-102	Rainville R, R. White, J Barbour. 2008. Assessment of timber availability from forest restoration within the Blue Mountains of Oregon. Gen. Tech. Rep. PNW-GTR-752. Portland, OR: USDA, Forest Service, Pacific Northwest Research Station. 65 p. **Response:** **This report was cited in one comment (TLC-21 pp. 38-39) discussing historical trends for the OFSS structural stage in the Blue Mountains, and how forest management activities might have affected those trends. It notes that "Changes in forest management have detrimentally affected the economic health of small communities in the Blue Mountain region of Oregon over the past few decades. A build-up of small trees threatens the ecological health of these forests and increases wildland fire hazard. Hoping to boost their economies and also restore these forests, local leaders are interested in the economic value**

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	of timber that might be available from thinning treatments on these lands. This study identified densely stocked stands where thinning could provide a reliable source of wood, and examined the quantity, distribution, and economic value of the resulting timber for 5.5 million acres of national forest lands in eastern Oregon. Our findings verified local land managers' observations that the land base to support timber harvest targets in the region is smaller than anticipated in the past. Legal restrictions and current management practices have reduced the acreage available for harvest and mechanical restoration. Additionally, we found that on lands where active forestry is allowable, thinning of most densely stocked stands would not be economically viable. Findings from this analysis can help establish a common understanding of Blue Mountains vegetative and economic conditions for managers trying to restore the region's national forests." **We agree with the conclusions from this reference, as quoted above, and acknowledge that it describes how early commercial logging was known to have preferentially removed large-diameter ponderosa pine trees from old-forest stands (this is the OFSS structural stage) (see pages 4-6 in Rainville et al. 2008 for the Commercial Logging discussion).**
REF. TLC-103	Raphael, Martin G., Richard S. Holthausen, Bruce G. Marcot, Terrell D. Rich, Mary M. Rowland, Barbara C. Wales, Michael J. Wisdom, 2000. DRAFT Effects of SDEIS Alternatives on Selected Terrestrial Vertebrates of Conservation Concern within the Interior Columbia River Basin Ecosystem Management Project, March 2000, revised June 23, 2000 and November 14, 2000. **Response:** **Effects of alternatives that were not implemented in this reference are not relative to this project.**
REF. TLC-104	Rapp, V. 2008. First-Decade Results of the Northwest Forest Plan. Northwest Forest Plan. The First 10 Years (1994-2003). PNW –GTR-720.

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	Response: **N/A – UMATILLA FOREST IS NOT IN THE NORTHWEST FOREST PLAN**
REF. TLC-105	Rhodes, J.J. 2007. The watershed impacts of Forest Treatments To Reduce Fuels and Modify Fire Behavior. Commissioned by Pacific River Council, 94 pp. **Response:** **Design criteria identified in the DEIS, Chapter 2, Table 2-5 pages 2-19-25, including PACFISH interim RHCAs prevent damage and protect water resources and other resources.**
REF. TLC-106	Running, S.W. (2008), Ecosystem Disturbance, Carbon, and Climate, Science, 321, 652-653. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "The terrestrial carbon cycle provides a sink for about 25% of the anthropogenic carbon emissions that increase atmospheric CO2. Comprehensive models based on a detailed understanding of this carbon sink are needed to inform mitigation strategies aimed at stabilizing climate and adaptation strategies to minimize biospheric impacts. Can current models represent the full global range of ecosystem dynamics and both interannual and episodic variabilities that determine the strength of the terrestrial sink?"** **This is another carbon storage and sequestration reference. It pertains to the global carbon cycle and associated effects on the planet's biosphere. Since this study lacks any specific geographical or thematic relevance to the South George project or its planning area, it is difficult to evaluate without additional context.**
REF. TLC-107	Russell, R.E., V.A. Saab, and J.G. Dudley. 2007. Habitat-suitability models for cavity-nesting birds in a postfire landscape. Journal of Wildlife Management 71: 2600-2611.

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	Response: **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-108	Saab, V. A., R. E. Russell, and J. G. Dudley. 2007. Nest densities of cavity-nesting birds in relation to postfire salvage logging and time since wildfire. The Condor 109:97-108. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-109	Saab, V.A., J. Dudley, and W.L. Thompson. 2004. Factors influencing occupancy of nest cavities in recently burned forests. The Condor 106: 20-36. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-110	Saab, V.A., R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Pages 835-848 in P.J. Shea, W.F. Laudenslayer Jr., B. Valentine, C.P. Weatherspoon, and T.E. Lisle (eds.), Proceedings of the symposium on the ecology and management of dead wood in western forests, November 2-4, 1999, Reno, Nevada. U.S. Forest Service, General Technical Report PSW-GTR-181. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-111	Schwind, B. 2008. Monitoring trends in burn severity: report on the Pacific Northwest and Pacific Southwest fires (1984 to 2005). Online at: http://www.mtbs.gov/projectreports.htm. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**

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REF. TLC-112	Shatford, J.P.A., D.E. Hibbs, and K.J. Puettmann. 2007. Conifer regeneration after forest fire in the Klamath-Siskiyous: how much, how soon? Journal of Forestry April/May 2007, pp. 139-146. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-113	Shaw, D. C., D. M. Watson, and R. L. Mathiasen. 2004. Comparison of dwarf mistletoes (Arceuthobium spp., Viscaceae) in the western United States with mistletoes (Amyema spp., Loranthaceae) in Australia- ecological analogs and reciprocal models for ecosystem management. Australian Journal of Botany, 52, 481-498. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Whereas the biology, physiology and systematics of mistletoes have been explored in considerable detail, their ecology has received less attention and our understanding is highly fragmentary. A conspicuous exception is the dwarf mistletoes (*Arceuthobium* spp.)–a genus that exclusively parasitizes coniferous trees, including many commercially valuable species in the forests of the western United States. Accordingly, these plants have been the subjects of intensive cross-disciplinary research for the past five decades, initially from a control and management perspective but extending into most aspects of their ecology and life history. This review summarizes our understanding of dwarf mistletoes, focusing on recent developments in the areas of mistletoe-wildlife interactions, fire, ecosystem ecology, and conservation biology. We also compare dwarf mistletoes with Australian mistletoes in the genus *Amyema*, a diverse suite of species found throughout the continent. Despite fundamental differences in their evolutionary origin and most aspects of their autecology and life history, the genera exhibit many similarities in terms of their ecological role in forests and woodlands, and their influence on stand- and forest-scale dynamics. In particular, both groups provide nesting resources for a range of birds and mammals, and nutritional resources for a diverse assemblage of species.**

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	Both also interact with fire, potentially leading to changes in successional dynamics at the stand scale. At an applied level, both groups are widely considered as pests but, as our understanding of these keystone species improves, they have the potential to serve as sensitive ecological indicators for their respective ecosystems. Key research priorities are identified for further research on both groups of mistletoes and more explicit comparative research, with *Arceuthobium* serving as a valuable template for future work on *Amyema* and Australian mistletoes in general." **Dwarf mistletoe in Douglas-fir was examined in detail for the South George planning area (see the South George Silviculture Specialist Report, Insects and Diseases section), and western larch dwarf mistletoe was also considered, but not analyzed in detail, due to a small amount of host type in the planning area. Although the planning area has significant acreages of moderate or high susceptibility to Douglas-fir dwarf mistletoe, they were still considered to be within, or close to, the range of variation for this dwarf mistletoe species.** **We believe we have appropriately accounted for the ecosystem services provided by dwarf mistletoes as integral and native components of forest ecosystems. We agree, for example, that dwarf mistletoe is part of a healthy old growth ecosystem, particularly when mistletoe parasitism levels occur within their range of variation. When Douglas-fir occurs within its range of variation, for example, then we would expect Douglas-fir dwarf mistletoe to occur with a characteristic frequency and severity; if Douglas-fir is outside its range of variation, then we would expect uncharacteristic effects from Douglas-fir dwarf mistletoe.**
REF. TLC-114	Sherriff, R.L., and T.T. Veblen. 2006. Ecological effects of changes in fire regimes in Pinus ponderosa ecosystems in the Colorado Front Range. Journal of Vegetation Science 17: 705-718. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-115	Sherriff, R.L., and T.T. Veblen. 2007. A spatially-explicit reconstruction of historical fire occurrence in the Ponderosa pine zone of the Colorado Front Range. Ecosystems 10: 313-323.

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	Response: **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-116	Siegel, R.B, and R.L. Wilkerson. 2005. Short- and long-term effects of stand-replacing fire on a Sierra Nevada bird community. Final report for the 2004 field season. The Institute for Bird Populations. Point Reyes Station, California. **Response:** **N/A – GEOGRAPHICAL REFERENCE AND THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-117	Simons, Rachel; 2008. Historic range of variability-based forest management and climate change: understanding causes of disturbances in a changing climate. Unpublished literature review. **Response:** **This reference does not provide enough information to formulate a response. A web search did not locate this reference. It was cited in one comment (TLC-32b p. 54), which states that "restoration efforts aimed at the maintenance of historic ecosystem structures of the pre-settlement era would most likely reduce the resilient characteristics of ecosystems facing climate change." We disagree with this statement, and explain our rationale for why it is incorrect in a section in appendix D of the South George Silviculture Specialist Report called "Climate Change and HRV" (pages 115-116 in the Specialist Report).**
REF. TLC-118	Smith, J.K., ed. 2000. Wildland fire in ecosystems: effects on fire on fauna. U.S. Forest Service General Technical Report RMRS-GTR-42. Volume 1. U.S. Forest Service, Rocky Mountain Research Station, Missoula, MT, USA, 83 p. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to**

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	which it applies. The DEIS acknowledges that some wildlife species benefit from fire (DEIS, Chapter 3, page 3-125).
REF. TLC-119	Smithwick, E.A.H., M.E. Harmon, and J.B. Domingo. 2002. Changing temporal patterns of forest carbon stores and net ecosystem carbon balance: the stand to landscape transformation. Landscape Ecology 22:77-94. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Short- and long-term patterns of net ecosystem carbon balance (NECB) for small, relatively uniform forest stands have been examined in detail, but the same is not true for landscapes, especially those with heterogeneous disturbance histories. In this paper, we explore the effect of two contrasting types of disturbances (i.e., fire and tree harvest) on landscape level NECB by using an ecosystem process model that explicitly accounts for changes in carbon (C) stores as a function of disturbance regimes. The latter were defined by the average disturbance interval, the regularity of the disturbance interval (i.e., random, based on a Poisson frequency distribution, or regular), the amount of C removed by the disturbance (i.e., severity), and the relative abundance of stands in the landscape with unique disturbance histories. We used the model to create over 300 hypothetical landscapes, each with a different disturbance regime, by simulating up to 200 unique stand histories and averaging their total C stores. Mean NECB and its year-to-year variability was computed by calculating the difference in mean total C stores from one year to the next. Results indicated that landscape C stores were higher for random than for regular disturbance intervals, and increased as the mean disturbance interval increased and as the disturbance severity decreased. For example, C storage was reduced by 58% when the fire interval was shortened from 250 years to 100 years. Average landscape NECB was not significantly different than zero for any of the simulated landscapes. Year-to-year variability in landscape NECB, however, was related to the landscape disturbance regime; increasing with disturbance severity and frequency, and higher for random versus regular disturbance intervals. We conclude that landscape C stores of forest systems can be**

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	predicted using the concept of disturbance regimes, a result that may be a useful for adjusting estimates of C storage to broad scales that are solely based on physiological processes." **This is another carbon storage and sequestration reference. It describes results from a modeling study examining the influence of disturbance intervals on carbon cycling and sequestration, and it does so in the context of comparing fire with timber harvest. Although the paper is not definitive about the location of the simulated stands, it suggests that they represent "Pacific Northwest forests" similar to those found in the coastal Douglas-fir/western hemlock zone of western Oregon and western Washington, which is a biophysical context quite dissimilar from the South George planning area.** **The South George analysis relied on a carbon analysis pertaining specifically to the Blue Mountains, and to the planning area itself (see appendix D of the South George Silviculture Specialist Report, which provides a relatively detailed discussion of climate change and carbon sequestration considerations for the South George project), and we believe this was an appropriate analysis methodology for examining carbon relationships.**
REF. TLC-120	Solomon, S.D. et al., 2007: Technical Summary, in Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change 24, (Feb. 2, 2007). **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "this report provides new and important policy-relevant information on the scientific understanding of climate change, the complexity of the climate system and the multiple interactions that determine its behavior impose limitations on our ability to understand fully the future course of Earth's global climate. There is still an incomplete physical understanding of many components of the climate system and their role in climate change. Key uncertainties include aspects of the roles played by clouds, the cryosphere, the oceans, land use and couplings between climate and biogeochemical cycles. The areas of science covered in this report continue to undergo rapid progress and it should**

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	be recognized that the present assessment reflects scientific understanding based on the peer-reviewed literature available in mid-2006." **This is a long technical summary from a very large and detailed climate change analysis conducted at a global scale. The South George analysis relied on a climate change analysis pertaining specifically to the Blue Mountains (see appendix D of the South George Silviculture Specialist Report, which provides a relatively detailed discussion of climate change and carbon sequestration considerations for the South George project), and we believe this was an appropriate scale for considering climate change relationships.**
REF. TLC-121	Stephens, S.L., R.E. Martin, and N.E. Clinton. 2007. Prehistoric fire area and emissions from California's forests, woodlands, shrublands, and grasslands. Forest Ecology and Management 251: 205-216. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-122	Stephenson, N.L., D.J. Parsons, and T.W. Swetnam. 1991. Restoring natural fire to the Sequoia-mixed conifer forest: should intense fire play a role. Pages 321-337 in Proceedings of the 17th Tall Timbers Fire Ecology Conference, May 18-21, 1989. Tall Timbers Research Station, Tallahassee, Florida. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-123	Stokstad, E. 2005. Learning to Adapt. Science News Focus. 309: 688-690. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "The ambitious Northwest Forest Plan tried to balance desires for timber and biodiversity, but preservation trumped logging – and research. Can**

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	the plan be made as adaptable and science-friendly as intended?" **This short, science-focus item examines implementation results for the Northwest Forest Plan. Neither the South George planning area, nor the Umatilla NF of which it is part, occur within the Northwest Forest Plan area, so this reference has little relevance to the South George project.**
REF. TLC-124	Strittholt, J.R., and D.A. DellaSala. 2001. Importance of roadless areas in biodiversity conservation in forested ecosystems: a case study – Klamath-Siskiyou ecoregion, U.S.A. Conservation Biology Vol. 15(6):1742-1754 **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-125	Turner, David P., William D. Ritts, Zhiqiang Yang, Robert E. Kennedy, Warren B. Cohen, Maureen V. Duane, Peter E. Thornton, Beverly E. Law. Decadal trends in net ecosystem production and net ecosystem carbon balance for a regional socioecological system. Forest Ecol. Manage. (2011), doi:10.1016/j.foreco.2011.06.034 **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Carbon sequestration is increasingly recognized as an ecosystem service, and forest management has a large potential to alter regional carbon fluxes – notably by way of harvest removals and related impacts on net ecosystem production (NEP). In the Pacific Northwest region of the US, the implementation of the Northwest Forest Plan (NWFP) in 1993 established a regional socio-ecological system focused on forest management. The NWFP resulted in a large (82%) decrease in the rate of harvest removals on public forest land, thus significantly impacting the regional carbon balance. Here we use a combination of remote sensing and ecosystem modeling to examine the trends in NEP and net ecosystem carbon balance (NECB) in this region over the 1985–2007 period, with particular attention to land ownership since management now differs**

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	widely between public and private forestland. In the late 1980s, forestland in both ownership classes was subject to high rates of harvesting, and consequently the land was a carbon source (i.e. had a negative NECB). After the policy driven reduction in the harvest level, public forestland became a large carbon sink – driven in part by increasing NEP – whereas private forestland was close to carbon neutral. In the 2003–2007 period, the trend towards carbon accumulation on public lands continued despite a moderate increase in the extent of wildfire. The NWFP was originally implemented in the context of biodiversity conservation, but its consequences in terms of carbon sequestration are also of societal interest. Ultimately, management within the NWFP socio-ecological system will have to consider trade-offs among these and other ecosystem services." **This journal article reports on a study that used remote sensing and computer simulation modeling to examine carbon sequestration relationships for a large geographical area covered by the Northwest Forest Plan. The modeling and remote sensing results in this paper pertain to west-side forests of Douglas-fir and western hemlock. For this reason, the results are not comparable to east-side mixed-conifer forests similar to those found in the South George planning area. The carbon concepts and principles used in this paper are also not applicable to east-side ecosystems because the prevailing disturbance regimes, and their associated characteristics such as frequency and intensity, vary substantially between west-side and east-side ecosystems (west-side forests tend to have long, stand-replacing disturbance regimes operating on multi-century cycles, whereas east-side forests have shorter, mixed-severity disturbance regimes functioning on multi-decadal cycles).**
REF. TLC-126	Turner, David P.; Greg J. Koerper; Mark E. Harmon; Jeffrey J. Lee; 1995. A Carbon Budget for the Forests of the Coterminous United States, 5:2 Ecological Applications 421 (1995). **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "The potential need for national-level comparisons of greenhouse gas emissions, and the desirability of understanding terrestrial sources and sinks of carbon, has prompted interest in quantifying national forest carbon budgets. In**

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	this study, we link a forest inventory database, a set of stand-level carbon budgets, and information on harvest levels in order to estimate the current pools and flux of carbon in forests of the conterminous United States. The forest inventory specifies the region, forest type, age class, productivity class, management intensity, and ownership of all timberland. The stand-level carbon budgets are based on growth and yield tables, in combination with additional information on carbon in soils, the forest floor, woody debris, and the understory. Total carbon in forests of the conterminous U.S. is estimated at 36.7 Pg, with half of that in the soil compartment. Tree carbon represents 33% of the total, followed by woody debris (10%), the forest floor (6%), and the understory (1%). The carbon uptake associated with net annual growth is 331 Tg, however, much of that is balanced by harvest-related mortality (266 Tg) and decomposition of woody debris. The forest land base at the national level is accumulating 79 Tg/yr, with the largest carbon gain in the Northeast region. The similarity in the magnitude of the biologically driven flux and the harvest-related flux indicates the importance of employing an age-class-based inventory, and of including effects associated with forest harvest and harvest residue, when modeling national carbon budgets in the temperate zone." **This reference presents results from a national-scale analysis of carbon storage for the conterminous United States. The broad-scale scope of this journal paper renders it as generally irrelevant to the South George analysis, which provides a relatively detailed discussion of carbon sequestration considerations for the South George planning area (see Appendix D of the South George Silviculture Specialist Report for a 20-page Climate Change and Carbon Accounting Analysis). We believe that consideration of carbon sequestration relationships for the South George planning area was an appropriate analysis scale for this issue.**
REF. TLC-127	United Nations Environmental Programme (UNEP). 2002: Report of the Sixth Meeting of the Conference of the Parties to the Convention on Biological Diversity (UNEP/CBD/COP/6/20). Decision VI/26, UNEP. **Response:**

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	This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It refers to "The Conference of the Parties 6, decision VI/26," which is entitled "Strategic Plan for the Convention on Biological Diversity." Without additional context, it is not possible to determine if this item has any relevance to the South George analysis and, if so, what it might be.
REF. TLC-128	United States Department of the Interior (USDI). 1992. Recovery plan for the northern spotted owl: final draft. Prepared by the Northern Spotted Owl Recovery Team; Donald R. Knowles, coordinator. Washington, DC. **Response:** **N/A – UMATILLA NF IS NOT A NORTHERN SPOTTED OWL FOREST**
REF. TLC-129	USDA Forest Service, 2005b. Middle East Fork Hazardous Fuel Reduction Draft Environmental Impact Statement. Bitterroot National Forest. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-130	USDA Forest Service, 2007c. Myrtle Creek HFRA Healthy Forests Restoration Act Project Final Environmental Impact Statement. Soil Resources. March 2007. Bonners Ferry Ranger District, Idaho Panhandle National Forests **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-131	USDA. 2001. Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement, Volume 3. U.S. Forest Service, Regional Office, Vallejo, CA. **Response:** **N/A – GEOGRAPHICAL REFERENCE**

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REF. TLC-132	USDA. 2004. Sierra Nevada Forest Plan Amendment, Supplemental Final Environmental Impact Statement. U.S. Forest Service, Regional Office, Vallejo, CA. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-133	USDA. 2010. Plumas Lassen Study 2009 Annual Report. U.S. Forest Service, Sierra Nevada Research Center. Davis, CA. **Response:** **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-134	Van der Werf, G. R.; D. C. Morton, R. S. DeFries, J. G. J. Olivier, P. S. Kasibhatla, R. B. Jackson, G. J. Collatz and J. T. Randerson; 2009. CO2 emissions from forest loss. Nature Geoscience vol. 2, November 2009. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Deforestation is the second largest anthropogenic source of carbon dioxide to the atmosphere, after fossil fuel combustion. Following a budget reanalysis, the contribution from deforestation is revised downwards, but tropical peatlands emerge as a notable carbon dioxide source."** **This short journal article refers to deforestation. As noted in other responses, the South George project does not include deforestation, which is defined as a situation where forest land is converted to a "permanent" non-forest use such as housing or commercial development. This is in contrast to "reforestation," a practice included in the South George project, where tree cover is temporarily removed and then quickly replaced by using artificial or natural regeneration practices.** **Since deforestation is not included in the project's proposed action, and because the**

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	South George planning area does not contain tropical peatlands, this reference is irrelevant to the South George analysis. Also see other responses to carbon storage and sequestration references (including REF. TLC-14, TLC-22, TLC-35, TLC-36, and TLC-37).
REF. TLC-135	Veblen, T.T., T. Kitzberger, and J. Donnegan. 2000. Climatic and human influences on fire regimes in ponderosa pine forests in the Colorado Front Range. Ecological Applications 10:1178-1195. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "In the northern Colorado Front Range, fire suppression during the 20th century is believed to have created a high hazard of catastrophic fire in ponderosa pine (*Pinus ponderosa*) forests. Since the early 1990s, resource managers have increased the use of prescribed fires to recreate fire regimes and forest structures similar to those of the pre-Euro-American settlement period in order both to reduce fire hazard and to improve forest health. To improve understanding of historical fire regimes, we conducted a study of fire history along an elevational gradient from 1830 to 2800 m in ponderosa pine forests in the northern Front Range. Fire-scar dates were determined from 525 partial cross sections from living and dead trees at 41 sample sites. Fire frequencies and fire intervals were analyzed in relation to changes in human activities and interannual climatic variability as recorded in instrumental climatic records and tree-ring proxy records.** **Prior to modern fire suppression, the low elevation, open ponderosa pine forests of the northern Front Range were characterized by frequent surface fires, similar in frequency to many other ponderosa pine ecosystems in the West. In contrast, in higher elevation forests (above 2400 m) where ponderosa pine is mixed with Douglas-fir (*Pseudotsuga menziesii*) and lodgepole pine (*Pinus contorta*), the fire regime was characterized by a much lower fire frequency and included extensive stand-replacing fires as well as surface fires. In the mid-**

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	1800s there was a marked increase in fire occurrence that can be related both to Euro-American settlement and increased climatic variability. This episode of increased fire left a legacy of dense, even-aged stands in higher elevation ponderosa pine forests, whereas increased stand densities in low elevation forests are attributed mainly to fire exclusion during the 20th century. **Warmer and drier spring–summers, indicated in instrumental climatic records (1873–1995) and in tree-ring proxy records of climate (1600–1983), are strongly associated with years of widespread fire. Years of widespread fire also tend to be preceded two to four years by wetter than average springs that increase the production of fine fuels. Alternation of wet and dry periods over time periods of 2–5 years is conducive to fire spread and is strongly linked to El Niño–Southern Oscillation (ENSO) events. The warm (El Niño) phase of ENSO is associated with greater moisture availability during spring that results in a peak of fire occurrence several years following El Niño events. Conversely, dry springs associated with La Niña events were followed by more widespread fire during the same year.** **The 1600–1920 fire-scar record indicates that individual years during which high percentages of the 41 sample sites synchronously recorded fire have occurred at least several times per century. The association of these years of widespread fire with very strong ENSO events demonstrates the importance of ENSO-related climatic variabililty in creating extreme fire hazard at a landscape scale."** **This journal article pertains to forests of central Colorado's Front Range, not to the Blue Mountains of northeastern Oregon and southeastern Washington. It describes several forest types that also occur in the South George planning area. See our responses to references TLC-4, TLC-41, TLC-55, and TLC-91 for thoughts about the fire history and fire ecology relationships described in this paper, and to reference TLC-74 for our response to climatic influences on fire hazard.**
REF. TLC-136	Verner, J., K, S. McKelvey, B. R. Noon, R. J. Gutiérrez, G. I Gould, Jr., and T. W. Beck, Technical Coordinators. 1992. The California spotted owl: a technical assessment of its current status. Gen Tech. Rep. PSW-GTR-133. Albany, CA. Pacific Southwest Research Station. Forest Service, U. S. Department of Agriculture.

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	Response: **N/A – GEOGRAPHICAL REFERENCE**
REF. TLC-137	Vierling, K. T., L. B. Lentile, and N. Nielsen-Pincus. 2008. Preburn characteristics and woodpecker use of burned conifer forests. Journal of Wildlife Management 72: 422-427. **Response:** **N/A – THIS IS NOT A POST-FIRE PROJECT**
REF. TLC-138	Wales, B. C., Suring, L. H., and M. A. Hemstrom. 2007. Modeling potential outcomes of fire and fuel management scenarios on the structure of forested habitats in northeast Oregon, USA. Landscape and Urban Planning. 80:223-236. **Response:** **See response to Comment TLC – 21a.**
REF. TLC-139	Wardle, D.A., L.R. Walker, and R.D. Bardgett. 2004. Ecosystem properties and forest decline in contrasting long-term chronosequences. Science 305: 509-513. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "During succession, ecosystem development occurs; but in the long-term absence of catastrophic disturbance, a decline phase eventually follows. We studied six long-term chronosequences, in Australia, Sweden, Alaska, Hawaii, and New Zealand; for each, the decline phase was associated with a reduction in tree basal area and an increase in the substrate nitrogen–to-phosphorus ratio, indicating increasing phosphorus limitation over time. These changes were often associated with reductions in litter decomposition rates, phosphorus release from litter, and biomass and activity of decomposer microbes. Our findings suggest that the maximal biomass phase reached**

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	during succession cannot be maintained in the long-term absence of major disturbance, and that similar patterns of decline occur in forested ecosystems spanning the tropical, temperate, and boreal zones." **This reference discusses succession following disturbance, and it does so for three major vegetation biomes (tropical, temperate, and boreal zones). Disturbance and succession are topics discussed in the South George DEIS and in our response to many comments, but this journal paper does so in the context of Australia, Sweden, Alaska, Hawaii, and New Zealand – none of these study areas offer compelling relevance to the South George project or its planning area.**
REF. TLC-140	Waring, R. H. (2002), Temperate Coniferous Forests, in Encyclopedia of Global Environmental Change. Vol. 2. John Wiley and Sons, LTD, Chichester. **Response:** **This reference apparently applies to a Chapter or section in a larger work, which happens to be volume 2 in a 5-volume set. We do not have a copy of the book in our library, and cannot provide a response without obtaining a copy through an inter-library loan program. According to the publisher's website (Wiley), the set is quite expensive ($3,700 for the 5-volume set; $1,300 for one volume like volume 2). We certainly don't have the capability to purchase a set, although we would certainly appreciate a copy for our library because it sounds like a useful, climate-change reference.**
REF. TLC-141	Watson, D.M. 2001. Mistletoe- a keystone resource in forests and woodlands worldwide. Annual Review of Ecology and Systematics, 32, 219-249. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Mistletoes are a diverse group of parasitic plants with a worldwide distribution. The hemiparasitic growth form is critical to understanding their**

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Reference Number	Reference and Forest Service Response
	biology, buffering variation in resource availability that constrains the distribution and growth of most plants. This is manifested in many aspects of mistletoe life history, including extended phenologies, abundant and high-quality fruits and nectar, and few chemical or structural defenses. Most mistletoe species rely on animals for both pollination and fruit dispersal, and this leads to a broad range of mistletoe-animal interactions. In this review, I summarize research on mistletoe biology and synthesize results from studies of mistletoe-animal interactions. I consolidate records of mistletoe-vertebrate interactions, incorporating species from 97 vertebrate families recorded as consuming mistletoe and from 50 using mistletoe as nesting sites. There is widespread support for regarding mistletoe as a keystone resource, and all quantitative data are consistent with mistletoe functioning as a determinant of alpha diversity. Manipulative experiments are highlighted as a key priority, and six explicit predictions are provided to guide future experimental research." **After reviewing this reference, it refers primarily to true mistletoes (such as the *Phoradendron* genus in the United States), and has little or no coverage of the dwarf mistletoes in the *Arceuthobium* genus. The dwarf mistletoes are native to the South George planning area and to the planning area, whereas the true mistletoes have little or no occurrence in this area (other than limited occurrence with western juniper). Therefore, this reference is believed to have little relevance to the South George analysis.**
REF. TLC-142	Whitlock, C., J. Marlon, C. Briles, A. Brunelle, C. Long, and P. Bartlein. 2008. Long-term relations among fire, fuel, and climate in the north-western US based on lake-sediment studies. International Journal of Wildland Fire 17: 72-83. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Pollen and high-resolution charcoal records from the north-western USA provide an opportunity to examine the linkages among fire, climate, and fuels on multiple temporal and spatial scales. The data suggest that general charcoal levels were low in the late-glacial period and increased steadily through the last 11 000 years with increasing fuel biomass. At local scales, fire occurrence is governed by the interaction of site**

Letter #12 – References cited	
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Reference Number	**Reference and Forest Service Response**
	controls, including vegetation, local climate and fire weather, and topography. At subregional scales, patterns in the long term fire-episode frequency data are apparent: The Coast Range had relatively few fires in the Holocene, whereas the Klamath–Siskiyou region experienced frequent fire episodes. Fire regimes in the northern Rocky Mountains have been strongly governed by millennial- and centennial-scale climate variability and regional differences in summer moisture. At regional scales, sites in present-day summer-dry areas show a period of protracted high fire activity within the early Holocene that is attributed to intensified summer drought in the summer-dry region. Sites in summer-wet areas show the opposite pattern, that fire was lower in frequency than present in the early Holocene as result of strengthened monsoonal circulation then. Higher fire-episode frequency at many sites in the last 2000 years is attributed to greater drought during the Medieval Climate Anomaly and possibly anthropogenic burning. The association between drought, increased fire occurrence, and available fuels evident on several time scales suggests that long-term fire history patterns should be considered in current assessments of historical fire regimes and fuel conditions." **This journal article examines fire history and fire ecology relationships across a broad temporal timeframe. See our responses to references TLC-4, TLC-41, TLC-55, TLC-91, and TLC-135 for thoughts about the fire history and fire ecology relationships described in this paper, and to reference TLC-74 for our response to climatic influences on fire occurrence and fire hazard.**
REF. TLC-143	Woodbury, Peter B., James E. Smith & Linda S. Heath, 2007. Carbon sequestration in the U.S. forest sector from 1990 to 2010, 241 Forest Ecology and Management 14, 24 (2007). **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Forest inventory data supplemented with data from intensive research sites and models were used to estimate carbon stocks and sequestration rates in U.S. forests, including effects of land use change. Data on the production of wood products and emission from decomposition were used to estimate carbon stocks and**

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	sequestration rates in wood products and landfills. From 1990 through 2005, the forest sector (including forests and wood products) sequestered an average 162 Tg C year^{-1}. In 2005, 49% of the total forest sector sequestration was in live and dead trees, 27% was in wood products in landfills, with the remainder in down dead wood, wood products in use, and forest floor and soil. The pools with the largest carbon stocks were not the same as those with the largest sequestration rates, except for the tree pool. For example, landfilled wood products comprise only 3% of total stocks but account for 27% of carbon sequestration. Conversely, forest soils comprise 48% of total stocks but account for only 2% of carbon sequestration. For the tree pool, the spatial pattern of carbon stocks was dissimilar to that of carbon flux. On an area basis, tree carbon stocks were highest in the Pacific Northwest, while changes were generally greatest in the upper Midwest and the Northeast. Net carbon sequestration in the forest sector in 2005 offset 10% of U.S. CO_2 emissions. In the near future, we project that U.S. forests will continue to sequester carbon at a rate similar to that in recent years. Based on a comparison of our estimates to a compilation of land-based estimates of non-forest carbon sinks from the literature, we estimate that the conterminous U.S. annually sequesters 149–330 Tg C year^{-1}. Forests, urban trees, and wood products are responsible for 65–91% of this sink." **This reference was cited in the South George Silviculture Specialist Report, when it was used in this context: "Forests in the United States sequester about 10% of the annual anthropogenic CO2 emissions (Woodbury et al. 2007). Wildfires are increasing both in size and severity (Miller et al. 2009, Westerling et al. 2006) and they produce large direct CO2 emissions on the order of 4-6% of annual U.S. anthropogenic CO2 emissions (Spracklen et al. 2007, Wiedinmyer and Neff 2007). As the amount of burned acreage increases, fire suppression costs routinely exceed $1 billion a year and this is causing managers to consider a policy where some fires would be allowed to burn when doing so would provide ecosystem benefits (such as Fire Use for Resource Benefit) and reduced suppression costs (Donovan and Brown 2005, 2007, 2008)." This means that the reference had some utility for the South George analysis by helping to place the local situation in a broader context.**
REF.	WRCC. 2009. Western Regional Climate Center (www.wrcc.dri.edu/). Data accessed 10/18/09.

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TLC-144	**Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It provides the website link for obtaining climate summaries from the Western Regional Climate Center. Without further elaboration or context, we are unaware of which climate information it might refer to, or how the information pertains to the South George analysis.**
REF. TLC-145	Wu, J., and O.L. Loucks. 1995. From balance of nature to hierarchical patch dynamics: a paradigm shift in ecology. The Quarterly Review of Biology 70: 439-466. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "A common assumption historically in ecology is evident in the term "balance of nature." The phrase usually implies that undisturbed nature is ordered and harmonious, and that ecological systems return to a previous equilibrium after disturbances. The more recent concepts of point equilibrium and static stability, which characterize the classical equilibrium paradigm in ecology, are traceable to the assumptions implicit in "balance of nature." The classical equilibrium view, however, has failed not only because equilibrium conditions are rare in nature, but also because of our past inability to incorporate heterogeneity and scale multiplicity into our quantitative expressions for stability. The theories and models built around these equilibrium and stability principles have misrepresented the foundations of resource management, nature conservation, and environmental protection. In this paper, we synthesize recent developments that advance our understandings of equilibrium vs. nonequilibrium, homogeneity vs. heterogeneity, determinism vs. stochasticity, and single-scale phenomenon vs. hierarchical linkages in ecological systems. The integration of patch dynamics with hierarchy theory has led to new perspectives in spatial and temporal dynamics, with explicit linkage between scale and heterogeneity. The major elements of the hierarchical patch dynamics paradigm include the idea of nested hierarchies of patch mosaics, ecosystem dynamics as a composite of patch**

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Reference Number	Reference and Forest Service Response
	changes in time and space, the pattern-process-scale perspective, the nonequilibrium perspective, and the concepts of incorporation and metastability. Both environmental stochasticities and biotic feedback interactions can cause instability and contribute to the dynamics observed a various scales. Stabilizing mechanisms that dampen these destabilizing forces include spatial incorporation, environmental disturbances, biological compensatory mechanisms, and heterogeneity absorption. Hierarchical patch dynamics incorporates certain "emergent properties" of ecological system, such as metastability persistence at the meta-scale, as opposed to the transient dynamics that usually characterize local phenomena. In contrast to the stability that derives from an assumed self-regulation in a closed system, the concepts of incorporation and metastability deal explicitly with multiple-scale processes and the consequences of heterogeneity. The most important contribution of hierarchical patch dynamics lies in the framework provided for explicitly incorporating heterogeneity and scale, and for integrating equilibrium, multiple equilibrium, and nonequilibrium perspectives." **This reference is a fundamental and very important citation for the ecological literature. It describes how a paradigm shift has occurred in ecology over the last 30 years, with perspectives shifting away from a "nature is static" viewpoint to a dynamic equilibrium concept where nature is inherently variable, but the variations occur within some type of upper and lower bounds. The South George project was prepared by using the dynamic equilibrium concept, as evidenced by use of the historical range of variability analytical technique (which explicitly recognizes that ecosystem characteristics fluctuate between an upper and lower bound).** **We also believe that the management strategy most likely to sustain high levels of ecosystem function for the South George planning area is emulation of natural disturbance processes. A basic premise of disturbance emulation is that silvicultural practices, prescribed fire, and other management activities should mimic the natural disturbance regime, and not just the fire characteristics but all aspects of the disturbance regime, including consideration of wind and other processes. These concepts (and more) are embodied in this reference, and it was certainly influential when preparing the South George project.**

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REF. TLC-146	Zhou, G., Liu, S, Li, Z., Zhang, D., Tang, X., Zhou, C., Yan, J., & J. Mo. 2006. Old-Growth Forests Can Accumulate Carbon in Soils. Science, 314, pg 1417. **Response:** **This reference was not cited in a comment, so we are unaware of the specific context to which it applies. It notes that "Old-growth forests have traditionally been considered negligible as carbon sinks because carbon uptake has been thought to be balanced by respiration. We show that the top 20-centimeter soil layer in preserved old-growth forests in southern China accumulated atmospheric carbon at an unexpectedly high average rate of 0.61 megagrams of carbon hectare-1 year-1 from 1979 to 2003. This study suggests that the carbon cycle processes in the belowground system of these forests are changing in response to the changing environment. The result directly challenges the prevailing belief in ecosystem ecology regarding carbon budget in old-growth forests and supports the establishment of a new, nonequilibrium conceptual framework to study soil carbon dynamics."** **This is another carbon storage and sequestration reference. It describes results from a study in China examining carbon storage in soils. It also supports the establishment of a new, nonequilibrium conceptual framework for interpreting soil carbon dynamics. We support the nonequilibrium conceptual framework recommendation (see our response to reference TLC-145). Since the geographical context of this journal paper is China, it is not believed to be relevant to the South George planning area.**

The following letter and handwritten comments (made on pages of the DEIS) are attached for reference to this Appendix. These handwritten comments were not typed into this table but they are referenced by page number on which they were written. Please see the attached copy of the letter we received to read the actual comments that were made.

Letter #13	
Karen Coulter– Postmarked 04/09/12 Blue Mountain Biodiversity Project, (BMBP) League of Wilderness Defenders	
Comment Number	**Comment and Forest Service Response**
<u>SOILS SECTION – PAGES S-16 and 3-6 to 3-14</u> **Comments that reflect general statements or opposition in this section have been noted.**	
pages 3-6 and 3-7	**<u>Response:</u>** **In reference to stated concern on low detrimental soil conditions (DEIS 3-6). Proposed logging systems will have the least potential impact for further cumulative soil impacts. The detrimental soil conditions considered for each unit individually. The low detrimental soil condition can be a reflection of soil resilience to past impacts, recovery of previous impacts or previous harvest was low impact. (See Appendix E, Tables E-5, E-6, And E-7).**
page 3-7	**<u>Response:</u>** **Scenic integrity was not a consideration for calculation of detrimental soil disturbance. The determination of soil detrimental conditions is based on physical change and /or soil heat alteration.**
page 3-8	**<u>Response:</u>** **In reference to your multiple comments that 20% maximum soil detrimental conditions should be applied to the whole area and not to just the sale unit area. The scope of area for determination of soil impacts is based on FSM 2520.3, Supplement 50, 6/87 (Forest Plan p. 4-80 – an example of an activity unit are: a timber sale cutting unit, a grazing allotment pasture, a site preparation or slash disposal project or similar area). The determination of detrimental soil impacts is to be based on activity acres from the proposed activity.**
page 3-9	**<u>Response:</u>** **In reference to your request for the requested literature used to determine detrimental soil conditions. All of the mentioned topics are encompassed by FSM 2520.3, Supplement 50, 6/87. In addition each of the mentioned topics are research related to the comments is as follows:** **<20% increase in soil bulk density and < 15% increase in bulk density in other forest soils**

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Comment Number	**Comment and Forest Service Response**
	Dickerson, B.P. Soil Compaction after tree-length skidding in northern Mississippi. Soil Science Society American Journal. 40: 965-966; 1976 **Froelich, H.A. The effect of soil compaction by logging on forest productivity. Final report to U.S. Bureau of Land Management for contact 53500-CT4-5 (N) Corvallis, OR: Oregon State University, School of Forestry; 1976A** **Steinbrenner, E.C. and Gessel, S.P. The effect of tractor logging on physical properties of some forest soils in southwestern Washington. Soil Science American Proc. 19:372-376; 1955** **Johnson M.G. and Beschta, R.L. Logging, infiltration capacity and surface erodibility in western Oregon. Journal of Forestry 78: 334-337; 1980** **Tackle, D. Infiltration in a western larch-Douglas-fir stand following cutting and slash treatment. Res. Note No. 89 (Place of publication unknown) U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station; 1962**
page 3-9	**Response:** **In response to your question related to activity area. See response to page 3-8.**
page 3-10	**Response:** **In response to your question on methodology used to determine detrimental soil conditions. See response to page 3-8.**
page 3-10	**Response:** **In response to your question on subsoiling being calculated into detrimental soil conditions. As it relates to detrimental soil conditions, subsoiling is calculated in the removal of temporary created features (roads, and landings). Subsoiling is considered a recovery of both legacy and newly created compacted soil. Therefore it is calculated in the cumulative effects of detrimental soil conditions.**
page 3-13	**Response:** **In response to your comment of past logging impacts and detrimental impacts. Please see soils report information in Appendix E of the DEIS.** **Subsoiling is being calculated into detrimental soil conditions.**
page 3-14	**Response:** **In response to your comment of soil mitigations. These mitigations are incorporated into design features (Chapter 2, Table 2-5, pages 2-21 to 2-22) that will be incorporated into contractual features of the timber sale.** **See response to page 13.**

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Comment Number	**Comment and Forest Service Response**
HYDROLOGY SECTION – LETTER and PAGES S-17, and 3-14 to 3-32 **Comments that reflect general statements or opposition in this section have been noted.**	
Letter page 2	**Response:** **In reference to your opposition to stream crossings for timber removal – see DEIS, Chapter 2, Table 2-5, pages 2-19 to 2-20. All Class 1-4 streams will have PACFISH interim buffers, there are no vehicle crossings. Skyline corridors will cross an unnamed tributary to George Creek for RHCA fuels treatments, with mitigations as described in the above mentioned table.** **In reference to your opposition of allowed sedimentation of streams - All proposed actions have prescribed design criteria to eliminate, minimize, or mitigate sediment movement into surface waters. See DEIS, Chapter 2, Table 2-5, pages 2-19 to 2-20, and see the effects analysis, DEIS, Chapter 3, pages 3-23 to 3-25.**
page S-17	**Response:** **With regards to Equivalent Treatment Acre Model - See DEIS, Chapter 3, pages 3-18 to 3- 27 for a discussion of the risk of effects and the literature on which the conclusions are based.**
page 3-20	**Response:** **With regards to the Broken sentences:** **Thank you for calling this to our attention. We have corrected this in the Final EIS.**
pages 3-21 and 3-23	**Response:** **With regards to Questions about the specifics of the RHCA treatment – See Alternative B project description, Chapter 2, pages 2-17 to 18; Chapter 3, Fuels effects analysis (DEIS, Chapter 3, page 3-91). This replaces the Draft EIS reference to the Fuels Specialist report on page 3-21.**
page 3-22 and 3-26	**Response:** **With regards to comments regarding water temperature effects of RHCA treatments - See DEIS, Chapter 2, page 2-17, and Chapter 3 page 3-22, shade will not be reduced below ecological potential, low risk of temperature effects transmitting downstream or to a measureable increase in water temperature of George Creek.**
pages 3-23 and 3-24	**Response:** **With regards to effects of danger tree removal - See discussion of potential effects of danger tree felling in RHCAs (DEIS, Chapter 3, page 3-23 and 3-24). Danger trees will not be removed from RHCAs. Undisturbed ground between stream channels and**

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Comment Number	**Comment and Forest Service Response**
	danger tree removal area will prevent sedimentation from reaching those channels. There are a few, un-quantified, perennial stream crossings on haul routes. All of the perennial streams crossed by haul routes have very low flows during the summer season when water temperature could be affected by felling of danger trees." **Also see finding of consistency on pages 3-31 to 3-32.**
page 3-23	**<u>Response:</u>** **With regards to culvert removal sites, how protected into the future? – See project description for protection in the DEIS, Chapter 2, page 2-16, and water quality protection described in Chapter 3 on pages 3-23 and 3-24.**
page 3-25	**<u>Response:</u>** **With regards to your opposition to skyline yarding due to erosion channels from bottom to top - See DEIS, Chapter 3, page 3-25 for discussion of erosion control and effects of erosion in skyline corridors.**
pages 3-26 and 3-27	**<u>Response:</u>** **With regards to your comment on cumulative effects - See DEIS, Chapter 3, page 3-20 for a description on how cumulative effects were analyzed and on pages 3-26 to 3-27 for discussion of cumulative effects.**
page 3-27	**<u>Response:</u>** **With regards to your comment on water yield analysis - See DEIS, Chapter 3, pages 3-18 to 3- 27 for a discussion of the risk of effects and the literature on which the conclusions are based.**
page 3-29	**<u>Response:</u>** **With regards to hydrologic function. Hydrologic function and condition would improve over the existing condition and over Alternatives B and D as road and trail decommissioning was accomplished (DEIS, Chapter 3, page 3-29).** **Negligible is defined in Macmillan dictionary as: so small as to be meaningless; insignificant; not worth considering.**
page 3-32	**<u>Response:</u>** **With regards to your comment on statements of compliance - See DEIS, Chapter 3, pages 3-21 to 3-31 for hydrologic effects analysis, this develops the information used in the compliance conclusions.**

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Comment Number	**Comment and Forest Service Response**
AQUATIC TES SPECIES – PAGES 3-32 to 3-46 **Comments that reflect general statements or opposition in this section have been noted.**	
page S-17	**Response:** **See DEIS, Chapter 3, pages 3-38 to 3-39 for environmental consequences to Snake River Steelhead**
page 3-32	**Response:** **Effects to TES species and biological determinations are disclosed in the DEIS, Chapter 3, page 3-38 to 3-46.** **These streams still contain anadromous fish located off Forest.** **Forest Service managed lands in the "project planning area" are above natural fish passage barriers for adult anadromous salmonids. Habitat present is in near natural condition.** **We agree that this information is key to judging the potential effects of the proposed project.**
page 3-35	**Response:** **Forest Service Hankin & Reeves Level II survey protocols are designed/modeled to establish in-stream and riparian habitat conditions. Part of the survey is to observe/key aquatic wildlife. These surveys were conducted in the project area.** **Northern Leopard Frogs are in the "watershed" much lower, downstream outside the "project planning" area. This frog species prefers marshier habitat than step pools present in these high gradient, deep V streams. They were not observed in any of the surveys.** **The habitat preference for these species (No Impact determination) is present within the planning area but disturbances in the planning units do not overlap. (See Aquatic BE for preferences).** **Yes, the LWD is greater than 20' long. In 1993 and 2001 wood protocol must be >20' x >12" touching the water to be counted as LWD. Surveys conducted today would require LWD be at least 12" and twice bank full width.**

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Comment Number	**Comment and Forest Service Response**
	In reference to Table 3-14, PACFISH RMO pools per mile vary by channel width, greater number of pools would be found in step pool gradients verses slow moving meander water that would have fewer. LWD on the Eastside of the Cascades is at least 20 pieces per/mile of again based upon channel widths. Percent Fines should be <25%. **Historically there have been some sediment problems. Restoration projects (seeding/planting), road obliteration, riparian no cut buffers, and cattle removal, in place since 1993 have allowed the watershed to heal. One survey of daily temperature recording exceeded today's standards. Historically HOBO's (water monitoring system) in place monitoring the watershed have exceeded todays, seven day maximum temperature requirements, however these standards were changed and lowered to meet those for bull trout at 60.8 degrees Fahrenheit or 16 degrees Celsius (See Hydrologist Specialist Report). A HOBO was again placed in George Creek near the boundary in 2011, pre-project implementation monitoring. The 2011 data indicates 57 degrees Fahrenheit was the seven day maximum temperature, which is well below standards.**
page 3-37	**<u>Response:</u>** **Redband are native rainbow trout above known fish passage barriers that have been unaffected by hatchery productions. Resident fish may migrate downstream but not return due to a barrier (falls etc.). Steelhead are the anadromous life cycle form of rainbow trout. Redband by definition cannot be confirmed as not having some hatchery origins in these watersheds. However, those introductions were more than 20 years ago. This has been a scientific community determination.** **See response to Comment TLC-23c regarding Engelmann Spruce.**
page 3-38	**<u>Response:</u>** **Steelhead habitat is located two miles downstream from the project location and in a tributary subshed. Dry channel and subterranean flows occur between the project site and steelhead habitat. Project was reviewed on site by both NOAA and USFWS fish biologists for concurrence. A "Not likely to Affect" determination was made separately for these riparian units.** **There is no quantification of potential sediment increases because with 300 foot "no-cut" buffers, our instrumentation cannot pick up increases so small over background levels. This is the rationale for using the buffering established by the regulatory agencies in PACFISH/INFISH based upon scientific literature. Following these guidelines protects aquatic species and their habitat.**

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Comment Number	**Comment and Forest Service Response**
page 3-39	**<u>Response:</u>** **See response to above comment from page 3-38 regarding Steelhead.** **PACFISH requires buffering of 150 feet in key watersheds on intermittent stream channels (DEIS, Chapter 2, Table 2-5, pages 2-19 to 2-21).** **Steelhead habitat is located two miles downstream from the project location and in a tributary subshed. Dry channel and subterranean flows occur between the project site and steelhead habitat. Project was reviewed on site by both NOAA and USFWS fish biologists for concurrence. A "Not likely to Affect" determination was made separately for these riparian units.** **The approximately 25 acres of RHCA treatment was analyzed separately under ARBO Category 13, see DEIS, Appendix F, page F-13.** **To date several million dollars has been spent on mitigation with funding for restoration in the watershed. In the next three years several hundred thousand dollars of programed restoration money will be spent in these watersheds the IMW (Intensively Monitored Watershed) program. This is a 10 year assessment of project monitoring. No reason to believe these dedicated folks will discontinue the programs. (See Aquatic BE, pages 17 - 20).**
page 3-40	**<u>Response:</u>** **Analysis of effects is acknowledging Redband presence even though they may not be present. Worst case scenario was used. Determinations made was a may impact, acknowledging potential impacts in the short term if the species was present. Cattle are seasonal and green-up does occur. Terms and Conditions restrictions on Pomeroy Range District require permittees to remove any offending cattle from the RHCAs. If found twice they are removed from the pasture. Separate consultation was initiated, disclosed and concluded with the regulatory agencies with this potential interaction impact. Regulatory agencies toured the site locations in 2010.** **Regarding Bull Trout, the reader assumes incorrectly. The Bull Trout individual was actually found several miles downstream from National Forest lands, well outside the project planning area. A second Bull Trout was found in 2010, after several thousand rainbow/steelhead were sampled. Again as stated, the migratory nature of Bull Trout.**
pages 3-40 and	**<u>Response:</u>** **Bull Trout critical habitat designations are from a historic perspective and recommended for inclusion by this Biologist. Unfortunately years of dry channel near**

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3-41	**the mouth of George creek exceeding over one mile in late summer has probably extirpated this adfluvial subpopulation. Restoration work completed and that in progress hopefully will see the return of bull trout to this watershed as it has for steelhead.** **Indirect effects to Bull Trout from project activities are minimal because of the distance and location to potential to spawning fish and their habitat.** **If Bull Trout were able to access the headwaters the same assumptions for redband would be concluded. The BE determination was May Affect Not Likely to Adversely Affect (because of minimal indirect affects language). Consultation with the Regulatory Agencies has concurred.** **Yes,there is a connection between WDFW lands and the subwateshed and project. The rest of the subwatershed is in WDFW management below the National Forest boundaries. This ground has a closed riparian road/trail system that allow for access and restoration activities…** **Also see responses to Comments on page 40.**
page 3-42	**<u>Response:</u>** **Pomeroy Ranger District has deployed a number of ISCO sediment samplers within Asotin watershed including South Fork Asotin. These samplers have semi-continuous records dating back to the 1970's. This information is being incorporated into the IMW study being conducted by Ecological Solutions based at Logan Utah, and associated with Utah State. Also see response to Comments on page 3-38.** **Reader assumes incorrectly. The Bull Trout individual was actually found several miles downstream from National Forest lands, well outside the project planning area. A second Bull Trout was found in 2010, after several thousand rainbow/steelhead were sampled. Again as stated, the migratory nature of Bull Trout. So there is no direct contradiction.** **The same impacts noted to Redband would be mitigated by long term beneficial effects for all aquatic species including Bull Trout. Since the species is "not" present in the project, individuals would not be adversely affected and long term habitat improvements can be attained.** **Margined Sculpin - USFS conducts habitat surveys and notes presence/absence. The State, WDFW conducts population studies, and their conclusion is Margined Sculpin were present in significant numbers. The species presence is also an indicator of cold**

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	clean water, although the Forest Service does not use them as an MIS species. **Also see response to Comments on page 3-40.**
page 3-43	**<u>Response:</u>** **Direct, indirect and cumulative effects to margined sculpin are disclosed on this page in Chapter 3 of the DEIS.** **To date several million dollars has been spent on mitigation with funding for restoration in the watershed. In the next three years several hundred thousand dollars of programed restoration money will be spent in these watersheds the IMW (Intensively Monitored Watershed) program. This is a 10 year assessment of project monitoring. No reason to believe these dedicated folks will discontinue the programs. (See Aquatic BE, pages 17 - 20).**
page 3-44 and 3-45	**<u>Response:</u>** **See response to Comment on page 3-38.** **Habitat for butterflies only exists on edge of the project planning area and not within any units. Host plants for great basin fritillary is violet plants (Aquatic BE, pages 36 to 39).** **Based on the species (Northern Leopard Frog) the habitat is not considered present in the project area. There is no indication these frogs are present in Asotin, Garfield and Columbia Counties, WA (Aquatic BE, page 69).**
3-46	**<u>Response:</u>** Regarding how is the project consistent with ESA listed fish recovery plans? ***Reference: Summary Snake River Salmon Recovery Plan for SE Washington June 2005; prepared by Snake River Salmon Recovery Board for the Washington Governor's Salmon Recovery Office.*** **References in the *Snake River Salmon Recovery Plan for SE Washington* that support analysis and conclusions for consistency of the riparian area treatments in Units 1 and 2 for ESA listed fish recovery plans:** • **p. 1 last paragraph …"a plan…that addresses limiting factors"** • **p. 23 Table 8 Primary and Secondary Limiting Factors for Streams and Subbasins within the Snake River Recovery Region:** **Asotin Creek, George Creek; column four Primary Factors include Habitat diversity**

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	• **p. 41 Table 11 "Priority Protection and Restoration Areas…" "Lower George Creek restoration and protection"** • **p. 42 last paragraph "These are the habitat factors for which more data must be collected in the early phases of the recovery plans to ensure that projects and actions are targeted correctly and that fish productivity will improve".** • **p. 45 Habitat actions are described Table 13 Riparian Function Improve riparian areas** • **p. 48 Table 14 objectives for George Creek are described** • **p. 53 section 7.5 "actions proposed in this recovery plan are expected to increase abundance, productivity, and diversity of listed populations of spring/summer Chinook and steelhead in the recovery region. The projected increases would be the result of habitat protection and restoration actions…"** **A recovery plan is a broad planning document. The South George Vegetation and Fuels Management Project is a site specific project. The objectives of the fuels treatments in Units 1 and 2 are stated in the Aquatic Restoration Biological Opinion (ARBO) notification:** • **"The goal of this project is to reduce probability of crown fire initiation by treating ladder fuels, and to reduce crown fire spread by using treatments to disrupt canopy continuity in dry forest RHCAs."** • **"Historical fire suppression created an absence of fire in dry forest, and allowed shade tolerant understory trees to establish. The result is a change in forest plant composition in the Asotin watershed. "** **The benefits of these habitat actions are described in the ARBO notification:** • **"Benefits include maintenance of large wood to streams and reduced potential of catastrophic fire. The treatment should maintain the function of the riparian area. Objectives include restoration of desired levels of stream shade, bank stability, soil erosion and stream turbidity, stream nutrients, and large wood inputs."** **The treatments planned in Units 1 and 2 are designed to improve function in the riparian areas, and are therefore consistent with the *Snake River Salmon Recovery Plan for SE Washington.* Improved riparian function contributes to other riparian values such as large woody debris and instream habitat. In addition, projects that are planned and are consistent with Aquatic Restoration Biological Opinion also fulfill our requirements for consultation under the Magnuson-Stevens Act (ARBO p. 1)** **See DEIS, Appendix F.**

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VEGETATION– LETTER and PAGES S-14, S-15, and 3-46 to 3-75 and other pages as listed **Comments that reflect general statements or opposition in this section have been noted.**	
pages S-14	**MOIST FOREST COMMENTS** **Response:** **The purpose and need for this project is to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). These forest attributes (structure, composition, density) relate to important forest processes, including wildfire, insects, and diseases.** **Four sections of the DEIS describe proposed vegetation management activities for the South George project area: Chapter 1 (Purpose and Need) provides the ecological rationale for the proposed activities; Chapter 2 (Alternatives) describes the activities in detail, and how they would be implemented (including varying implementation amounts, by alternative) in order to move forest structure, species composition, and stand density toward their historical ranges of variability; Chapter 3 (Affected Environment and Environmental Consequences) describes how much of the planning area would be affected by the proposed activities, and the environmental effects expected from implementation of the activities; and Appendix J (NFMA Analysis; Existing and Historical Vegetation) provides a landscape-scale context by characterizing historical and existing vegetation conditions for the entire 21,000-acre planning area.** **The logic track for the South George vegetation analysis is this: Appendix J provides an overall context by examining existing conditions for the entire planning area, and how they compare with historical conditions – results from this comparison analysis are reported as findings; Chapter 1 uses findings from the landscape-scale analysis (App. J) to identify the purpose of, and need for, a South George Vegetation and Fuels Management Project; Chapter 2 describes the proposed actions in detail; and Chapter 3 discloses how much of the South George planning area would be affected by management activities, and how implementation of the proposed activities would affect the South George environment. [S-14]** **Fire regime condition class (FRCC) is a methodology developed for analyzing how current conditions have departed from reference conditions. FRCC is a methodology utilizing similar concepts to those used with the range of variation technique (HRV). Condition class 1 represents fire regimes that are within their historical range and, as such, their vegetation attributes are intact and functioning properly (Schmidt et al.**

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	2002). **The condition class 1 condition has also been termed the "ecosystem maintenance stage" (Zimmerman 2003) because existing conditions have departed by no more than 33% from reference conditions. When ecosystems have departed between 33 and 67% from reference conditions, then they exist in what is termed the "ecosystem alteration stage" (Zimmerman 2003). These condition class 2 areas represent a low to moderate amount of restoration need. When ecosystems have departed by more than 67% from reference conditions (this is condition class 3), they exist in the "ecosystem degradation stage" and represent a high level of restoration need.**
3-48	**Since nearly 100% of the planning area is in condition class 2 or 3 (Table 3-47 on page 3-80 of the DEIS), showing that current conditions have departed to a moderate (class 2) or high (class 3) extent from historical reference conditions, the planning area obviously has a high amount of restoration need. Since the majority of the project area is identified as moist forest, then it is not surprising that the majority of the class 2 acreage is also in moist forest (see Table 3-51 on page 3-88 in DEIS). Using vegetation treatments to modify the moist-forest class 2 areas so they are not departed from reference conditions after project implementation (i.e., moving moist-forest class 2 acreage back to class 1) would reduce the existing fire risk associated with moist forests. This fire-risk reduction need was included in the purpose and need for the South George project (Chapter 1 of DEIS). [3-48]**
3-49 letter-page 2	**The historical range of variability (HRV) was used as an analytical technique for evaluating whether existing forest vegetation components (composition, structure, density) have departed from their historical ranges and, if so, by how much. Utilizing the HRV technique also allowed us to explicitly incorporate some aspects of uncertainty into our analysis process. Here is an example from Chapter 1 in the DEIS: forest ecosystems are recognized as being complex, and one reason for using the HRV technique is to explicitly acknowledge that ecosystems experienced a range of conditions across which processes are resilient and self-sustaining. Evaluating forest structure by using ranges (15-55% of dry forest in the OFSS structural stage, for example) is a much more ecologically appropriate strategy for incorporating uncertainty than would be obtained by comparing existing conditions against a single numerical value (such as the mid-point value of 35% for dry-forest OFSS, for example). [Letter, and 3-49]** **Why wouldn't implementation of the silvicultural activities associated with alternatives B/C result in more of the forest cover types moving within their historical ranges? Basically, this outcome is related to two factors: 1. A relatively low proportion of area (acreage) is being treated, which limits the**

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	opportunity to change under- or over-represented forest cover types. Alternatives B/C only affect 25% of the forested portion of the planning area, and only 28% of the forest vegetation affected environment (see Table 2-2 in the South George Silviculture Specialist Report, which is incorporated by reference in the DEIS – see page 3-47 in DEIS).
3-57	**2. Proposed silvicultural activity units cannot generally address every indicator simultaneously. Very few individual units address all three of the forest vegetation indicators (composition, structure, density) concurrently, so certain activity units directed toward one indicator (composition) may have a neutral or negative effect on another indicator (structure or density), depending on a unit's suitability for addressing indicators, and on priority setting between units. [3-57]**
3-132	**Moist forest is targeted for thinning or other vegetation management activities when implementing them would move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). HRV is used to assess whether existing conditions depart from reference conditions and, if so, by how much and in which direction (by determining if existing conditions are above, within, or below the range of variation). Multi-layered old forest (OFMS) is included in the forest structure HRV assessment, so proposed vegetation treatments could be directed toward restoration of historically appropriate levels of this structural stage if existing OFMS conditions depart from reference conditions for one or more of the upland forest biophysical environments present in the South George planning area. [3-132]**
page 3-37 and 3-38	**<u>COLD FOREST COMMENTS</u>** **<u>Response:</u>** **Higher-elevation forest is targeted for vegetation management activities when implementing them would move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). HRV is used to assess whether existing conditions depart from reference conditions and, if so, by how much and in which direction (by determining if existing conditions are above, within, or below the range of variation). Engelmann spruce and subalpine fir is included in the species composition HRV assessment (as the "spruce-fir" type), so proposed vegetation treatments could be directed toward restoration of historically appropriate levels of this forest cover type if existing spruce-fir conditions depart from reference conditions for one or more of the upland forest biophysical environments present in the South George planning area.** **It is not a project objective to kill naturally occurring Engelmann spruce and subalpine fir at high elevations unless the HRV analysis determines that the existing**

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	level of spruce-fir cover type is uncharacteristically high (above HRV), or if retention of spruce and fir, as individual species in a broader mixed-conifer type, are incompatible with certain project objectives such as provision of early-seral stands (because spruce and fir are late-seral species, retaining a large proportion of them in a mixed stand might not be appropriate for an early-seral composition objective, but would obviously be ideal for a late-seral composition objective).
pages letter page 2	**DENSITY COMMENTS** **Response:** **The stand density metrics used for forest vegetation treatments are based on an ecological approach where residual tree density levels reflect not only the requirements of the species involved, but also the ecological site potential as represented by plant associations (Cochran et al. 1994, Powell 1999). The approach of basing suggested stocking levels on tree species, as has been traditionally done for decades, but varying any species-specific stocking levels by plant association (Cochran et al. 1994, Powell 1999) has not been adopted for any geographical area other than the Blue Mountains in North America. [Letter]**
3-51	**Historical ranges for tree density were taken from a Forest Service white paper, and they were based on "a variety of published and unpublished sources" (Schmitt and Powell 2008). In order to compile historical ranges of variability for nine insects or diseases (or groups) in the context of their Blue Mountain habitats, it was necessary to prepare historical ranges for species composition, forest structural stage, forest canopy layering, and stand density (previously, only forest structural stage ranges had been available because they were required for implementing the Eastside Screens amendment to the Forest Plan). [3-51 (10)]**
S-14	**Why wouldn't implementation of the silvicultural activities associated with alternatives B/C result in more of the tree density classes moving within their historical ranges? Basically, this outcome is related to two factors:** **1. A relatively low proportion of area (acreage) is being treated, which limits the opportunity to change under- or over-represented density classes. Alternatives B/C only affect 25% of the forested portion of the planning area, and only 28% of the forest vegetation affected environment (Silviculturist Report, page 18, Table 2-2).** **2. Proposed silvicultural activity units cannot generally address every indicator simultaneously. Very few individual units address all three of the forest vegetation indicators (composition, structure, density) concurrently, so certain activity units directed toward one indicator (composition) may have a neutral or negative effect on another indicator (structure or density), depending on a unit's suitability for addressing indicators, and on priority setting between units. [S-14, S-14]**

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3-54	**Tree density can be characterized in different ways depending on management objectives, or on the issue, concern, or need being addressed. Tree density classes (high, moderate, low) are determined separately from canopy-biomass classes (referred to as crown fire potential in Chapter 3 of the DEIS). Tree density classes represent stocking levels indexed to important stand development thresholds or benchmarks (such as the "lower limit of the self-thinning zone" and "lower limit of full site occupancy") and expressed by using metrics such as stand density index (SDI) or basal area per acre (Powell 1999), whereas the canopy-biomass classes are indexed to specific levels of canopy bulk density, and they are expressed as kg/m^3 of canopy foliage (Agee 1996, Powell 2010). This means that it is entirely possible for a planning area to be within HRV when evaluating existing conditions by using tree-density classes expressed as SDI, but not within HRV when assessing crown-fire potential by using classes of canopy bulk density. [3-54]**
3-60	**The purpose and need for this project is to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). These forest attributes (structure, composition, density) relate to important forest processes, including wildfire, insects, and diseases. HRV is used to assess whether existing conditions depart from reference conditions and, if so, by how much and in which direction (by determining if existing conditions are above, within, or below the range of variation). Tree density is only one of the upland vegetation components analyzed by using an HRV assessment, so proposed vegetation treatments could be directed toward restoration of historically appropriate levels of tree density, or they could be directed toward addressing a species composition or forest structure need. We disagree with a position that this project focuses its purpose and need on tree density, particularly if this comment suggests that tree density had a higher priority than either composition or structure. We believe that a careful review of Chapter 3 in the DEIS reveals that all three vegetation components (composition, structure, density) received equal and balanced consideration, and that one of them was not emphasized to a greater or lesser extent than the others. [3-60]**
3-126	**Full stocking is defined as a stocking threshold where sufficient inter-tree competition is occurring to result in crown-class differentiation, which is a developmental process where single-cohort stands, whether of single or multiple species, differentiates into crown classes (e.g., dominant, codominant, intermediate, subcanopy classes). Full stocking is above the lower limit of the self-thinning zone, so density is high enough for trees in dominant canopy positions to kill trees in subordinate canopy positions. Full stocking is one threshold or benchmark that can effectively be used as a measure of potential density. In fact, the suggested stocking levels guide for the Umatilla NF uses full stocking as the reference level, which fills a similar conceptual role to "potential**

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	density" (Powell 1999). The Umatilla NF stocking guide provides the basal area per acre values associated with the upper and lower limits of a management zone – the management zone is established by using specific percentages of the full stocking threshold value, except for lodgepole and ponderosa pines whose management zone is established by using a different process accounting for mountain pine beetle susceptibility (Powell 1999). [3-126]
pages letter pages 2-4	**<u>INSECT AND DISEASE SUSCEPTIBILITY COMMENTS</u>** **<u>Response:</u>** **The insect and disease susceptibility section of the DEIS, page 3-70, states that "Having an ecologically appropriate representation of insect and disease susceptibility well distributed throughout the South George planning area is a desired future condition for forest vegetation." This statement acknowledges that insects and diseases are an important component of ecosystem function. Insect and disease susceptibility also occurs within characteristic levels that are closely related to forest structure, species composition, and stand density because these components provide habitat for insect and disease organisms. This means that when structure, composition, or density occurs at uncharacteristic levels (either above or below their historical ranges of variability), then uncharacteristic levels of insect or disease activity would also be expected. No aspect of the South George project's purpose and need, or its proposed action, is designed to reduce insect and disease susceptibility to levels below what is considered characteristic for native insects and diseases of the planning area.** **The two insects/diseases of special concern for the planning area, in terms of uncharacteristically high levels of susceptibility, are fir engraver and defoliating insects (budworm/tussock moth); see table 3-42 in DEIS. But the silviculture specialist report (the South George Silviculture Specialist Report is incorporated by reference in the DEIS – see page 3-46 in DEIS) provides a detailed analysis of insects and diseases for the planning area (see pages 88-104). These 17 pages of the specialist report provide an analysis of recent insect and disease activity for the planning area (including summaries of annual area affected by four categories of insects for the time period of 1990 to 2008), a detailed analysis of existing insect and disease susceptibility for 6 agents, and an HRV analysis of susceptibility for the same 6 agents in order to put existing susceptibility into an ecological context – is existing susceptibility, as categorized by using low, moderate, and high classes, higher or lower than what would be expected if vegetation components (composition, structure, density) were all occurring within their historical ranges? The silviculture specialist report also describes how the 9 insect and disease agents included in Schmitt and Powell (2005) were winnowed to just the 6 used for the South George analysis.**

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	The HRV analysis for insect and disease susceptibility, as found on pages 91-97 of the silviculture specialist report, clearly shows whether each of the susceptibility classes (high, moderate, low) is within, above, or below the historical range, and it does so for each of the six insect or disease agents individually. Results of this analysis in the specialist report formed the basis for bringing 2 agents forward into the DEIS – fir engraver (a bark beetle species), and defoliating insects. The susceptibility analysis is viewed as crucial for understanding insect & disease hazard (or vulnerability) because it uses the HRV analytical technique to answer the "so what" questions about insect or disease risk – is existing susceptibility more or less than what would have been expected historically, and what do existing susceptibility levels bode for the future (e.g., possible future trends)?
3-70	**We agree that insects and diseases are integral ecosystem components, and that they provide a wealth of crucial ecosystem services that provide not only wildlife habitat, but also contribute to ecosystem function and productivity (nutrient cycling, mediators of decomposition processes, etc.). The premise of the South George analysis is that just like forest attributes (composition, structure, density), insect and disease susceptibility historically occurred within characteristic levels, and that an HRV analysis, as was completed for the South George DEIS, can be used to determine if existing susceptibility levels are above, within, or below the historical levels. [All three Letter comments]** **As stated above, insect and disease susceptibility is closely related to forest structure, species composition, and stand density because these vegetation components provide habitat for insect and disease organisms. Since the "building blocks" of insect and disease susceptibility – species composition, forest structural stage, canopy layering (which is closely related to structural stages), and tree density – are all represented by the existing upland-forest vegetation indicators (composition, structure, density), then there was no need to include susceptibility as a direct indicator because doing so would have introduced needless redundancy into the analysis. However, for the two organisms with especially high susceptibility levels in the planning area (fir engraver, defoliating insects), an abbreviated analysis was included in the DEIS (see Table 3-42 on page 3-71 in DEIS). [3-70]** **The Schmitt and Powell (2005) protocol for calculating existing susceptibility classes (high, moderate, low) is based on existing vegetation attributes only, so there is no distinction between "dry ponderosa pine vs. moist mixed conifer." This differs from both previous versions of the susceptibility protocol (1994, 2002) because they included potential vegetation type (as represented by ecoclass codes) as a rating variable. Potential vegetation type was dropped as a rating factor because existing vegetation characteristics better describe near-term insect and disease susceptibility, and existing**

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	vegetation is described well by using host species and canopy composition, both of which are included as rating factors. Potential vegetation type is better used in the HRV context (Schmitt and Powell 2008) because it accounts for the fact that differing amounts of susceptibility would be expected, for the same insect or disease organism, from one biophysical environment to another. The applicability of the Schmitt and Powell (2005) protocol to the South George analysis is described in the Insects and Diseases section of the South George Silviculture Specialist Report, pages 88 to 104. [3-70]
pages 3-49 3-101	<u>DRY FORESTS COMMENTS</u> **<u>Response:</u>** **The entire South George planning area (approximately 21,000 acres) is characterized in a vegetation database compiled by using a variety of analytical processes (as described in Justice 2009b). Each of the vegetation polygons is associated with a potential vegetation type (PVT), which is defined as a plant association, plant community type, or plant community (Powell et al. 2007). PVTs are coded in the database by recording a 6-digit ecoclass code. Each of the PVTs in the Blue Mountains (approximately 507 types have been described thus far) has been assigned to one, and only one, plant association group (PAG) and potential vegetation group (PVG), which are two of the potential vegetation hierarchical levels established for the Blue Mountains by using an ecological temperature-moisture classification framework (Powell et al. 2007). This means that a Douglas-fir stand would be assigned to the Dry upland forest PVG if it occurred on the grand fir/elk sedge PVT (ecoclass code = CWG111), or to the Moist upland forest PVG if it occurred on the grand fir/big huckleberry PVT (ecoclass code = CWS211). [Note that in both examples, Douglas-fir is occurring as a mid-seral species on PVTs where the climax or PNC (potential natural community) would be dominated by grand fir, not by Douglas-fir.] For both situations, the forest cover type is the same (Douglas-fir), so the Dry vs. Moist assignment would be based solely on its PVT code. Knowing the PVT code for a polygon tells us if it is "naturally" dry or moist or cold. [3-49].** **The genetic characteristics of a plant species allow it to be adapted to a specific range of environmental conditions, which is called its ecological amplitude (Daubenmire 1968). Ecological amplitude controls how a plant species interacts with physical or abiotic site factors such as altitude (elevation), aspect, geology, and soil type. Together these factors create the underlying foundation, a geomorphic template, upon which the biological landscape is constructed. The physical factors of a plant's environment interact to form a temperature and moisture regime influenced primarily by gradients of elevation, slope steepness and configuration, aspect, and geologic parent materials and their resulting soils. These site factors interact by complementing or counteracting**

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	each other, so any individual factor has limited influence by itself. Grand fir and Douglas-fir are two tree species with fairly wide ecological amplitude. Grand fir occurs on sites with a warm dry temperature-moisture regime, and also on cool moist, cold dry, cool dry, cool wet, cool very moist, warm very moist, and warm moist sites (Powell et al. 2007). Douglas-fir has similar amplitude. So when their amplitude allows grand fir or Douglas-fir to occur on warm dry sites, then they occur in the Dry Upland Forest PVG and they would be considered "dry." And when grand fir or Douglas-fir occur on cool moist sites, then they occur in the Moist Upland Forest PVG and they would be considered "moist" (Powell et al. 2007). [3-101]
pages letter page 5 3-99 3-101 3-102 3-129 3-132	**<u>OLD GROWTH and TREES > 21 INCHES DBH COMMENTS</u>** **<u>Response:</u>** **The project does include timber harvest (logging) in old forest when doing so would move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). Note, however, that timber harvest occurring in old forest does not change the status of those areas from old forest to a different structural stage that is not old forest. As described in the DEIS for alternatives B/C (page 3-58): "Although some of the existing old-forest stands (OFMS and OFSS) would be affected by proposed silvicultural activities in these alternatives, the overall amount of old forest is expected to increase after implementation because:** **(1) Only improvement cutting is proposed for existing old-forest stands, and the post-treatment structural stage remains old forest because improvement cutting does not remove large-diameter trees.** **(2) Improvement cutting is used to transform certain stands of stem exclusion or understory reinitiation to old forest when they have a sufficient number of large-diameter trees (10 or more per acre that are 21-inches or larger in diameter) to qualify as old forest after treatment." [Letter, and 3-101]** **The purpose and need for this project is to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). These forest attributes (structure, composition, density) relate to important forest processes, including wildfire, insects, and diseases. HRV is used to assess whether existing conditions depart from reference conditions and, if so, by how much and in which direction (by determining if existing conditions are above, within, or below the range of variation). Forest structure, including the old forest structural stages, is only one of the upland vegetation components analyzed by using an HRV assessment, so proposed vegetation treatments could be directed toward restoration of historically appropriate levels of old forest, or they could be directed toward addressing a species composition**

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	or tree density need. The purpose and need for this project is not focused exclusively on forest structure, and forest structure did not have a higher priority than either composition or structure, so the HRV results for any of the three vegetation components could have formed the basis for proposing timber harvest in old forest. Removing trees over 21" dbh in portions of the project area is permitted by the Forest Plan and its Eastside Screens amendment, as is described in appendix C of the DEIS (Consistency with Eastside Screens and National Forest Management Act). Until operational activities are completed following eventual NEPA approval of the South George project (such as tree designation in treatment units), it is unknown how many total trees greater than 21" dbh would be removed. [3-99, 3-101, 3-101, 3-102, 3-129, 3-132]
pages	**OTHER COMMENTS** **Response:** **Improvement cutting and low thinning are defined on page 2-9 in the DEIS. [Letter]**
3-49	**The HRV modeling involved 1,200-year simulations to include reasonable levels of temporal variation for the ecosystem characteristics being examined, as described in this quote from the Morgan and Parsons (2001) report: "To obtain the HRV estimates, we needed a reasonable starting point for simulations. To obtain the initial conditions, we ran the VDDT models with the probabilities estimated by the experts for 1200 (or more) simulated years with 1000 pixels. To obtain the HRV estimates, we then induced random variation around each of the probabilities. The latter was done to account for variation between years and across time. This was accomplished within VDDT by generating normally distributed random numbers and normalizing them to ensure that the overall average probabilities were those originally chosen by the experts (see next section). Where data were available this was scaled to represent the variation in fire frequency documented in fire history studies. The HRV estimates were summarized from the results of VDDT model runs for 300 years for each habitat type class." Historical evidence suitable for VDDT validation is available in several forms for the Umatilla NF, including a map prepared by spatial interpolation of General Land Office survey notes and pertaining to the period 1879-1887 (this map covers 1,500,515 acres located within the proclaimed boundary of the Umatilla NF) (Powell 2011), other historical vegetation mapping reaching back to the early 20th century (Powell 2009b), and fire history studies (Mehringer 1997, Powell 2009a). [3-49]**
3-53	**Projects that might occur more than 5 years from now are considered speculative or preliminary at this point, and they are not included in the Schedule of Proposed Actions for that reason. [3-53]**

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	The entire South George planning area (approximately 21,000 acres) is characterized in a vegetation database compiled by using a variety of analytical processes (as described in Justice 2009b). For polygons where previous activity or natural disturbance has occurred, the "cumulative impact" of an activity or process on upland-forest vegetation conditions is reflected by the current information available for the polygon. For example, if a polygon had been characterized as Douglas-fir cover type, old-forest multi-strata structural stage, and high tree density class before a regeneration timber harvest activity occurred in 1977, and the site subsequently developed after the treatment in such a way that it can now be characterized as ponderosa pine cover type, stem exclusion structural stage, and moderate tree density class (in 2009, when the most recent inventory was completed), then the current information (the 2009 data) reflects the "cumulative impact" of previous activities (harvest, planting, thinning, burning, etc.), along with normal successional processes, on existing vegetation conditions. The South George project considered the influence of previous impacts when past, present, and reasonably foreseeable actions were analyzed. Other cumulative impacts, as related to soils, hydrology, wildlife, fish, etc., are described in Chapter 3 of the DEIS. [3-53]
pages 3-71 to 3-75	**<u>CLIMATE CHANGE COMMENTS</u>** **<u>Response:</u>** **The commenter provided a series of comments relating to Chapter 3, page 3-71 of the DEIS in which she contended that the project scale is appropriate for conducting a climate change analysis and for examining carbon sequestration relationships. We disagree with this contention, and it runs counter to direction and counsel we receive from our Regional Office (RO). In fact, some of the language in the first paragraph of the climate change section on page 3-71 of the DEIS (which the commenter responded to) was taken verbatim from a guidance document prepared by the RO regarding climate change considerations and project-level NEPA (the document is entitled "Rationale for Project-Scale Effects Conclusions on Climate Change").** **Climate change is a very broad-scale issue, as exemplified by figure D1 in the South George Silviculture Specialist Report (see Appendix D, Climate Change and Carbon Accounting Analysis, in the report pages 111 to 130) showing that temperature and precipitation predictions compiled for the project planning effort had to be completed at the scale of Washington State (thus indicating that broad-scale predictions based on global-scale general circulation models have generally not been down-scaled in such a way that they could be fitted to the scale of an individual project). A similar situation exists for carbon sequestration – the "Carbon Assessment for the Pacific Northwest Region, USDA Forest Service" report states on page 17 that carbon sequestration is best assessed for the whole Region (Region 6 of the USFS) (Bennett et al. 2011).**

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	One comment (page 3-72) questioned the supposed efficacy of improvement "logging" as a treatment that could continue to support forest in the planning area in the future. As described in Chapter 3, Table 3-43 of the DEIS (pages 3-72 to 3-74), the Forest Service is concerned about the future sustainability of forest as a physiognomic class (rather than having forest transition to the shrub or herb physiognomic classes), and with the future resilience of old, large-diameter trees, if climate change creates a warmer and dryer future. If such an eventuality occurs, we are not advocating removal of the large old trees (because they might not be adapted to future climates that are quite different from climatic conditions when they became established), but two of the vegetation management activities (improvement cutting, low thinning) being proposed as understory treatments in old forest stands will effectively account for climate change and other stressors by removing enough of the smaller trees to improve the survivability of the large old trees. **One comment (page 3-72) questioned whether the climate change analysis properly disclosed scientific controversy. Our response is that it most certainly did! Much of the vegetation analysis relies on HRV, as an analytical technique, for evaluating whether existing forest vegetation components (composition, structure, density) have departed from their historical ranges and, if so, by how much. Use of HRV could be problematic as climate change unfolds in the future. This concern has been discussed in much recent scientific literature, as exemplified by this quote: "Climate change suggests that planning must not depend on expectations that the past will provide a template for the future. But if not the past, then what? For the present, no one seems to know. Like the often-quoted investment advice, it now seems that past performance is no guarantee of future results" (deBuys 2008). We agree with deBuys (2008) that at the present time, no one has come up with a viable alternative for HRV when considering climate change.** **Continuing with the HRV approach, however, may still be the best option, as described here from the "Climate Change and HRV" section in the South George Silviculture Specialist Report: "Some feel that HRV may no longer be a viable concept for managing lands in the future because of expected climate warming and increasing human activities across the landscape. Today's climates might change so rapidly and dramatically that future climates will no longer be similar to those climates that created past conditions. Climate warming is expected to trigger major changes in disturbance processes, plant and animal species dynamics, and hydrological responses to create new plant communities and alter landscapes that may be quite different from historical analogs" (Keane et al. 2009:1033-1034).** **"At first glance, it may seem obvious that using historical references may no longer be reasonable in this rapidly changing world. However, a critical evaluation of possible**

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	alternatives may indicate that HRV, with all its faults and limitations, might be the most viable approach for the near-term because it has the least amount of uncertainty" (Keane et al. 2009:1034), particularly as compared to the uncertainty associated with the magnitude, timing, scale, and spatial extent of climate change impacts. **"Given the uncertainties in predicting climatic responses to increasing CO2 and the ecological effects of this response, we feel that HRV time series derived from the past may have significantly lower uncertainty than any simulated predictions for the future. We suggest it may be prudent to wait until simulation technology has improved to include credible pattern and process interactions with regional climate dynamics and there has been significant model validation before we throw out the concept and application of HRV. In the meantime, it is doubtful that the use of HRV to guide management efforts will result in inappropriate activities considering the large genetic variation in most species and the robustness inherent in regional landscapes that display the broad range of conditions inherent in HRV projections" (Keane et al. 2009:1034). We agree with Keane and his colleagues that continued use of the HRV concept in the near term would result in inappropriate management activities.** **Other research perspectives continue to recognize the value of considering reference conditions, even in the context of a rapidly changing climate. "Historical reference conditions remain useful to guide management because forests were historically resilient to drought, insects, pathogens, and severe wildfire. Adaptation of reference information to future climates is logical: historical characteristics from lower, southerly, and drier sites may be increasingly relevant to higher, northerly, and currently wetter sites" (Fulé 2008). "The study of past forest change provides a necessary historical context for evaluating the outcome of human-induced climate change and biological invasions. Retrospective analyses based on fossil and genetic data greatly advance our understanding of tree colonization, adaptation, and extinction in response to past climatic change" (Petit et al. 2008).** **There are many comments (pages 3-72 to 3-74) related to information presented in Table 3-43, Chapter 3 of the DEIS. Several comments contend that timber harvest and post-harvest planting would reduce species diversity by increasing homogeneity of post-implementation stand composition, or by preferentially removing certain tree species to the detriment of overall diversity. The DEIS clearly states on page 3-75 that a very diverse mix of tree species will be planted after the regeneration treatments (five species are mentioned as being included in the planting mix, and other late-seral species are expected to establish on their own as natural regeneration). And Table 3-43 of the DEIS clearly states that we are not considering assisted migration or other adaptation strategies that would establish tree species in the South George planning**

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	area that are not native there now, such as western redcedar, a species that the Interior Columbia Basin Ecosystem Management Project showed with a very high probability of occurrence (75-100%) under a doubled carbon dioxide climate-change scenario for the Blue Mountains, including the South George planning area (Jensen et al. 1997). **Several comments (page 3-74) referred to existing precipitation and moisture conditions in the planning area and how they would tend to dampen any future effects of climate change, and that recent trends for the region have seen later snowpacks in spring and fewer fires. We strongly disagree with this contention, and the recent occurrence of two extremely large fires on the Pomeroy Ranger District (School fire in 2005 and the Columbia Complex fire in 2006) suggests that the trend is opposite to what the commenter suggests – fires are becoming more intense and cover much larger areas than they did historically (with historically being defined as the time period for which fire occurrence data is available in our digital fire atlas). And as described in the DEIS, much recent research suggests that insect outbreaks and wildfire are both predicted to occur at significantly higher levels in a warmer and dryer future than at present (Canadell and Raupach 2008, Kurz et al. 2008a, Westerling et al. 2006) (page 3-74 in DEIS).** **Several comments (page 3-75) claim that climate change is being used as justification for clearcutting (and other regeneration cutting), and as rationale for preferentially targeting removal of late-seral species that would be expected to be poorly adapted to warmer, dryer, and more open conditions in the future (should they occur). As described above in response to several other comments, the rationale for proposing vegetation management activities in the South George project is to move forest structure, species composition, and stand density toward their historical ranges of variability (DEIS, p. 1-4). And as stated in the DEIS on page 3-71, "climate change was not used as an issue during the NEPA process, and no indicators were established for comparing climate change effects between alternatives." The context of the DEIS climate change analysis, and the associated Specialist Report climate-change material from which it was excerpted, is "to assess whether silvicultural activities in the proposed action would be expected to maintain or enhance forest adaptation to the predicted effects of climate change." In other words, climate change was <u>not</u> used a reason for proposing vegetation management activities, but after they had been proposed for other reasons (primarily related to the HRV analyses of composition, structure, and density), the climate-change section of the DEIS examined their compatibility with certain principles and concepts of climate change mitigation and adaptation. Therefore, it is disingenuous to insinuate that the rationale for proposing regeneration cutting or any other upland-forest vegetation management treatment was based on climate change.**

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FUELS – LETTER and PAGES S-15 and 3-77 **Comments that reflect general statements or opposition in this section have been noted.**	
letter page 3	**Response:** **With regards to how much fire suppression has actually occurred within the project area or adjacent to it, and how successful has it been.** **Historical wildland fire data shows that very small acreages (less than 120 acres) have burned during the last 40 years in the South George planning area. In respect to fire return frequency, this means at least two fire return intervals have been missed in Fire Regime I and one in Fire Regime III. This absence of fire has resulted in increased surface fuel loads with high connectivity, and increased tree density and canopy layering. Increased canopy cover has led to regeneration of shade tolerant, fire intolerant species with low crown bases and heat-trapping foliage. These abundant small trees serve as ladders that carry fire from the forest floor to the canopy, increasing the likelihood of high severity, stand-replacement fires (Huff et al. 1995).** **Historically, fire was a dominant disturbance type in most forests in the Pacific Northwest. These fires kept stands from becoming overstocked and ground fuels from accumulating. In the late 1800's and early 1900's settlers began moving to the northwest. So began timber harvest and grazing and the establishment of Forest Service (Agee 1993.) Along with establishment of the Forest Service agency came policy to suppress all wildfires (Agee 1993.) This absence of fire has allowed stands to become overstocked and ground fuels to accumulate resulting in increased fire severity in forest types that once were adapted to low intensity wildfires.** **Based on GIS analysis, less than 100 acres of the project area have burned since 1960 (DEIS, Chapter 3, Table 3-48, page 3-81).**
letter page 4	**Response:** **With regards to how is it planned logging and fire suppression going to help altered fire regime condition classes, given that these were the causes identified for the current altered conditions?** **It is necessary to reduce tree stand densities and canopy biomass in areas to emulate low and mixed severity fire that was the historic disturbance type in dry and moist forests in the Pacific Northwest. It is well documented that fire suppression, timber harvest and grazing have all contributed to current conditions. (See DEIS, Chapter 3, Affected Environment, pages 3-78 to 3-86).**

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letter page 4	**<u>Response:</u>** **With regards to moist forests see response to TLC-8a regarding moist forests and "low to moderate severity" fire.** **See response to TLC-7 on condition classes. Fire suppression is one of the reasons for the significantly altered fire regime. Aggressive fire suppression has been the Forest Service policy since the destructive fire season in northern Idaho and western Montana in 1910. By restricting fire spread through suppression, fuels that would have been reduced by wildfire have been allowed to accumulate, increasing the probability of large, more intense fires. Fire suppression has also affected current conditions by substantially decreasing fire mosaics or patches on the landscape. Historically, fires burned large areas creating a landscape consisting of a mixture of succession patterns or mosaics, with some of these patches serving as natural fire barriers. With successful fire suppression, the large-scale fire mosaics or patches on the landscape are being lost, creating a more uniform fuel structure with little or no natural barriers to help contain fire growth. Concerns over this change in fire regimes in the Blue Mountains were one of the factors prompting the US Forest Service to institute a nationwide policy of ecosystem management (Everett et al. 1994, Heyerdahl 2001).**
pages 3-21 and 3-23	**<u>Response:</u>** **With referecen to non-commercial thinning. The purpose of this project is to reduce probability of crown fire initiation by treating ladder fuels and to reduce crown fire spread by using treatments to disrupt canopy continuity in dry forest RHCAs and utilizing prescribed fire to reduce existing and created ground material (DEIS, Chapter 1, pages 1-4 and 1-5). As evident during the School Fire of 2005, dry forest RHCA's provided corridors for wildfire to spread across the landscape (personal observation, 2005). Historically, fire was a dominant disturbance type in most forests in the Pacific Northwest. These fires kept stands from becoming overstocked and ground fuels from accumulating. In the late 1800's and early 1900's settlers began moving to the northwest. So began timber harvest and grazing and the establishment of Forest Service (Agee 1993.) Along with establishment of the Forest Service agency came policy to suppress all wildfires (Agee 1993.) This absence of fire has allowed stands to become overstocked and ground fuels to accumulate resulting in increased fire severity in forest types that once were adapted to low intensity wildfires. Treatment is proposed to reduce the estimated current basal area from 190 to approximately 150 by removing trees 18" in dbh and less (DEIS, Chapter 2, page 2-17 and Silviculturist Report for RHCAs, project file).**
page 3-48	**<u>Response:</u>** **See are response to TLC-8a in regards to moist forest.**

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	Research shows that torching and crowning create fire brands that can spread fire well beyond their source, increasing fire spread to adjacent stands. Crowning significantly limits fire suppression options, requiring suppression personnel to rely on aerial resources or implement other indirect attack techniques. **Crown fire potential in the South George project area was calculated based upon the potential for individual stands to support a fire moving from the ground into the crowns of the trees, initiating and sustaining a crown fire.** **Roughly 64 percent of the dry and moist forest types in the South George project planning area are classified as having high crown fire potential (DEIS, Chapter 3, page 3-77).**
page 3-77	**<u>Response:</u>** **Figure 3.3 illustrates that most of the project area and sale units are not naturally subject to frequent low intensity fie, but to historic mixed severity (which includes stand replacement) and stand replacement crown fires, indicating it is not appropriate to log these areas to reduce fire risk as if they were dry ponderosa pine dominate forest types.** **See response to comments TLC-8a and TLC-8b.** **Fire Regime Condition Class (FRCC) is an interagency, standardized tool. It was developed to guide management objectives and set priorities for treatments. It is used in Landfire which was developed in part by The Nature Conservancy. It is a protocol used by all Forest and has been used since the early 1990 by the Umatilla National Forest. Condition class also ties in directly with Historical Range of Variability (HRV) which is used to establish reference conditions for managing landscapes. For the northern Blue Mountains, HRV uses a range of reference conditions pertaining to the pre-settlement era (mid 1800's) (Silvicultural Specialist Report, page 6). Condition Class then characterizes the amount of departure the vegetation from the HRV. Condition Class is also used in Forest Service reporting database FACTS (Forest Service Activity Tracking System). This database tracks all treatments on Forest Service land and condition of landscape (or stands)(condition class) to the Washington Office.**

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WILDLIFE – PAGES S-14, S-15, and 3-105 to 3-139 **Comments that reflect general statements or opposition in this section have been noted.**	
pages S-16 3-99 3-100 3-101 3-102 3-129 3-132	**COMMENTS REGARDING CONSERVATION OF OLD FOREST AND LARGE DIAMETER TREES:** **Response:** **Environmental effects to old forest are described in the DEIS, Chapter 3, pages 3-102 and 3-103.** **Alternative D has fewer effects to old forest stands. For example, no harvest would take place in moist old forest. There would be less intermediate harvest proposed in the largest patches of old forest, which are primarily old forest single story stands in mixed conifer grand fir. Cover and structure in some stands adjacent to old forest and other key areas would be conserved.** **Also see response to comments on Vegetation in the section above.**
pages S-19 S-20 3-102 3-121 3-126	**COMMENTS REGARDING MANAGEMENT INDICATOR SPECIES** **Response:** **Action alternatives are above the minimum Forest Plan standard for satisfactory elk cover, DEIS Chapter 3, page 3-109.** **An analysis of effects to pileated woodpecker and three-toed woodpecker is found on DEIS Chapter 3 pages 3-113 to 3-121 and the snag analysis is found in the DEIS, Chapter 3, pages 3-121 to 3-127.** **Regarding meeting Forest Plan standards for dead wood, see snag discussion in the DEIS Chapter 3, pages 3-121 to 3-127.** **Individual primary cavity excavator species, besides pileated woodpecker and northern three-toed woodpecker, are not listed as Management Indicator Species (MIS) in the Umatilla Forest Plan (see DEIS Chapter 3, page 3-103, Table 3-64).**
pages 3-113 3-114	**Response:** **Formal population surveys were not conducted at the project level, but key areas were field checked for some species. Determinations made for MIS wildlife species are based on past and current known occurrences of these species, field reconnaissance,**

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3-118 3-119 3-120 3-126	**and habitat conditions. Population surveys often fail to detect species, whereas habitat assessments identify potential habitat whether the species is currently present or not. The known or potential presence of these species is disclosed in the DEIS, Chapter 3. Monitoring of entire populations and habitat trends is more appropriate at the Forest or province level than at the scale and extent of the South George project.**
pages 3-112 3-113 3-122 3-127	**<u>Response:</u>** **"Habitat acres affected" does not necessarily equate to long term habitat elimination. Most affected habitat for these species, which may or may not be currently occupied, would be thinned. There may be short term effects to reproductive opportunities in some, but not all, affected areas.** **All statements such as "small negative habitat trend" are qualified with a percentage figure. For snags, the quantity is less than one percent (.006). See DEIS, Chapter 3, page 3-127.**
pages 3-122 to 3-126	**<u>COMMENTS REGARDING SNAGS</u>** **<u>Response</u>:** **The average snag density in the Asotin watershed is 1.1 per acre in dry and 3 per acre in moist forest (DEIS Chapter 3, Table 3-69). Project activities would retain 3 large snags per acre where they exist. All dry forest units would retain a fully stocked stand, which should provide adequate future snags. Structural habitat for cavity excavating birds would be reduced at the stand scale, but watershed averages would remain relatively constant or become more in line with historical distributions (DEIS, Chapter 3, page 3-127).** **This project will maintain dead wood habitat and green replacement trees at or beyond levels identified in the DEIS, Chapter 2, Table 2-5, page 2-24. Also see Table 2-13, page 2-43 - Snags within harvest units would be retained above the minimum levels required in the Forest Plan. The number of acres with 2-4 snags per acre would increase and be more in line with reference conditions.** **This project has no specific objective to reduce snag numbers (including for fuels), although secondary reductions could be associated with timber harvest (danger trees, operational removals for landings, skyline corridors, etc.). Although snags would potentially decrease in harvest units (depending on existing levels in each stand), large diameter snags would be retained above minimum levels identified in the Forest Plan.** **Also see response in the Vegetation Section for page 3-126 regarding fully stocked.in terms of basal are for dry and moist forest.**

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page 3-113	**<u>CUMULATIVE EFFECTS:</u>** **<u>Response:</u>** **Species viability cannot be assessed within a project area; it must be looked at in a broader context. The Blue Mountain forest plan revision team is currently assessing population viability for these species.**
pages 3-132 3-133 3-134	**<u>VIABILITY OF ALL BIRD SPECIES</u>** **<u>Response:</u>** **As stated in the DEIS, Chapter 3, page 3-130, Partners in Flight (PIF) led an effort to complete a series of Bird Conservation Plans, which we use to address the requirements contained in Executive Order (EO) 13186 (January 10, 2001), Responsibilities of Federal Agencies to Protect Migratory Birds.** **The DEIS acknowledges that some woodpecker species would benefit from Alternative A, which may provide the best opportunity for insect outbreaks and stand replacement fires in the analysis area (DEIS, Chapter 3, page 3-125).** **Over 75,000 acres of Pomeroy district burned in wildfires in 2005 and 2006. Stand replacement burns are currently not at a deficit in this area.**
page 3-135 and 3-136	**<u>CANADA LYNX</u>** **<u>Response:</u>** **The Blue mountains are on the fringe of Canada lynx range. Individuals may show up on occasion, but the U.S. Fish and Wildlife Service concluded that a sustained population probably never existed here (DEIS, Chapter 3, page 3-135).** **See response to Comment TLC-12 regarding range of alternatives.**
INVASIVE PLANTS – PAGES 3-147 to 3-148 **<u>Comments that reflect general statements or opposition in this section have been noted.</u>**	
pages 3-147 3-148	**<u>Response:</u>** **The following design features and management requirements will be used for the control and prevention of invasive plants (DEIS, Chapter 2, Table 2-5, pages 2-22 and 2-23:** **Noxious weed sites will be treated consistent with the 2005 Region 6 Invasive Plant**

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	FEIS and ROD that amended the Umatilla Forest Plan in March, 2006, and the July 2010 Umatilla National Forest Invasive Plant Treatment Project FEIS and ROD. **All gravel, fill, sand stockpiles, quarry sites, and borrow material will be inspected for the presence of invasive plants before use and transport. Use only gravel, fill, sand, and rock that are judged to be weed seed free by District or Forest weed specialist.** **Road blading, brushing, and ditch cleaning in areas with high concentrations of invasive plants will be conducted in consultation with District or Forest-level invasive plant specialists.** **Invasive plant treatment and prevention practices will be incorporated as appropriate.** **Project or contract maps will show currently inventoried high priority noxious weed infestations as a means of aiding in avoidance and/or monitoring.** **Prior to moving onto the Forest, reasonable measures will be taken to insure that all off-road equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. In addition, prior to moving off-road equipment from a cutting unit known to be infested with invasive species to any other unit that is believed to be free of noxious weeds, reasonable measures will again be taken to make sure equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds (timber sale contract provision B/BT 6.35 or equivalent provision).** **Use state certified weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If state certified straw and/or mulch is not available, individual forests should require sources certified to be weed-free using the North American Weed Free Forage Program standards, or a similar certification process.** **Soils disturbed by project activities will be revegetated with certified weed-free native seed.** **Logging system design will consider the objectives of maintaining ground cover and minimizing ground disturbance. Forest Plan standards and guidelines for ground and soil disturbance will be followed.** **Landings and parking areas will be located outside known areas of invasive plants. If no other location is feasible the site will be surveyed and treated for noxious weeds prior to use.**

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SCENERY – PAGES 3-160 to 3-170 **Comments that reflect general statements or opposition in this section have been noted.**	
page 3-160	**Response:** **Scenery Management is a resource management system that considers the resource within the context of a dynamic ecosystem. Scenic integrity takes into account natural disturbances as part of the beauty and grandeur of natural landscapes when the disturbances are within the historic range of variability. Disturbances such as large stand replacement fire that is not consistent with the HRV, is considered to reduce scenic integrity.**
page 3-161	**Response:** **Visual Quality Objectives (VQOs) are based on and mapped from primary viewer platforms. Preservation is the only VQO that assumes compliance from every "acre/inch". It is understood that from some areas there will be some areas that will not comply with the VQO, and the application of VQOs within the Forest Plan has taken into consideration the number of viewers and the duration of view, as per the National Forest Landscape Management Volume 2, Chapter 1, Visual Management System, pg. 3. The paragraph states that "where these patches are most visible the visual quality is modification. FR4300 is the viewer platform utilized in the Forest Plan as the viewer platform, and since the "patchwork is not evident from FR4300; the existing VQO is partial retention. Photos are taken from FR4302-Hogback Road, to fully disclose that there are areas that are impacted.**
page 3-162	**Response:** **The statement about timber being visibly unhealthy relates to field verification where stands were viewed from immediate foreground viewing positions(less than 300ft). From this view and from stand data that is evaluated within the context of the associated biophysical groups, these stands are unhealthy, meaning that the condition of the stands are outside HRV. For comment responses related to HRV, and FRCC, see the Fuels and Vegetation responses.** **There is agreement that the patchiness of Figure 1-14 is a natural appearance and the patchiness of Figure 3-13 is unnatural fragmentation of the forest. This unnatural fragmentation is reflected in the existing condition. "Current visual quality varies from modification toe maximum modification" DEIS, Chapter 3, page 3-162.** **The strong contrast of grass slopes and timbered draws in noted as a striking attribute to the scenic character of this landscape. However, it is agreed and note on said page that the patchiness created by the clearcuts in previous years detracts from the visual quality, hence modification, to maximum modification.**

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page 3-164	**<u>Response:</u>** **Your concern for further impairment of scenic integrity is noted. However, the analysis takes a balanced approach to managing scenic integrity and scenic stability. Recognizing that doing nothing in landscapes that show trends and conditions that are outside HRV would retain a level of risk to scenic integrity. We have witness in similar areas and conditions disturbances that have occurred at a scale and severity that are far beyond a natural disturbance cycle. (School Fire, 2007) These incidences are detrimental to the visual quality. Scenic integrity is reduced by disturbances that do not reflect the scale and severity of a natural disturbance.** **Regarding fire regime condition class and stand density see response to comments in the Vegetation and Fuels sections above.**
page 3-165	**<u>Response:</u>** **Environmental effects analysis for project activities regarding scenery is described in DEIS, Chapter 3, pages 3-165 to 3-170. Other resource effects are described throughout Chapter 3, such as vegetation, fuels, climate, wildlife, etc.**
page 3-166	**<u>Response:</u>** **Scenic stability is an indicator of the long term sustainability of scenic attributes within the context of a dynamic, cyclical disturbance cycle.** **When thinning is done selectively with care to ensure that natural form, line, color and texture remain intact, the forest stand appears naturally more open and affords the longer views which has been shown to be desirable.** **This project was designed in a manner to specifically address stand conditions and fuel loads that are outside of HRV.** **This comment uses the term "translates", which is an opinion that is duly noted. However, scenery management does utilize the environmental design arts to address impacts related to form, line, texture, and color; to help blend the impacts of management activities. (Volume 1, Chapter 2, Visual Management System, pg. 8) When forms and lines are sharp and geometric in nature, the composition often appears unnatural. When sharp lines and geometric shapes are broken, undulated, feathered, and scalloped the composition becomes much more natural appearing.** **The visual impacts of skyline logging, and skid trails are not completely gone in the short-term, but effects are no longer dominate to the view and therefore do not pose a long-term impact to scenery resources. Visual Quality Objectives are based on**

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	dominance of the impact. It is important to consider viewing distance, and angle from the viewer platforms which are the identified sensitive routes. **Evidence of logging is addressed in the project design features. That is not to say that all evidence of logging is eliminated, however, a balance approach is used in forest stand management. Managing forests with logging to return conditions to the HRV is considered to be a practical way of reducing uncharacteristically large and severe disturbances that create impacts to scenery that are not valued by the public or enjoyed by recreationists.** **This comment refers to a visual preference survey. The relevance to ecological values is noted. However, there are social values within ecological values which are directly related to scenery resources and how they are managed. The terms "messy, clean up and clutter" are terms directly from the survey of public viewers. The opinion that these terms are "purposefully misleading" is noted. However, there are discussions within the DEIS, Chapter 3 of ecological benefits and it is also the case that the project does not propose to eliminate or reduce snags or down wood to a level of ecological detriment.**
page 3-167	**<u>Response:</u>** **The Bradley, Forest Aesthetics is the reference for the statement that "viewers prefer views of large trees with open space." This document is a wide arrayed survey that covers more than just open, dry ponderosa pine forests. The preference is related more directly to aesthetic composition rather than forest type. Large trees provide forms within a composition that complement the other attributes such as a grassy forest floor, or shrub layer. A thicket offers a view of very little distinct pieces of a composition. It reads to the eye as one element with very little variety.**
page 3-168	**<u>Response:</u>** **We disagree with your opinion that the DEIS is Orwellian. However, the idea that all logging is the same and all logging is bad is a very simplified view and more than likely incorrect. There are logging practices that can correct problems caused by past logging that was done in a much different way than is being proposed.** **We disagree with your term Bogus. However, there was no sharper focus or brightening done in this visual simulation. Tree density was lessened and some small openings were created to mimic the proposed harvest of species specific removal. An understory of shrubs and new growth was inserted to represent the expected growth with more sunlight and moisture. The openings soften the hard distinct edges of the previously clear cut patches. This would likely be considered "rehabilitation" (Volume 1, Ch. 2 Visual Management System, pg. 28).**

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	Any references to Vegetation, Fuels, and Wildlife are addressed in the sections above and effects to these resources are addressed in Chapter 3 of the DEIS.
page 3-169	**<u>Response:</u>** **Created openings do not disappear. Correct. That was not what was stated. The openings no longer appear as a visual form. Agreed, it is possible to see the opening due to color mostly, but the form created by the opening is much less discernible as time goes by and trees reach 20 to 25 feet because the edges are less and less prominent, especially when viewed from oblique angles. Monocultures are not created unless there is only one seed source and conditions that support the regeneration of only one species. However, it is important to note that selectively harvesting certain species and leaving fire resistant species will provide a more diverse seed source, and creating small openings, less than 2 acres in size will create diverse conditions of moisture and light for a variety of tree and shrub species to grow.** **The use of herbicides is carefully applied. The loss of native plants is negligible from viewer platforms other than in immediate foreground views. The treatment minimizes invasive species with very minor and short term impact to the visual quality. (See design features DEIS, Chapter 2, Table 2-5, pages 2-22 and 2-23).**
page 3-170	**<u>Response:</u>** **See DEIS, Chapter 2, Table 2-11, page 2-35 for a summary of proposed silvicultural prescriptions for each action alternative. Clearcutting alone is not listed in this table.** **Wenatchee Cabin is in retention. Harvest would meet partial retention. Management activities would be visually subordinate to the characteristic landscape (Volume 1, Ch. 2 Visual Management System, pg. 34)** **Trails are in modification. Harvest would meet modification. Management activities may dominate the original characteristic landscape (Volume 1, Ch. 2 Visual Management System, pg. 34).**
<u>ECONOMIC ANALYSIS – PAGES 3-170 to 3-174</u> **<u>Comments that reflect general statements or opposition in this section have been noted.</u>**	
page 3-172	**<u>Response:</u>** **This project provides sawlog timber in accordance with two Umatilla Forest Plan goals (FP pages 4-1 to 4-2) Goal #1 -** ***Provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources,***

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	***uses, and values with meet local, regional, and national social and economic needs* and Goal #15 – *Provide for production and sustained yield of wood fiber and insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency* (DEIS, Chapter 1, page 1-5).**
pages 3-173 and 3-174	**<u>Response:</u>** **Project feasibility, Financial Efficiency, and Economic Impacts are all disclosed on this page. The analysis is in accordance with Forest Service manual and handbook guidance to complete a financial analysis for timber sales (FSH 2409.18). It documents the financial monetary measures for timber and the financial costs of removing the timber (DEIS, Chapter 3, page 3-175).** **See response to Comment RA-18 and RA-19.**
<u>IRA/PWA/OTHER UNDEVELOPED LANDS – REQUIRED DISCLOSURES AND APPENDIX H PAGES 3-176 to 3-191 and H-6 to H-10</u> **<u>Comments that reflect general statements or opposition have been noted for this section.</u>**	
page 3-176	**<u>Response:</u>** **No comments made on this page only requests for copies of reports.**
page 3-180	**<u>Response</u>:** **The Forest Service has considered the map presented by Oregon Wild and disclosed that consideration in Appendix I of the DEIS, pages I-1 to I-5 along with five maps showing the activities proposed for each alternative.**
page 3-182	**<u>Response:</u>** **The following information discloses the scale of analysis for undeveloped lands and the indicators used and why they were used see below:** **Other undeveloped lands have intrinsic ecological and social values because they do not contain roads and evidence of past timber harvest. These values are used as indicators of comparison to display effects between alternatives. Values and features that often characterize an inventoried roadless area (36 CFR 294) were specifically avoided as indicators of comparison to reduce confusion because other undeveloped lands are not inventoried roadless areas or potential wilderness areas and therefore are described using different indicators of comparison(DEIS, Chapter 3, page 3-182).** **Indicators of comparison between alternatives are:** • **Intrinsic physical and biological resources (soils, water, wildlife, recreation, fisheries, etc.)**

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	• **Intrinsic social values (apparent naturalness, solitude, remoteness)** • **Change in acres of other undeveloped lands**
page 3-183	**<u>Response</u>:** **Areas of potential wilderness identified using inventory procedures found in Forest Service Handbook (FSH) 1909.12 Chapter 71 are called potential wilderness areas. The inventory is conducted with the express purpose of identifying all lands that meet the criteria for being evaluated for wilderness suitability (DEIS, Appendix H, page H-1).** **See Tables H-1B and H-1C in Appendix H for detailed information on how each polygon in the project planning area was examined and assessed and considerations given to the four largest polygons.**
page 3-184	**<u>Response</u>:** **The scale of analysis for Wildlife habitat and old forest habitat are identified in the DEIS, Chapter 3, page 3-98 and environmental effects and findings of consistency are located on pages 3-100 to 3-142.** **Disclosure on insect and disease susceptibility can be found in the DEIS, Chapter 3, page 3-70 and in Appendix J, page J-15 to J-24 along with a map, graph, and tables.** **See response to page 3-183 for information regarding the four largest polygons of other undeveloped lands.**
page 3-185	**<u>Response</u>:** **See response to page 3-183 for information regarding the four largest polygons of other undeveloped lands.** **Alternative A discloses effects of not implementing proposed activities and three additional alternatives were considered but eliminated from detailed study (DEIS, Chapter 2, pages 2-33 to 2-34).**
page 3-186	**<u>Response</u>:** **The scale of analysis for Wildlife habitat and old forest habitat are identified in the DEIS, Chapter 3, page 3-98 and environmental effects and findings of consistency are located on pages 3-100 to 3-142.**
page 3-187	**<u>Response</u>:** **See response to wildlife comments in page 3-186 above.**

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page 3-188	**<u>Response</u>:** **See response to wildlife comments in page 3-186 above.** **Also see DEIS, Chapter 1, pages 1-6 to 1-8 for a summary description of goals and desired future conditions for Forest Plan management area allocations located within the project planning area. Detailed descriptions can be found in the Forest Plan pages 4-94 to 4-186.**
page 3-189	**<u>Response</u>:** **See DEIS, Chapter 3 specifically for all Threatened, Endangered and Sensitive Species(Aquatic, Plant, and Terrestrial) and MIS species and Findings of Consistency for each resource that discloses consistency with Umatilla Forest Plan and NFMA.**
page 3-190	**<u>Response</u>:** **See response to wildlife comments on page 3-186 above. Effects to soils is located in the DEIS, Chapter 3, pages 3-8 to 3-14 and to invasive plants on pages 3-146 to 3-148.** **Government to Government consultation with the Nez Perce was conducted directly with the tribe for this project. This project is not likely to impact the exercise of treaty rights in any way.**
page 3-191	**<u>Response</u>:** **Other undeveloped lands with no proposed harvest activity (7,155 acres in Alternative B, 7,155 acres in Alternative C, and 7,605 acres in Alternative D) would retain their intrinsic physical, biological, and social values as described in the affected environment (Table 3-86). They would remain free of developments such as forest roads or timber harvest stumps. All 8,785 acres of other undeveloped lands (Alternative A- no action) within the project planning area would still not be a potential wilderness area, inventoried roadless area, or a designated wilderness area. This outcome is consistent with the intent of management area land allocation decisions made in the Forest Plan (DEIS, Chapter 3, page 3-188).**
page H-6	**<u>Response:</u>** **This page disclosed Forest Service policy and criteria used in potential wilderness inventory taken from Forest Service Handbook 1909.12, Chapter 71.1, along with maps that depict the methodology and process. Table H-C1, page H-8 disclosed the consideration given to the four largest polygons analyzed in South George project planning area.**
pages H-8, H-9, and H-10	**<u>Response</u>:** **See response to page H-6 above.**

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	Effects to wildlife and wildlife habitat are disclosed in the DEIS, Chapter 3, pages 3-98 to 3-142.

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Comment Number	**Reference and Forest Service Response**
REF BMBP-1	Baker, W.L. 2009. Fire ecology in Rocky Mountain landscapes. Island Press, Oxford. **Response:** **See response to REF TLC-3.**
REF BMBP-2	Baker, W.L., T.T. Veblen, and R.L. Sheriff. 2007. Fire, fuels and restoration of ponderosa pine-Douglas fire forests in the Rocky Mountains, USA. Journal of Biogeography 34: 251-269. **Response:** **See response to REF TLC-4**
REF BMBP-3	Beschta, R.L., 1.1. Rhodes, *1.B.* Kauffinan, R.E. Gresswell, G.W. Minshall, *1.R.*Karr, D,A. Perry, E.R. Hauer, and C.A. Frissell. 2004. Postfire management on forested public lands of the western USA. Conservation Biology 18: 957-967. **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT.**

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- **References identifying specific geographical areas and references that are opinion pieces were not considered**

Comment Number	Reference and Forest Service Response
REF BMBP-4	Bond, M.L., D.E. Lee, C.M. Bradley, and C.T. Hanson. 2009. Influence of pre-fire tree mortality on fire severity in conifer forests of the San Bernardino Mountains, California. The Open Forest Science Journal Z: 41-47. **Response:** **This journal article notes that "High tree mortality due to drought and insects often is assumed to increase fire severity once ignition occurs. In 2002-2003, coniferous forests in the San Bernardino Mountains, California experienced a significant tree mortality event due to drought and an outbreak of western pine beetles (*Dendroctonus brevicomis*). In October 2003, fire burned approximately 5,860 ha of conifer forest types in many beetle- and drought-affected stands where most pre-fire dead trees had retained needles. We used pre- and post-fire GIS data to examine how fire severity was affected by pre-fire tree mortality, vegetation characteristics, and topography. We found no evidence that pre-fire tree mortality influenced fire severity. These results indicate that widespread removal of dead trees may not effectively reduce higher-severity fire in southern California's conifer forests. We found that sample locations dominated by the largest size class of trees (≥61 cm diameter at breast height (dbh)) burned at lower severities than locations dominated by trees 28-60 cm dbh. This result suggests that harvesting larger-sized trees for fire-severity reduction purposes is likely to be ineffective and possibly counter-productive."** **It is unclear if this article was cited in a specific comment, so we are unaware of the specific context to which it applies. This reference pertains to the San Bernardino Mountains of southern California. The study reports tree mortality-fire severity interactions for mixed-species stands exposed to large, human-caused fires and Santa Ana wind conditions. The tree species involved were ponderosa pine, Jeffrey pine, Coulter pine, white fir, sugar pine, incense cedar, black oak, canyon live oak, and bigcone Douglas-fir. Of these 9 tree species, only ponderosa pine occurs in the South George planning area. This study lacks relevance to the project because the South George planning area does not occur in southern California and its associated climatic conditions (including Santa Ana winds), it only contains one of the nine tree species included in the study, and South George is not a post-fire project.**
REF	Donnegan, *1.,* S. Campbell,and D. Azuma, tech. eds. 2008. Oregon's forest resources, 2001-

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BMBP-5	2005: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW -GTR-765. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. 186 p. **Response:** **See response to REF. TLC-24 for Letter #12.**
REF BMBP-6	Hanson, C.T., and M.P. North. 2008. Postfire woodpecker foraging in salvage-logged and unlogged forests of the Sierra Nevada. The Condor 110: 777-782. **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT**
REF BMBP-7	Hanson, C.T., D.C. Odion, D.A. DellaSala, and W.L. Baker. 2009. Overestimation of fire risk in the Northern Spotted Owl Recovery Plan. Conservation Biology 23: 1314-1319. **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT**
REF BMBP-8	Hanson, C.T., D.C. Odion, D.A. DeIlaSala, and W.L. Baker. 2010. More-comprehensive recovery actions for Northern Spotted Owls in dry forests: reply to Spies et al. Conservation Biology 24: 334-337. **Response:** **N/A THIS IS NOT A NORTHERN SPOTTED OWL FOREST**
REF BMBP-9	Henjum, M.G., 1.R. Karr, D.L. Bottom, D.A. Perry, J.C. Bednarz, S.G. Wright, S.A. Beckwitt, and E. Beckwitt. 1994. Interim protection for late successional forests, fisheries and watersheds:·national forests east of the Cascade crest, Oregon and Washington. The Wilderness Society,Bethesda, Maryland. **Response:** **See response to REF. TLC-40 for Letter #12**

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REF BMBP-10	Hessburg,P.F., R.B. Salter, and K.M. James. 2007. Re-examining fire severity relations in premanagement era mixed-conifer forests: inferences from landscape patterns of forest structure.Landscape Ecology 22: 5-24. **Response:** **See response to REF. TLC-41 for Letter #12**
REF BMBP-11	Hutto, R.L. 1995. Composition of bird communities following stand-replacement fires in northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology 9: 1041-1058. **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT**
REF BMBP-12	Hutto, R.L. 2006. Toward meaningful snag-management guidelines for postfire salvage logging in North American conifer forests. Conservation Biology 20: 984-993. **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT**
REF BMBP-13	Hutto, R.L. 2008. The ecological importance of severe wild:frres: some like it hot. Ecological Applications 18: 1827-1834. **Response:** **Not a scientific paper but the views of the author were considered in wildlife analysis; we acknowledge that some wildlife species benefit from wildfire**
REF BMBP-14	Karr, 1.R., 1.1. Rhodes, G.W. Minshall, F.R. Hauer, R.L. Beschta, C.A. Frissell, and D.A. Perry.2004. Postfrre salvage logging's effects on aquatic ecosystems in the American West. BioScience 54: 1029-1033. **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT**

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REF BMBP-15	Klenner, W., R. Walton, A. Arsenault, and L. Kremsater. 2009. Dry forests in the southern interior of British Columbia: historic disturbances and implications for restoration and management. Forest Ecology and Management 256: 1711-1722. **Response:** **N/A GEOGRAPHICAL REFERENCE**
REF BMBP-16	Medler, M. (abstract), 3rd International Fire Ecology & Management Congress (http://emmps.wsu.eduitirecongress),SanDiego,CA, USA, November 13-17,2006. **Response:** **Week long congress to discuss fire effects on vegetation and wildlife, wildland fire use, post-fire rehabilitation, and fire modeling.**
REF BMBP-17	Mitchell, S.R., M.E. Harmon, and K.E.B.O. O'Connell. 2009. Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems. Ecological Applications] 9: 642-655. **Response:** **See response to REF. TLC-83 for Letter #12**
REF BMBP-18	Noss, R.F., J.F. Franklin, W.L. Baker, T. Schoennagel, and P.B. Moyle. 2006. Managing fireprone forests in the western United States. Frontiers in Ecology and Environment 4: 481-487. **Response:** **See response to REF TLC-91.** **As for forest management during wildfire, Umatilla National Forest follows the policy outlined in the Umatilla National Forest Land and Resource Management Plan for fire suppression. This is outlined in response to comment TLC-32. In regards to the portion of the article on management post wildfire, this is not a post wildfire project therefore does not apply.**

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REF BMBP-19	Pierce, 1.L., G.A. Meyer, and A.J.T. lull. 2004. Fire-induced erosion and millennial-scale climate change in northern ponderosa pine forests. Nature 432: 87-90. **Response:** **See response to REF. TLC-99 for Letter #12**
REF BMBP-20	Rhodes, 1.1., and W.L. Baker. 2008. Fire probability, fuel treatment effectiveness and ecological tradeoffs in western u.S. public forests. The Open Forest Science Journal 1: 1-7. **Response:** **This article was not cited in a specific comment so we are unaware to the specific context to which it applies. This article published in The Open forest Science Journal, 2008, 1, 1-7. Abstract:** ***Abstract: Fuel treatment effectiveness and non-treatment risks can be estimated from the probability of fire occurrence. Using extensive fire records for western US Forest Service lands, we estimate fuel treatments have a mean probability of 2.0-7.9% of encountering moderate- or high-severity fire during an assumed 20-year period of reduced fuels (Rhodes et. al 2008).*** **This article uses watershed and aquatic systems as a specific contest for evaluating tradeoffs involved with treatment and non-treatment of fuels on western public lands (Rhodes et. al 2008). In general the article suggests that the probability is relatively low that an area treated will experience a wildfire within the 20 years of treatment effectiveness and that the negative effect on watersheds and aquatic systems of repeated treatments is outweighs the short term benefit of a fuel treatment (Rhodes et. al 2008). Environmental effects analysis for watershed and aquatic species for this project are located in the DEIS, Chapter 3, pages 3-15 to 3-46.**
REF BMBP-21	Schoennagel, *T., T.T.* Veblen, and W.L. Romme. 2004. The interaction of fire, fuels, and climate across Rocky Mountain forests. BioScience 54: 661-676. **Response:** **This journal article concludes that "Understanding the relative influence of fuels and climate on wildfires across the Rocky Mountains is necessary to predict how fires may respond to a changing climate and to define effective fuel management approaches to controlling wildfire in this increasingly populated region. The idea that decades of fire**

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	suppression have promoted unnatural fuel accumulation and subsequent unprecedentedly large, severe wildfires across western forests has been developed primarily from studies of dry ponderosa pine forests. However, this model is being applied uncritically across Rocky Mountain forests (e.g., in the Healthy Forests Restoration Act). We synthesize current research and summarize lessons learned from recent large wildfires (the Yellowstone, Rodeo-Chediski, and Hayman fires), which represent case studies of the potential effectiveness of fuel reduction across a range of major forest types. A "one size fits all" approach to reducing wildfire hazards in the Rocky Mountain region is unlikely to be effective and may produce collateral damage in some places." **It is unclear if this article was cited in a specific comment, so we are unaware of the specific context to which it applies. We agree with this reference's conclusion that a "one size fits all" approach to reducing wildfire hazards is inappropriate. Further, we believe it is important to properly characterize fire regimes in order to examine whether certain characteristics of existing vegetation conditions in a planning area could be interpreted as indicating that fire return intervals or other aspects of a fire regime might have been affected by fire suppression or other activities.** **Five coarse-scale fire regimes have been defined for the United States by using two factors: fire frequency and fire severity (Barrett et al. 2010). Moist upland forests like those in the South George planning area have a mixed-severity fire regime (Fire Regime III). At the broad scale of the United States, fire regime III includes a wide fire frequency range of 35 to 200 years (Barrett et al. 2010). At the finer scale of the Blue Mountains, fire regime III is believed to have three variants or sub-regimes: IIIa (fire frequency of 50 years or less), IIIb (fire frequency of 51 to 100 years), and IIIc (fire frequency of greater than 100 years). Historically, low-to-moderate severity fires were an important component of the mixed-severity regime (Agee 1993, Brown and Smith 2000) – these are the FR IIIa and IIIb sites. Research in the Blue Mountains portion of the interior Pacific Northwest has often shown that mixed-severity regimes have more variability in fire frequency and severity than previously thought (Heyerdahl 1997, Marouka 1994, Olson 2000, Williamson 1999). Use of the fire sub-regimes, in combination with local fire history research, demonstrates that the South George analysis did not uncritically adopt a model developed elsewhere, and for dry ponderosa pine forests, for the planning area.** **This reference has limited relevance to the South George project because the**

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	studied fires (Yellowstone, Rodeo-Chediski, and Hayman) occur in Arizona, Wyoming, and Colorado, and the South George analysis relied primarily on fire ecology and fire history references developed from research conducted in the Blue Mountains (e.g., Heyerdahl 1997, Marouka 1994, Olson 2000, Williamson 1999).
REF BMBP-22	Sherriff, R.L., and *T.T.* Veblen. 2006. Ecological effects of changes in fire regimes in *Pinus ponderosa* ecosystems in the Colorado Front Range. Journal of Vegetation Science] 7: 705-718. **Response:** **N/A GEOGRAPHICAL REFERENCE**
REF BMBP-23	Swanson, M.E., J.E Franklin, R.L. Beschta, C.M. Crisafulli, D.A. DellaSaJa, R.L. Hutto, D.B.Lindenmayer, and F.J. Swanson. 2010. The forgotten stage of forest succession: early successional ecosystems on forest sites. Frontiers in Ecology and Environment doi: .] 0.] 890/090] 57. **Response:** **This journal article concludes that "Early-successional forest ecosystems that develop after stand-replacing or partial disturbances are diverse in species, processes, and structure. Post-disturbance ecosystems are also often rich in biological legacies, including surviving organisms and organically derived structures, such as woody debris. These legacies and post-disturbance plant communities provide resources that attract and sustain high species diversity, including numerous early-successional obligates, such as certain woodpeckers and arthropods. Early succession is the only period when tree canopies do not dominate the forest site, and so this stage can be characterized by high productivity of plant species (including herbs and shrubs), complex food webs, large nutrient fluxes, and high structural and spatial complexity. Different disturbances contrast markedly in terms of biological legacies, and this will influence the resultant physical and biological conditions, thus affecting successional pathways. Management activities, such as post-disturbance logging and dense tree planting, can reduce the richness within and the duration of early-successional ecosystems. Where maintenance of biodiversity is an objective, the importance and value of these natural early-successional ecosystems are underappreciated."**

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	It is unclear if this article was cited in a specific comment, so we are unaware of the specific context to which it applies. We agree with this reference's conclusion that early-successional plant communities are often underappreciated. **As described in the South George DEIS, the project includes regeneration cutting methods that will create early-successional conditions after their implementation, and the post-harvest planting activity consists primarily of outplanting tree species (five species will be used, which in combination with the expected natural regeneration response to the regeneration cuttings, will contribute to very diverse stands), but shrubs are also expected to be included in the planting mix. Inclusion of shrubs in the planting mix, which is an atypical response to post-harvest reforestation need, is proposed primarily in response to the same ecological concepts described in this article (including an appreciation for the role and function of herbs and shrubs in early-successional communities). The specifications for the tree planting activity do not include dense planting (close spacing), and the resulting more open stand condition will provide numerous benefits, including these: (1) lower cost for tree planting; (2) less need for future noncommercial thinning (depending on the magnitude of the natural regeneration response); (3) longer provision of early-successional conditions (because it will take longer for the trees to reach a dense condition and thereby shade out the herbs and shrubs); and (4) more future resilience to climate change and its associated increase in disturbance processes (including more fire occurrence than historically).**
REF BMBP-24	USFS and USBLM. 1997. An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins, Volumes 1-4. General Technical Report PNW -GTR-40S. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon. **Response:** **This "Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins" provides detailed information about current conditions and trends for the biophysical and social systems within the Basin. This information can be used by land managers to develop broad land management**

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	goals and priorities and provides the context for decisions specific to smaller geographic areas. The Assessment area covers about 8 percent of the U.S. land area, 24 percent of the Nation's National Forest System lands, 10 percent of the Nation's BLM-administered lands, and contains about 1.2 percent of the Nation's population. This results in a population density that is less than one-sixth of the U.S. average. The area has experienced recent, rapid population growth and generally has a robust, diverse economy. As compared to historic conditions, the terrestrial, aquatic, forest, and rangeland systems have undergone dramatic changes. Forested landscapes are more susceptible to fire, insect, and disease than under historic conditions. Rangelands are highly susceptible to noxious weed invasion. The disturbance regimes that operate on forest and rangeland have changed substantially, with lethal fires dominating many areas where non-lethal fires were the norm historically. Terrestrial habitats that have experienced the greatest decline include the native grassland, native shrubland, and old forest structures. There are areas within the Assessment area that have higher diversity than others. Aquatic systems are now more fragmented and isolated than historically and the introduction of non-native fish species has complicated current status of native fishes. Core habitat and population centers do remain as building blocks for restoration. Social and economic conditions within the Assessment area vary considerably, depending to a great extent on population, diversity of employment opportunities, and changing demographics. Those counties with the higher population densities and greater diversity of employment opportunities are generally more resilient to economic downturns. This Assessment provides a rich information base, including over 170 mapped themes with associated models and databases, from which future decisions can benefit. **It is unclear if this 4-volume report was cited in a specific comment, so we are unaware of the specific context to which it applies. This reference provides fundamental and foundational science for the Blue Mountains area. It has findings that are pertinent to the South George project. For much of the interior Columbia River basin, for example, there has been a large increase in the proportion of closed, mid-age forest, including on the warmer and drier portion of the moist-forest biophysical environment (the fire regime IIIa and IIIb sites). For ecosystems that evolved with occasional, fine-scale, replacement fire severity, the recent exclusion of low and mixed severity fires may lead to increased frequency, and perhaps most**

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	importantly, more spatially contiguous replacement fire than was experienced historically (Hessburg et al. 2007, Quigley et al. 1996). "A detailed study of the entire inland portion of the northwestern United States also concluded that areas historically under a nonlethal or mixed-severity fire regime have now shifted toward stand replacement regimes (Morgan et al. 1998; Quigley et al. 1996)" (Arno et al. 2000, p. 227).
REF BMBP-25	Veblen, T.T. 2003. Historic range of variability of mountain forest ecosystems: concepts and applications. Forestry Chronicle 79: 223-226. **Response:** **This journal article concludes that "Concepts of historical range of variability (HRV) have taken on an increasingly important role in resource planning and the management of mountain forest ecosystems. This essay draws on examples from the study of the history of disturbance ecology in the Colorado Rocky Mountains and the southern Andes to examine key HRV concepts and their applications. These case studies show that historical perspectives can reduce the chances of major future surprises in ecosystem conditions related to climatic variation, which often overrides many of the effects of management practices. They demonstrate the long-lasting legacy effects of relatively infrequent but severe disturbances in the past that shaped the present landscape and its potential response to future climatic variation. Finally, the case studies illustrate the importance of conducting area-specific research in potential management areas rather than simply extrapolating research findings from studies of historic range of variability of forest ecosystems conducted elsewhere."** **It is unclear if this journal article was cited in a specific comment, so we are unaware of the specific context to which it applies. We agree with many of the conclusions from this reference, and believe the South George project appropriately incorporates them. As described above in response to other comments, HRV was used as an analytical technique to evaluate whether existing conditions depart from reference conditions and, if so, by how much and in which direction (by determining if existing conditions are within, above, or below HRV for the vegetation component being analyzed). And as also described above, we considered the possible influence of climate change on the future applicability of the HRV concept, and we used historical reference materials**

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	(mapping derived from General Land Office survey notes, other maps from the early 20th century, and fire history studies) to validate the HRV ranges developed specifically for a portion of the interior Pacific Northwest located immediately adjacent to the Blue Mountains. The long time period used when completing VDDT modeling to develop the HRV ranges (1,200 years) properly accounts for both year-to-year variation and infrequent but severe disturbance events. This article has limited relevance to the South George analysis from the perspective that its disturbance ecology studies relate to the Colorado Rocky Mountains and the Andes Mountains of South America, two areas with climatic conditions and disturbance regimes varying from those prevailing in the Blue Mountains.
REF BMBP-26	Whitlock, C., J. Marlon, C. Briles, A. Brunelle, C. Long, and P. Bartlein. 2008. Long-term relations among fire, fuel, and climate in the north-western US based on lake-sediment studies. International Journal of Wildland Fire 17: 72-83 . **Response:** **"The paleofire data support the idea that increased spring and summer temperatures and earlier spring snowmelt, observed at present and projected in the future, are likely to be accompanied by ever-greater fire activity"** **See response to REF. TLC-142 for Letter #12**
REF BMBP-27	**Effects of logging on fire regimes in moist forests** David B. Lindenmayer", Malcolm l. Hunter2, Philip J. surton", & Philip Gibbons' **Response:** **This article was not cited in a specific comment so we are unaware to the specific context to which it applies. From the abstract: " Logging can alter key attributes of forests by changing microclimates, stand structure and species composition, fuel characteristics, the prevalence of ignition points, and patterns of landscape cover. These changes may make some kinds of forests more prone to increased probability of ignition and increased fire severity. Such forests include tropical rainforests where fire was previously extremely rare or absent and other moist forests where natural fire regimes tend toward low frequency, stand replacing events." See response to TLC-8**

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	regarding moist fire regimes in South Georgeproject planning area.
REF BMBP-28	Decaying. Logs as Moisture Reservoirs After Drought and Wildfire *M. P.·Amaranthus, D. S. Parrish and D.* A *Parry* **Response:** **N/A THIS IS NOT A POST-FIRE PROJECT**