CHAPTER 3

Affected Environment
and
Environmental Consequences

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INTRODUCTION

This chapter describes past, present, and reasonably foreseeable actions, affected environment of area resources, and environmental consequences that would affect those resources based on implementation of alternatives analyzed in detail, as described in Chapter 2.

Effects are shown as being direct (occurring at the same time and plane as the triggering action), indirect (separate in time or space from the action that caused them), or cumulative (incremental effect of the project when added to effects from other past, present, and reasonably foreseeable actions). Each resource specialist considered and included activities relevant to the individual resource in the cumulative effects analysis. Direct, indirect, and cumulative effects are described in terms of increases, decreases, intensity, duration, and timing. The discussion of these effects also provides a comparison of the trade-offs associated with each alternative. Relevant direction from Umatilla Land and Resource Management Plan (Forest Plan) and applicable laws, regulations, and agency policies are also discussed in this chapter. The scale of analysis may be different for each resource. This chapter ends with a discussion of compliance with environmental laws and executive orders.

PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

The temporal and spatial scale of analysis is variable depending on the resource concern being evaluated, particularly when considering the effects of past, present, and reasonably foreseeable actions. During the interdisciplinary process the team followed guidance presented in CEQ's letter dated June 24, 2005. Using this guidance the following summary of past, present, and reasonably foreseeable actions within and adjacent to South George Vegetation and Fuels Management Project planning area was developed. These projects were considered, where relevant, when addressing cumulative effects for various resources.

Cumulative impact (or effect) is defined in CEQ regulations as *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions*. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

SUMMARY OF PAST ACTIONS:

The residual effects of these activities are displayed on the landscape and contribute to the description of the current condition (affected environment). Past actions are maintained as a layer in the District's GIS database and they are used to calculate Equivalent Treatment Acres for watershed conditions, elk habitat

effectiveness index (HEI), and cover values for big game, historical range of variability (HRV), and soil conditions. Following are brief summaries of past actions that occurred in the project planning area:

- **Timber Harvest by decade**:

Table 3-1 Timber Harvest by Decade In South George Project Planning Area (21,000 Acres)

Years	Acres	Silviculture Prescriptions
1960-1969	197	Regeneration harvest – Clearcutting, stand
	1,331	Regeneration harvest – Partial removal
1970-1979	165	Regeneration harvest – Clearcutting, stand
	2,605	Intermediate harvest - Mortality
	82	Intermediate harvest – Sanitation
	1,240	Intermediate harvest – Thinning
	132	Regeneration harvest, final removal - Shelterwood
	2,685	Regeneration harvest – Partial removal
	275	Regeneration harvest, removal cut – Shelterwood
	185	Regeneration harvest, seed cut –Shelterwood
1980-1989	974	Regeneration harvest – Clearcutting, stand
	75	Intermediate harvest - Mortality
	219	Intermediate harvest – Sanitation
	118	Intermediate harvest – Thinning
	110	Regeneration harvest, final removal - Shelterwood
	896	Regeneration harvest – Partial removal
	893	Regeneration harvest, removal cut – Shelterwood
	1,126	Regeneration harvest, seed cut –Shelterwood
1990-1999	353	Regeneration harvest – Clearcutting, stand
	75	Intermediate harvest - Mortality
	170	Regeneration harvest, final removal - Shelterwood
	923	Regeneration harvest, removal cut – Shelterwood
	308	Regeneration harvest, selection cut – Individual tree
2000-2009	61	Intermediate harvest - Thinning

- **Planting –**Approximately 2,750 acres were hand planted between 1996 and 2008.

- **Non-Commercial Thinning -** Between 1968 and 2008, approximately 2,400 acres of forest land has been non-commercially thinned.

- **Invasive Plant Treatments -** Approximately 1,520 acres have been treated, including 40 acres of herbicide treatment, 1,480 acres of hand pulling.

- **Wildfire –** From 1970 to 2008 there have been approximately 85 wildfires resulting in approximately 40 acres burned in the project planning area.

- **Grazing - Asotin C&H Allotment -** Grazing has occurred at various levels beginning in the mid-1800s. Wild horses used the area from 1885 to 1910. The average amount of permitted livestock grazing from 1929 to 1964 was 815 head of cattle. Range improvements include: 28 springs, 29 ponds, 3 corrals, and 18 miles of fence (includes boundary fence) within the project planning area.

- **Roads -** Approximately 18 miles have been decommissioned in South George project planning area in the past 12 years.

SUMMARY OF PRESENT ACTIONS (Ongoing):

- **Red Hill –** This project decision (3/27/07) allowed for the implementation of prescribed fire on approximately 226 acres to reduce fuel loadings, reduce wildfire risk, and improve wildlife habitat. Previous treatment includes the Red Hill timber sale and ladder fuel reduction and pullback in harvest units, and prescribed burning. Approximately 70 acres have been treated with prescribed fire. Remaining acres will be treated with prescribed burning.

- **Park Ridge –**This project decision (2/20/04) allowed for the treatment of 415 acres. This project was designed to increase the growth and vigor of desirable trees, increase canopy base height, increase resistance to insect and disease attack, and reduce fuel loading within the stands. Previous treatments include non-commercial thinning, and pullback from residual trees. Prescribed burning has been completed on 168 of the 415 acres.

- **Recreation –** Ongoing use of dispersed camping, hunting, and sightseeing occurs year-round. Public firewood gathering and snowmobile use will continue to occur.

- **Grazing – Asotin C&H Allotment –** The current number of permitted cow/calf pairs has been 495 since 1965, however, only 413 cow/calf pairs have actually grazed the allotment from 1995 to the present. The allotment area totals approximately 39,400 acres, of which about 21,000 acres are within the project planning area.

- **Invasive Plant Treatments –**Invasive plant treatments (herbicide, hand pulling and biological agent release) is currently being done. Where appropriate, treated areas are seeded with local sources of native grasses and forbs after treatment.

- **Road Maintenance –** Road maintenance consists of a variety of activity components including surface rock replacement, spot surfacing, roadside brushing, erosion control, logging out, road surface blading, ditch cleanout, slide removal, dust abatement, culvert cleaning or replacement, danger tree removal, and other items that contribute to the preservation of the existing road and its safe use.

SUMMARY OF REASONABLY FORESEEABLE ACTIONS:

- **Non-Commercial Thinning and Fuels Reduction**– A decision memo has been signed (6/9/08) to allow treatment of approximately 500 acres per year over a 5 year period with non-commercial thinning and fuels reduction treatments. Approximately 300 acres will be non-commercially thinned and 200 acres will be treated for fuels reduction using either hand or mechanical methods.

- **Invasive Plant Treatments –** Umatilla National Forest Invasive Plants Treatment FEIS and ROD (July 2010) will be implemented. The 1,520 acres mentioned above plus an additional 3 percent of acres are planned for herbicide treatments based on current increases being noted. Where appropriate, treated areas will be seeded with local sources of native grasses and forbs after treatment.
- **Eastside Prescribed Burn** – A decision memo has been signed (6/26/08) to allow implementation of prescribed fire treatments on approximately 4,500 acres to improve forage for wildlife, reduce natural

fuel loadings and ladder fuels, and reduce wildfire hazards. The project has four prescribed fire treatment areas: Round Prairie, Smiley Ridge, Dark Canyon, and Little Butte.

- **Restoration of Spring Developments and Cattle Access Sites** - Springs identified for protection and/or restoration include Cold Spring, Park Spring, Seven Sister's Spring, Round Prairie pond and spring, and Hostetler Springs (it is expected that these projects would be implemented as money becomes available, within the next ten years). Actions would include as necessary: replacing troughs, moving troughs away from springs and stream channels, hardening areas around trough areas, and revegetation work as needed. Spring protection would be replaced or improved as needed by rebuilding spring boxes and enlarging or rebuilding fenced out areas.

  Three areas along the Hogback Road (FR 4302) and two other areas near problem culverts have been identified as sites where cattle watering at road crossings cause localized bank disturbance. Hardening of these sites with rock is proposed to reduce disturbance and improve bank conditions and localized water quality.

- **Road Maintenance –** Road maintenance would continue to be the same as identified above in ongoing activities**.**

- **Recreation –** Recreation use would continue to be the same as identified above in on-going activities.

SOILS

This section incorporates by reference the South George Soils 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The scale of analysis for soil resources is the activity unit, where ground disturbing operations would occur (see Forest Plan reference below). Associated system roads and temporary roads are included in assessments. Characterization data (e.g. ecological settings) refers to the entire project planning area (approximately 21,000 acres).

Forest Plan - Standards and Guidelines (FP p. 4-80) - A minimum of 80 percent of an activity area is to be maintained in a condition of acceptable productivity potential. Acceptable productivity potential is defined as a less than 20 percent increase in bulk density in volcanic-ash derived soils and a less than 15 percent increase in bulk density in other forest soils (a measure of soil compaction); soil displacement of less than 50 percent of the topsoil or humus enriched A1 and/or AC horizons from an area of 100 square feet or more which is at least 5 feet in width; molding of soil in vehicle tracks and rutting of less than a 6 inch depth; or soils that are not burned severely due to prescribed fire. Further detail, clarification, and policy guidance is provided in Forest Service Manual (FSM) 2520.3, R6 Supplement 50, 6/87. This supplement has been updated in R6 Supplement 2500.98-1. Soil conditions exceeding these levels (thresholds) of acceptable productivity potential are considered in a detrimental soil condition (DSC).

Indicators for comparison purposes between alternatives are:

- **Detrimental Soil Condition** (DSC) as a percentage of the area of each activity unit, expressed in acres for comparison of alternatives. Permanent roads and temporary roads associated with harvest are included. As described above, soil conditions exceeding the thresholds for compaction, displacement, puddling, and severe burning are considered in a detrimental soil condition.
- **Effective ground cover**[1]- as a percentage of the area of each harvest unit. The number of units exceeding the minimum effective ground cover is used for comparison of alternatives. Inclusion of project design elements (Chapter 2, Table 2-5) and or Best Management Practices (BMPs), listed in Appendix D, for erosion control is also considered when assessing erosion hazard of proposed actions. This is particularly important for concentrated areas of disturbance, such as skid trails, where water can collect on linear, uninterrupted lengths without adequate control measures.

  The minimum percent of effective ground cover after cessation of any soil disturbing activity is as follows:

Table 3-2 Forest Plan (p. 4-80) Standards –
Minimum Percent of Effective Ground Cover after Soil Disturbing Activity

Erosion Hazard Class	Minimum Percent Effective Ground Cover	
	1st Year	2nd Year
Low (very slight, slight)	20-30%	30-40%
Medium (moderate)	30-45%	40-60%
High (severe)	45-60%	60-75%
Very High (very severe)	60-75%	75-90%

- **Coarse and fine woody debris** (also referred to as woody debris or small and large woody fuels) expressed in tons per acre. Coarse woody debris is typically defined as dead standing and downed pieces larger than 3 inches in diameter (Harmon and others 1986) and fine woody debris as smaller than 3 inches.

Guidance for methodology includes: *Protocol for Assessment and Management of Soil Quality Conditions*, Umatilla National Forest, 2002; and *Guidelines for Sampling Some Physical Conditions of Surface Soils,* Howes, Hazard, and Geist, US Forest Service Pacific Northwest Region, 1983.

AFFECTED ENVIRONMENT

Landscape Setting, Geology, and Soils

South George project planning area lies within the Tollgate Plateau Subsection in the far northern-most portion of the Blue Mountains section of the Blue Mountains Ecoregion (Province). The Tollgate Plateau is influenced by marine air flowing through the Columbia River Gorge and is particularly strong in this area with comparatively high rain and snowfall amounts and temperature moderated compared to southern portions of the Umatilla National Forest.

[1] Effective ground cover is defined as: all living or dead herbaceous or woody materials and rock fragments, greater than three-fourths of an inch in diameter, in contact with the ground surface. It includes tree or shrub seedlings, grass, forbs, litter, chips, etc.

The South George project planning area is in the northern-most part of the large anticline that is the Blue Mountains of northeastern Oregon and southeastern Washington. The rock type is dominated by Columbia River Basalt (CBR) group and comprised of the Grande Ronde and Wanapum lava flows (McKee 1972, as cited in Clark and Bryce 1997).

Soils are dominantly volcanic ash overlying basalt and andesite residual soils in varying depths. Some of the more stable soils in this area have a thin subsurface layer of loess on top of the (basalt/andesite) bedrock. Even the shallowest soils in non-forest positions have considerable volcanic ash mixing in the surface, and (therefore) exhibit some characteristics of deeper ash soils, notably dustiness.

Within units, soil type is quite variable, with the primary difference the depth of volcanic ash on the surface. This directly influences the plant communities that can grow there with the deeper ash soils supporting greater density of trees and moisture-demanding varieties. Ash soils are typically more susceptible to compaction and displacement impacts when dry. Shallower soils in the area are more susceptible to puddling and displacement impacts, especially when wet.

Additional descriptive characterization and dominant representative soil series typical of land type associations (LTA) in South George project planning area are located in the project file (Soils Report and Appendix E of this document). The Umatilla National Forest Soil Resource Inventory (SRI) was used for soil type identification and field verified by the Forest Soil Scientist for harvest units visited.

Detrimental Soil Condition (DSC)

Forest Plan standards and guidelines for management induced soil disturbance are described in terms of the amount of area of an activity unit (for example, a harvest unit) exceeding certain levels of soil impacts in degree and extent. Impacts that are considered include compaction, displacement, rutting (puddling), and severe burning from prescribed fire. Changes from natural conditions from any permitted or management directed activity (e.g. livestock grazing) is included in assessments. Impacts from compaction, displacement, and puddling, in particular, tend to be persistent and last many years in this area. A study in central Idaho indicates that natural recovery of the soil may take 40 to 70 years (Froehlich & McNabb 1984). The persistence of compacted soil over time, for example, determines its affect on stand response and the long-term effect on forest productivity. How long soils remain compacted is determined by natural recovery rates or tillage operations or both (McNabb and Froehlich 1983). As such, these impacts from previous soil disturbing actions are still observable. 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.

Harvest units in the project planning area were assessed for the extent and degree of previously impacted soil using field observation starting in the fall of 2005, the soil resource inventory (SRI) with field verification by the Forest Soil Scientist, prior history of activity (including harvest entries), and prior knowledge of sites from previous assessments by both district and Forest staff. Observations and ratings were done by field layout crews that had previous experience and training.

Units with prior harvest history and the likelihood for greater existing impacts were evaluated by the Forest Soil Scientist for quantitative assessment relative to Forest Plan standards and guidelines for detrimental soil condition. Soils have (also) been examined in the field by the Forest Soil Scientist during other project monitoring of previous management activities within the area. An estimate of DSC as a percentage of the area was assigned for each activity unit to provide a consistent tracking measure (see Appendix E, Table E-5).

The following table shows existing detrimental soil conditions within the project planning area:

Table 3-3 – Existing Detrimental Soil Condition in South George Project Planning Area

Area	Acres*
Harvest Units	57 acres
Temporary Roads	0 acres
Non-commercial thinning units	23 acres
Total	80 acres
*See Appendix E, Table E-6 for acres by unit.	

While previous entries are an indicator of silvicultural activity, it is not necessarily a strong indicator of current soil detrimental conditions as the reasons for entries (treatments) and impacts from them vary considerably. The historical entries data ranges from low disturbance thinning (often completed by hand) to higher disturbance activity such as tractor skidding, but under a variety of conditions producing highly variable effects. Natural recovery from these activities also varies considerably depending on soil type, location, weather, and other factors.

Mechanical thinning units observed have low levels of observable residual disturbance, and some moderate levels of detrimental soil conditions similar to proposed harvest units.

Effective Ground Cover

Forest Plan standards and guidelines describe minimum effective ground cover percentages (Table 3-2) after soil disturbing activity based on soil erosion hazard classes. Effective ground cover typically recovers quickly and is not a long-lasting condition. Effects to ground cover are also used as an erosion and sedimentation factor in the Hydrology section where erosion is discussed and modeled.

Effective ground cover in proposed activity units is within acceptable condition and Forest Plan standards. Accelerated erosion is not evident currently within units with little to no current ground disturbing activity that would create bare soil subject to erosion risk. Portions of units that received prior disturbance of ground cover removal have recovered. Vegetation typically recovers quickly from disturbance in these soil and climatic conditions that are found in this area.

Coarse and Fine Woody Debris

Maintaining soil productivity over the long-term generally requires presence of soil organic material and fire effects characteristic of the natural fire regime. Most fires characteristic of the historical fire regime or moderate severity prescribed fires are likely to enhance soil development and fertility over the long-term by periodic release of nutrients. However, extremely severe fires or large severely burned areas within fires, brought on by either rare natural events or humans, are likely to be highly detrimental to forest soils (Harvey et al. 1989). Graham and others (1994) developed conservative recommendations for leaving coarse woody debris (CWD) after timber harvesting to ensure enough organic matter was left to maintain long-term forest productivity, amounts adjusted based on the vegetation types. These vegetation types are a primary component of classification of forests into fire regimes (Agee 1993, Brown 1995).

The concern for woody debris levels is one of balancing retention of sufficient quantities of woody debris for organic matter retention and soil surface stabilization needs versus (too) large quantities such that wildfire in future years would create undue severity to the soil. The amount of coarse woody debris (CWD) that provides desirable biological benefits, without creating an unacceptable fire hazard or potential for high fire severity reburn, is an optimum quantity that can be useful for guiding management actions (Brown et al. 2003).

Current levels of woody debris are within or above recommended levels in most units. Typically fine material type is relatively quickly decomposed and incorporated into forest duff layers and eventually into the soil. Additional discussion of current conditions of fuel loads can be found in the Fuels section of this chapter.

ENVIRONMENTAL CONSEQUENCES

Most concerns to the soil resource resulting from ground disturbing activity center on potential detrimental effects to soil productivity, hydrologic and biological function, and risk of accelerated erosion.

This analysis discloses environmental effects relative to soil disturbance exceeding criteria for detrimental soil condition described in the Forest Plan, effects to effective ground cover, and coarse and fine woody debris as compared to Forest Plan guidelines. Other relevant soils issues are briefly discussed with references made to other sections in this EIS where these issues are further addressed.

This analysis takes into consideration local experience and knowledge of past harvest activities and comparison of activity units in this area having the same soil characteristics. This analysis is spatially bound by the harvest unit boundaries.

Alternative A- No Action

Direct/Indirect Effects – Alternative A

Detrimental Soil Condition (DSC)

This alternative would produce no increase or reduction in detrimental soil disturbance (detrimental soil condition) from logging or thinning operations and associated activities. No rehabilitation and native seeding of existing landings, skid trails, or unauthorized roads would occur. No road decommissioning or unauthorized trail rehabilitation would occur to improve soil productivity on detrimentally altered sites.

Effective Ground Cover

Effective ground cover would remain on all acres at current rates, with no temporary reductions due to surface disturbance and yarding of logs or burning of slash. Because the prescribed burning of piled logging slash would not occur, the potential for high burn severity sites from this activity would not be realized from piling. This would not exclude the potential of high burn severity from wildfire occurring with high fuel loads.

Coarse and Fine Woody Debris

Dead wood amounts would remain at current levels. Total dead wood amounts would be within or above the range recommended (Brown et al. 2003) on units that would otherwise be treated in action alternatives. The positive effects of higher wood amounts over the long-term would be accompanied by increased risk of high severity fire (Brown et al. 2003).

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects – Alternatives B, C, and D

Detrimental Soil Condition (DSC)

Vegetation Removal – Harvest - 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.

The intent of Forest Plan standards and guidelines for detrimental soil impacts is to minimize the extent (area) of detrimental levels of soil disturbance. Specifically, the total area in an activity area (e.g. harvest unit) should be 20 percent or less in area exceeding criteria for detrimental disturbance. Different types of impacts are combined together to produce detrimental soil condition (DSC).

Not all soil disturbance is detrimental to ecological processes or productivity, or creates an erosion hazard. Effects can vary by degree, extent, duration, and distribution depending on the highly variable soil and site characteristics (Jurgensen et al. 1997). Thresholds for detrimental thresholds for compaction, displacement, puddling, and severe burning are described in the Forest Plan or Forest Service Manual, Pacific Northwest Region Supplement 2500.98-1. Compaction is typically measured using bulk density changes, with a 20 percent or greater increase in ash soils, common in this area, considered exceeding detrimental thresholds. Displacement, puddling, and severe burn impacts have separate criteria for detrimental thresholds.

Project operational features with the objective of reducing the extent and degree of potential effects to soil are incorporated in design features for all action alternatives (see Chapter 2, Table 2-5). Contemporary ground based harvest system operation proposed for this project is capable of extracting timber with minimal area effects on soil resources. This requires careful control. It is common for operations on Umatilla National Forest using ground-based systems to impact less than 8 percent of an activity area. Skyline and helicopter systems have even lower results; typically less than 5 percent of an activity area is affected. Anticipated environmental effects are based on monitored results of previous timber harvest operations on Umatilla National Forest.

Soil mycorrhizael 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). Design criteria (Chapter 2, Table 2-5), timber sale contractual controls, and overall limitation of disturbance effects that could be detrimental to soil organisms are intended to minimize potential adverse effects to soil's physical, chemical, and biological character and processes. Rehabilitation work before final completion of unit operations further ameliorates long-term site effects. Response of soils and stands to earlier harvest activities with much greater disturbance levels than proposed in this project indicates that ecotypes (soils and vegetation) in the project planning area are resilient to disturbance. Tree growth and soil surface recovery is excellent in plantations in the area, providing indication of recovery of mycorrhizae populations. Positive repopulation in highly disturbed sites is observed in Harvey et al. 1997.

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.

In addition to avoiding adding excessive detrimental soil effects by operational design, mitigation in the form of subsoiling treatments in areas of highest compaction (landings, high-use skid trails) and revegetating with native species (grasses and trees), serves to reduce the total area of soils that would otherwise be in a detrimentally compacted condition. Some areas of previously compacted or puddled soil that would be reentered in this proposed project would also receive treatment, thereby reducing a portion of the existing detrimentally disturbed soil.

Table 3-4 below displays the total acres of detrimental soil condition by alternative. Alternative B shows a net increase of about 191 acres in total detrimental soil condition, Alternative C an increase of about 187 acres, and Alternative D an increase of about 126 acres. Remediation due to subsoiling would reduce areas in a highly compacted condition, but is not readily quantifiable due to the variable extent that it would be needed. It is not anticipated that subsoiling would be needed on skid trails except for some main trails adjacent to landings.

Non-Commercial Thinning and Planting – Manual hand thinning operations have no adverse effects to soils. Thinning slash, whether left in place or hand-piled, remains largely within units. Burning, if prescribed, often occurs from 1 to 3 years later allowing for needles to fall from branches and reduce fire threat to residual trees. Piles in residual stands are normally small enough that fire intensity from pile burning rarely gets hot enough to produce severe burning effects on the soil.

Planting activity has no direct adverse effects to soils, because effects are limited to walking and using a shovel or similar instrument to make a planting site for the seedlings. Indirect effects would be those related to transportation to and from the sites (road use) and associated effects from crews moving through the area.

Mechanical Fuels Treatment- Thinning - Mechanical thinning and or grapple-piling equipment is proposed in portions of the project planning area on about 800 acres. This equipment is usually grapple or mastication heads mounted on small-body excavators that have wide tracks. This type of equipment has relatively low ground-pressure and can work on top of downed logs and existing or created slash, and can produce additional compaction and some displacement while turning. Operation on downed slash and other woody material and use of existing trails keeps additional compaction and displacement effects low. Past monitoring of grapple-piling or mechanized thinning operations on Umatilla National Forest indicates detrimental soil impacts in the 0-2 percent range.

Riparian Habitat Conservation Area (RHCA) Mechanical Thinning (RHCA units 1 and 2) - The approximately 25 acres of fuels treatments proposed in riparian areas would be expected to create similar or lower disturbance levels as other mechanized equipment operations. Detrimental soil conditions would be expected to be similar or less than other mechanized operations, and would not add measurably to total estimates of DSC for action alternatives.

Landscape Prescribed Burning - Broadcast or landscape burning prescriptions would be expected to create little to no detrimental soil condition. Prescribed fire can create areas of high burn severity where concentrations of fuels provide for long (fire) residence times. Areas burned are expected to be spread

out over several years as to not have the entire area in a burned condition in any one year. The extent of high burn severity would be expected to be nearly immeasurable- under 1percent of the 3000 acres proposed.

Landscape burning can also produce a slight, temporary increase in erosion potential where bare, mineral soil is exposed with minimal to no vegetative buffer between surface water. Vegetative buffers reduce the transport of suspended sediment into streams and rivers. Should this condition occur it is expected to very limited in area and widely scattered and non-contiguous, producing minimal and likely immeasurable amounts of sediment. Fire line is projected to be either by black-line or hand construction. Any constructed line would be treated for erosion control. As such, this will add negligibly to total soil disturbance.

Danger Tree Removal - Danger tree removal along haul routes would create disturbance from felling and yarding operations. Typically this is soil compaction and displacement from mechanized equipment similar to timber harvest of larger trees. Soil disturbance would be limited to the area traveled by equipment used in removal of the danger tree. Detrimental soil condition would be limited in extent and typically is widely scattered in this type of operation, not adding measurably to DSC.

Effective Ground Cover

Vegetation acts as a barrier and shield to the soil from the impact of raindrops. In fact, any material on the surface helps protect the soil from the impacts of raindrops that displace soil. Effective ground cover includes limbs, tree boles, vegetation, or other material protecting soil from erosion.

Additional discussion of erosion and sedimentation may be found in the Hydrology section in this chapter.

Operational design criteria (Chapter 2, Table 2-5), best management practices (Appendix D), and particularly retention of branches and downed wood in skid trails and landing areas has been effective in mitigating potential erosion from these types of operations. Skyline systems affect very little ground but can create long, continuous areas of bare soil where one end of logs is dragged uphill, called skyline corridors. The continuity of these corridors is often broken by downed wood, slash dropping onto the corridor soil surface, and ground irregularities. Keeping erosion control measures (water bars, slash, etc.) current during and after operations is very effective in minimizing erosion hazard. Helicopter operations produce little in the way of increased erosion hazard outside of the areas used for landings. Landings are readily treatable for erosion control when use is completed.

No combination of harvest operation system and site treatment or fuels treatment (which also would be in subsequent years) in any one unit would produce levels of bare ground (lack of effective ground cover) over standards and guidelines or above a level of concern. Tree planting activity would not measurably decrease effective ground cover.

Broadcast burning affects future stand structure and succession (Grifantini et al. 1991). Burning can aid the establishment of planted conifers by reducing competing vegetation. Burning can also favor fire resistant plants such as grasses and some pioneering plants such as *Ceanothus* species, which add nutrients to the soil (Sexton 1994). Indirect effects of underburning slash and ground cover is proportional to underburn or landscape treatment acres.

In summary for this project, operational design features (Chapter 2, Table 2-5) choice of operation systems, the use of best management practices (Appendix D), and timber sale contractual controls are

designed so that no activity unit would exceed Forest Plan effective ground cover standards and guidelines.

Coarse and Fine Woody Debris

Soil productivity is irreplaceable in human timescales and should be protected (Beschta et al. 1995). Organic matter in the soil surface horizon plays a role in the regulation of water availability, movement and storage, soil structure and soil stability. Alteration of organic resources has a great influence on both biotic and abiotic properties of any given site (Harvey et al. 1987). The interactive roles of wildfire, forest management practices, and organic matter decay are critical for forest productivity in this region.

Professional experience and extensive research has shown that increased fuel loads can result in increased fire intensity and severity. In other words, given the same weather and topographic conditions, areas with higher fuel loads would burn hotter, have longer flame lengths, have greater potential to convert to crown fires, be more difficult to contain, pose greater risks to firefighters, kill more vegetation, and damage soils more severely than areas with lower fuel loads. Literature shows that when dead and live tree biomass increase, so does flame length and fireline intensity (Rothermal, 1983) and while large woody fuels have little influence on the spread of the initiating fire, they can contribute to development of large fires and high fire intensity and severity (Brown, et al. 2003), especially where fuel loads are continuous.

Slash burning has the potential to cause nutrient loss to the extent that forest duff and vegetation is consumed. This effect would be greater where post harvest underburn treatments are proposed.

Coarse woody debris (CWD) enhances microsite conditions and habitat, but is not in itself a great source of nutrients. Nutrients captured in coarse wood are brought to CWD habitat by animals and recycled by decomposers such as fungi. The environmental effects of log removal are primarily through wildlife habitat alterations.

Compared to no action, the direct effects of the proposed logging would reduce levels of snags (largely for safety reasons) and coarse wood in harvest units. In terms of both short and long-term soil productivity, the tree harvest represents some fundamental trade-offs to the nutrient cycle that organic matter fosters.

Tree bole removal would remove a long-term source of organic matter, while reducing the risk of localized severe fire effects in the future by reducing fuel loading where amounts are considered excessive.

Maintenance of adequate levels of soil and soil surface organic matter are key to mycorrhizael populations and healthy soils (Graham et al. 1994). Proposed actions are designed to maintain coarse wood levels to Forest Plan standards and recommendations by Graham.

Effects that Differ between Action Alternatives

Direct/Indirect Effects – Alternative C

Differences in the three action alternatives for harvest and associated activities are related to the switch to helicopter yarding in Alternative C. Helicopter acres increase to 550; skyline decreases to 625 acres; and tractor decreases to 2,725 acres (see Table 2-11, Comparison of Alternatives). The primary difference between the two, other than total units and differences in affected acres, is the miles and or acres of new temporary road construction and existing unauthorized use and road rehabilitation. Temporary road construction is eliminated in Alternative C, approximately 31 miles of system road decommissioning is proposed, and 15.5 miles of unauthorized roads and trails would be decommissioned. This represents about 75 acres of road rehabilitation, and about 19 acres of non-system road and trail rehabilitation.

Direct/Indirect Effects – Alternative D

In comparison to the proposed action (Alternative B), acres of skyline logging are reduced to 500 acres and acres of tractor logging to 1,800. Total acres are reduced in Alternative D by dropping units.

Cumulative Effects - Alternatives B, C, and D

The impacts to soil productivity would be created by the equipment used to implement this project. Therefore, this analysis is spatially bound by harvest unit boundaries, temporary access routes to those units, and the time it would take the soil to recover from the impacts and soil mitigations of proposed activities.

Detrimental Soil Condition (DSC)

Project proposed activities are designed with a considered balance between potential site effects and the feasibility of operations. Previous management activities disturbed soils to varying degrees and extent, with some effects still exceeding levels considered detrimental as described in the Forest Plan and Regional Guides. Existing soil disturbance is scattered across proposed activity areas, and concentrated on more level ground that is readily accessed. It is primarily in the form of old skid trails and access roads that were sufficiently disturbed at the time of their use and they remain in exceedance of criteria for detrimental disturbance levels. This existing detrimental soil condition is often referred to as legacy disturbance, and is factored into assessments of cumulative effects for new management actions.

A certain amount of overlap occurs when logging activity occurs in units with existing detrimental soil condition as machinery reuses some trails and landing sites. This tends to reduce the amount of added, new detrimental soil impacts. However, this was not used to reduce the estimated increase percentage in DSC in the assessment due to uncertainty on the extent of this effect on a specific unit. This would likely lead to some overestimation of total potential DSC in units with existing soil disturbance from previous activity. Tree planting activities would not contribute measurably to detrimental soil condition.

The reasonably foreseeable Eastside Burn prescribed fire (p. 3-3) is adjacent to activity areas in the South George project planning area. Treatment acres (burned) are anticipated to be spread out over several years, lighting different areas in subsequent years. This would keep excessively large areas from being in a burned condition which can increase erosion hazard during the following few months until vegetation has recovered. Vegetative recovery (in grasslands) is typically more robust than before the burning activity due to the release of nutrients and increased growing space.

Detrimental soil condition would be expected to be very slight as discussed in landscape burning above and would not be on the same acres as other land disturbing activities described in action alternatives.

Non-commercial thinning activities listed in the summary of reasonably foreseeable actions (p. 3-3) would be on different acres than proposed units in action alternatives, therefore, no additive detrimental soil condition would occur due to this activity. Little to no increased erosion hazard would occur due to thinning activities, therefore there would be no cumulative erosion hazard increase.

For Alternative C, road decommissioning of existing unauthorized roads and trails would increase acreage with improved productivity compared to current as these areas would be back into improved productive capacity and stabilized. This activity would also reduce the area with detrimental soil condition.

Table 3-4 below displays cumulative effects to detrimental soil disturbance by Alternative.

Table 3-4 Summary of Cumulative Detrimental Soil Condition (DSC) by Alternative

	Alternative			
	A (Existing Condition)	**B**	**C**	**D**
Detrimental Soil Condition – Acres	57	248	244	183
Temporary Road - Acres	0	7.2	0	5.5
Non-commercial Thinning - Acres	23	40	40	40
Roads and Trails Rehabilitated - Acres	0	0	94	0

Effective Ground Cover

With the exception of road surfaces, effective ground cover is minimally recovered within the timeframes mentioned on page 3-5 and essentially recovered within 3 to 5 years after cessation of disturbing activities (Umatilla NF monitoring). Therefore, effects within harvest units are assessed as short-term, direct, and indirect effects.

Coarse and Fine Woody Debris

When considering the incremental impacts of this project, then adding past, present and reasonably foreseeable future activities within the project area; it is determined no meaningful adverse cumulative effects to effective ground cover can be attributed to any of the action alternatives (Soils Report, Archuletta, page 4, project file).

FINDINGS OF CONSISTENCY

All alternatives would be consistent with Forest Plan standards and guidelines for achieving soil quality maintenance objectives. Action alternatives have been designed to achieve project objectives with minimal soil disturbance of any kind, especially activities that would create added erosion hazard, while balancing operational feasibility considerations. Existing areas of detrimental soil disturbance (DSC) that would be reused (e.g. old landings), and additional DSC from proposed activity, would be mitigated with decompaction treatments as needed and native seeding, thereby ameliorating existing detrimentally disturbed area. In addition, some of the existing roads and unauthorized trails (Alternative C) would be rehabilitated. This would improve their existing productive capacity, and move those particular units, and the project area as a whole, on an improving trend. Implementation of this project (also) meets guidance included in the Forest Service Manual, Pacific Northwest Region 6 Supplement 2500.98-1.

HYDROLOGY

This section incorporates by reference the South George Hydrology 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The hydrologic system and the hydrologic effects of proposed actions will be analyzed for National Forest System (NFS) lands by Hydrologic Unit Code (HUC) 6 Subwatershed (SWS). 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).

The following table lists subwatersheds (SWS) in Asotin Creek Watershed.

Table 3-5 Asotin Creek Subwatersheds

Subwatershed	SWS Name	Umatilla National Forest Acres	Total HUC 6 Acres	Percent of HUC 6 in NFS Management
170601030201	N. Fork Asotin Ck.	24,962	28,104	89%
170601030202	Lick Creek	8,261	12,403	67%
170601030203	***S. Fork Asotin Creek**	**11,931**	**25,794**	**46%**
170601030204	Charley Creek	9,241	14,403	64%
170601030205	Middle Asotin Creek	5	30,335	<.02%
170601030206	***Upper George Creek**	**8,722**	**21,655**	**40%**
*** SWS located in South George project planning area**				

Treatment alternatives are evaluated based on their effect to hydrologic function and condition, water quality, and water yield.

Indicators used for comparison purposes between alternatives are:

- Hydrologic Function and Condition:
  - road density
  - number of stream crossings
- Water Quality:
  - water temperature,
  - sediment
- Water Yield:
  - Equivalent Treatment Acre (ETA) Model

The methodologies used for hydrologic analysis conform to the best available science and accepted professional practices for managing forest and other associated natural resources, and are in accordance with the best professional judgment of practicing professional watershed specialists.

AFFECTED ENVIRONMENT

Elevations in South George project planning area range from about 3,200 feet where South Fork Asotin leaves NSF lands to about 6,000 feet at Wickiup Campground. Annual precipitation ranges from about 22 inches per year at lower elevations to 30 inches per year at the highest elevations. Ninety percent of the precipitation occurs between September and May with 30 percent of the winter's precipitation falling as snow. Tributaries and headwaters of South Fork Asotin Creek, from Dark Canyon south to Sheriff Gulch, drain the northern portion, and George Creek headwaters and tributaries south to Coombs Canyon drain the southern portion of the project planning area.

Topography of the area consists of uplifted Columbia River Basalts rocks. Folding and uplifting of the underlying bedrock has resulted in a plateau tilted slightly to the north and east. The increase in elevation from this uplift caused streams to cut down and form very steep, and generally narrow, v-shaped canyons.

Hydrologic Function and Condition

The following table shows road density by Asotin Creek subwatersheds.

Table 3-6- Road Density by Subwatershed

Subwatershed Number	Subwatershed (SWS) Name	Existing Road Miles (opened and closed)	Decom-missioned Road Miles	Existing Road Density (open and closed) mi per sq. mi.	Number of Stream Crossings
170601030201	N. Fork Asotin Creek.	56	5	1.4	na
170601030202	Lick Creek	24	30	1.8	na
170601030203	***S. Fork Asotin Creek**	**46**	**18**	**2.5**	**42**
170601030204	Charley Creek	64	20	4.4	na
170601030206	***Upper George Creek**	**48**	**2**	**3.5**	**40**
***SWS are in the South George project planning area.**					

Approximately 18 miles of road has been decommissioned in South Fork Asotin Creek SWS within the last twelve years. Road density declined from 3.3 to 2.5 miles per square mile, and riparian habitat conservation area (RHCA) roads in that SWS declined from over 9 miles to less than 2 miles. Full recontour and revegetation of these roads has reduced connectivity with and expansion of the drainage network. Routing of surface runoff and subsurface flow has been moved towards pre-management characteristics. However, localized water quality effects continue to occur. Upper George Creek SWS road density is 3.5 miles per square mile. Both SWS have few miles of road in RHCAs and about the same number of stream-road intersections. Many of these are ephemeral or intermittent crossings.

Unauthorized ATV trails are found over most of the project planning area. These unauthorized roads and trails are located throughout the planning area but are concentrated in upper elevation which is relatively flat and located off of Forest roads (FRs) 4302, 4300, 4304, and 4305060. In these locations many of the trails are old timber sale skid trails, or temporary roads which were never decommissioned and are kept open by illegal users. Lower elevation areas are less forested and user-developed ATV trails are found on most ridges leaving the project planning area and NFS lands. These trails increase the effective road density. Most are located in areas that do not drain into channels or cause sedimentation, but some unauthorized ATV use has localized hydrologic condition and water quality effects.

RHCA Condition - The Forest Plan was amended by PACFISH in 1995. Prior to that time, timber harvest units often extended to creek bottoms. Harvest history information was used to estimate RHCA harvest. From the mid 1960s to the implementation of PACFISH about 35 percent of the linear distance of RHCAs had harvest entries. Harvest was concentrated in the upper elevations of the project planning area and avoided the deep gorges of South Fork Asotin Creek and George Creek. Past entries ranged from clearcuts crossing channels to thinning in the outer edges of RHCAs. Logging practices at that time would have removed down wood in and near the channels as well as removing future recruitment. Reforestation of harvest units is required by NFMA and the RHCA portions of harvest units were planted with the rest of the unit. Trees are growing in these areas and the process of recovery has begun.

Water Quality

Water Temperature - Summer water temperature was collected on South George Creek at the Forest boundary for approximately 10 years between 1990 and 2003. Seven-day maximum averages were reported as shown in the following table.

Table 3-7 Water Temperatures (°F)
South George at Forest Boundary 7-day Maximum Average Temperatures

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
64	56	n/a	57	n/a	57	61	61	60	63	59	61

Several past harvest units in the upper watershed extended into the RHCA of South George Creek. Water temperature effects of those mid 1980s entries have not been quantified.

Sediment - Most road miles in the project planning area are not connected to the hydrologic system, that is, they do not cross channels and runoff from them does not enter surface waters.

Roads which are hydrologically connected are a risk to water quality. Observations made August 20, 2008 during a rain storm demonstrate this effect. Forest road (FR) 4300, although on the ridge, is entrenched in segments and water runs down the road for long stretches increasing in velocity and eroding sediment. It leaves the road at low points and deposits eroded sediment in areas that sometimes correspond with the headwaters of channels. FR 4302 (Hogback road) is an upper midslope road that crosses many draws and streams (South Fork Asotin and its headwater tributaries including Sheriff Gulch). Road surfacing gravel is old and not effective, rutting occurs during wet times of the year and road runoff is channelized in ruts and carries sediment into channels as it drains from the road.

FR 4300 near the junction with FR 4302 is constructed below the natural ground surface and therefore, cannot drain. Runoff from the August 2008 storm flowed down the road causing rills and shallow gullies until it was able to move off the road, where it deposited its sediment load. In this area FR 4300 is not near or other wise connected to the hydrologic system and so this sediment load does not cause water quality problems.

Culvert sizing and maintenance are critical to water quality protection. Two culverts have been identified that have recurring problems with plugging:

- FR 4305060 Coombs Canyon drainage
- FR 4300130 George Creek drainage

The project planning area is part of the Asotin Cattle and Horse (C&H) Allotment. Cattle trails along channels between FR 40 on the ridge and FR 4302 at mid slope are causing enough channel disturbance and bank damage to contribute to erosion, sedimentation, and elevated turbidities during rain events, as witnessed during the August 2008 storm. Access to water at road crossings of stream crossings leads to concentrated use and contributes to water quality problems. Erosion and sedimentation associated with certain roads and with some cattle watering locations causes localized water quality problems. The location high in the watershed and on small and intermittent channels limits the transport of sediments downstream. It is unlikely that this sedimentation is detectable as streams leave NFS lands

Water Yield

The relationship between created openings in forested landscapes and changes in water yield and peak flows has been documented by numerous studies. Changes in these parameters would be of concern for aquatic habitat and biota, downstream water users, and for channel morphology. Recent reviews of literature demonstrate that the relationship is highly variable (Stednick 1995, and Scherer 2001). Generally effects are not seen below 15-20 percent equivalent clearcut or treatment acres (ECA or ETA) and in a local study; effects were not seen below 50 percent ECA (Helvey 1995). Grant et al. 2008 suggests that increased peakflows could occur at greater than or equal to 20 percent ECA and the potential for effects to channel morphology is in the 5-10 year recurrence interval flow ranges.

Umatilla National Forest equivalent treatment acre (ETA) model (Ager and Clifton 2005) was used to evaluate the cumulative effects of harvest through time in this project planning area, and to see what change the proposed alternatives would make to this indicator.

Table 3-8 displays the results of this model for the condition in 2010. Subwatersheds in the project planning area and others in the HUC 5 Watershed where the project is located are below any threshold of concern that has been identified. Management caused changes in water yield, timing of flow, or peak flow are negligible.

Table 3-8 Equivalent Treatment Acre (ETA) Percent in 2010 Asotin Creek Watershed

Subwatershed Number	Subwatershed Name	Existing ETA %
170601030201	N. Fork Asotin Creek.	1.9%
170601030202	Lick Creek	5.8%
170601030203	***S. Fork Asotin Creek**	**3.1%**
170601030204	**Charley Creek	12.9%
170601030206	***Upper George Creek**	**3.1%**
*** indicates SWS located in project planning area**		
**calculated for Upper Charlie EIS, ongoing, not in harvested data base at this time		

CLEAN WATER ACT

Congress has designated the State of Washington as having responsibility to implement the Clean Water Act. This Act requires that water quality standards be developed to protect beneficial uses and a list be developed of water quality impaired streams (303d list). The South George project planning area is located in the Asotin Basin.

Beneficial Uses

Beneficial uses have been identified by the State of Washington. The following descriptions apply to the streams in the project planning area (State of Washington, WAC 173-201A-606 Table 602).

George Creek above Coombs Canyon (including tributaries)

Char (Bull Trout) spawning and rearing
Extraordinary Primary Contact (recreation)
Domestic, Industrial, Agricultural, and Stock water supply uses

Asotin River from and including Charley Creek to headwaters (including tributaries)

Core Summer Salmonid Habitat
Extraordinary Primary Contact (recreation)
Domestic, Industrial, Agricultural, and Stock water supply uses

Water Quality Standards

Water quality standards are based on life stages of fish and the most restrictive need sets the standard. The table below shows water quality criteria for George Creek and Asotin River (State of Washington WAC 173-201A-200).

Table 3-9 Water Quality Criteria

	Aquatic Life Uses	Temperature Criteria	Turbidity Criteria
George Creek	Char Spawning and Rearing	12ºC (53.6ºF)	Not to exceed 5 NTU over background
Asotin River	Core Summer Salmonid Habitat	16ºC (60.8ºF)	

Impaired Waterbodies-303d Category 5 Streams

The most recent water quality assessment in Washington State was made in 2008 (State of Washington, Washington State Department of Ecology, Washington State's Water Quality Assessment and 303(d) List, 2008).

South George project planning area has two 303d listed streams segments. George Creek is listed for water temperature upstream of the forest boundary. A comparison of NFS water temperature data Table 3-7, with temperature standards for George Creek and Table 3-9 shows the basis for the listing. Forest Service collected data varies over the period of record, but is always above the standard. South Fork Asotin is listed for water temperature near the confluences of Redhill and Sheriff Gulches. There are several other listings downstream of the forest boundary.

Forest Service's responsibilities under the Clean Water Act are defined in a November 2000 Memorandum of Agreement (MOA) between Washington State Department of Ecology and the Forest Service. The MOA designates the Forest Service as the management agency responsible for meeting the Clean Water Act on NFS lands and recognizes best management practices (BMPs) as the primary mechanism to control nonpoint source pollution on NFS lands. It further recognizes that they are developed by the Forest Service as part of the planning process. This means the Forest Service is responsible for defining and implementing appropriate BMPs for National Forest Lands to meet the Clean Water Act. BMPs that apply to this project are identified in Chapter 2, Table 2-5, and Appendix D.

ENVIRONMENTAL CONSEQUENCES

National Forest Service (NFS) lands are located in the highest elevation, headwater location of the subwatersheds and cannot be analyzed to the same detail or using the same methodology as those on NFS comprise less than half the acres of each of the two subwatersheds in the project area (Table 3-5). Topographic and vegetative characteristics change gradually from the head to mouth of the subwatersheds as elevation and precipitation decline. Information on actions on non-NFS lands is limited lands and cannot be analyzed to the same detail or using the same methodology as those on NFS lands.

Cumulative effects for all hydrologic indicators are analyzed using HUC 6 subwatersheds. This geographic extend encompasses the area that reasonably could be affected by the South George project.

Cumulative effects for water quality are analyzed for short-term one day to one week and for long-term, up to one year. These time scales were chosen to display short-term concentrated effects, and longer-term seasonal effects that are sometimes seen during spring runoff.

Cumulative effects for water yield are calculated using records of timber harvest activity dating to the 1960s. The Equivalent Treatment Acre (ETA) model has a 33 year time-frame for the slowest sites to recover hydrologically (collection, storage, and release of precipitation). Although vegetation management proposed in the project may occur over a number of years, the calculation is done as if it all occurs in one year, therefore shows the maximum effect that could be expected.

Alternative A – No Action

Direct/Indirect Effects - Alternative A

Hydrologic Condition and Function

No change to the existing road system is foreseen under this alternative. Road density and proximity to channels would remain the same. Few of the project planning area roads have regular maintenance. Problems identified in the existing condition section would remain, and through time would worsen to some degree as weather and use degrade road drainage.

Water Quality

Water temperature -Water temperature would improve slowly over time as near channel vegetation grew and provided more shade. The magnitude of this change is unknown and related to the degree that shade currently departs from site potential. Disturbance events like fires and floods could reverse this trend. The timeframe for shade and water temperature improvement is long, related to the growth rate of site potential vegetation, which in the case of conifers is measured in decades.

Sediment -Ongoing use by ungulates and continued lack of road maintenance would be the primary management related sources of accelerated erosion. Natural disturbance regimes like flood and fire would be the dominant sediment risks for the future.

Water Yield

The affected environment disclosed above discusses analysis methods and results. In subwatersheds with existing recent harvest, vegetative recovery through time would reduce ETA values. Current values of ETA suggest that there is no measurable difference between current conditions and those with no harvest. Additional growth of conifer stands into the future would not measurably change water yield or peak flows.

Cumulative Effects -Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

Water Quality

Water Temperature

RHCA Fuels Treatment – non-commercial mechanical thinning (RHCA units 1 and 2) - All action alternatives propose removing some trees in the RHCA along about 0.6 miles (approximately 25 acres) of an unnamed tributary to George Creek. This stream is a PACFISH Category 2, perennial non-fish bearing stream. Removal would occur across the entire RHCA on both sides of the channel to reduce probability of crown fire initiation, disrupt crown continuity, and use prescribed fire to reduce existing and created ground material. The treatment would occur in two units located near or at the Forest boundary. This entry is designed to protect the stands from fire moving up the drainage from private lands (project file, Fuels RHCA Specialists Report, p. 1).

Summer stream temperature increases due to removal of riparian vegetation are well documented and have lead to development of BMPs (Appendix D) to protect shade. The sun's angle (zenith- height above the horizon) and sun position through the day (azimuth) together with vegetation and channel characteristics influence shade and its effectiveness in protecting and maintaining water temperatures, vegetation height, location, and density, stream width, orientation, and steepness of adjacent uplands. Peak stream temperatures occur in July and August.

Many variables are involved in determining water temperature and the effect shade removal can have on water temperature. Differing results are seen in the literature. Two studies cited below discuss the effect of harvest on small headwater stream temperatures and the downstream temperature effect to fish bearing reaches.

A 1991 study of water temperature effects of riparian harvest in small perennial headwater streams on larger fish bearing streams of riparian harvest in small perennial headwater streams found very minimal influence on downstream water temperature. This was attributed to the difference in stream size; relative amount of flow between the treated and the receiving waters. The study found that water temperature in small streams was responsive to localized conditions and quickly came into equilibrium with downstream conditions. Higher than expected shade levels were found in logged reaches, including logging debris and understory brush in these western Washington streams (Caldwell et al. 1991).

More recently, the water temperature effect of headwater riparian harvest was evaluated in a northern Idaho study. Two treatment types were evaluated; clearcut or partial cut (thinning) on 50 percent of the drainage. One clearcut site showed an increase in peak water temperature in the stream reach of the clearcut, the downstream effect was slight. Temperature effects in the partial cut watershed ranged from very slight to no change. Long-term monitoring sites on downstream fish bearing streams showed no

change in the extent or timing of summer maximum water temperatures. Annual variation in precipitation, snow pack, and summer air temperatures, as well as ground water influence, and increased base flow contributed to these results (Gravelle et al. 2007).

The proposed treatment would reduce RHCA basal area by about 20 percent and overall stand canopy closure would drop by 10 percent (project file Silviculturist RHCA Report, p. 1). The tributary channel is perennial non-fish bearing with a few subsurface segments in late fall. Field measurements and estimates were made in July 2009.

Mid summer flows in the tributary are low <0.5 cfs, and make up about one-quarter of the flow of George Creek at the confluence which is about 0.25 mile below the end of treatments at the Forest boundary. Water temperature was cool, 9° C at the Forest boundary (11:30 am, July 14, 2009). The stream drains to the northeast and is shaded by vegetation on the northwest facing slope (southeast side of the creek). A steep inner gorge (approximately 70 percent) is present and the overall gradient of the adjacent slope is approximately 50 percent. The valley bottom is 10-12 feet wide and in some places is entirely occupied by spring high flows. Shade is provided by the lower levels of the conifer canopy as well as the over-story canopy.

Specific design features will be implemented (Chapter 2, Table 2-5) for the RHCA thinning project.

Model derived shade nomographs were used to evaluate the site potential effective shade, that is, the shade that protects water temperature. Using these nomographs and based on local site conditions; channel width and orientation and the height and density of over-story vegetation, existing effective shade in the proposed treatment area is estimated at about 90 percent (USDA, 2005).

Shade reduction from this treatment would be low, but could lead to a short-term small increase in water temperature in the small stream. Shade would recover over 10 to 20 years as the conifer crowns fill in the area (Forest Silviculturist, personal communication). Increased shrub growth would depend on reduced shading and is unlikely to be strong (D. Powell, Forest Silviculturist, personal communication).

This project proposes treatment on about 0.50 mile of channel. Water temperature increase in the tributary due to this project would be expected to be small based on design criteria that would limit shade reductions to 10 percent leaving an estimated 80 percent effective shade. The treatments end at the Forest boundary, about 0.25 mile above the confluence with George Creek and the treated tributary is about one-quarter of the flow of George Creek at the confluence.

A small reduction in shade would occur with these treatments and there is potential that water temperature in the tributary could increase slightly due to the treatment. Since the tributary flow is a small portion of George Creek, about one-quarter of the flow, only a small effect on George Creek would be expected. It is unlikely that there would be a measurable water temperature increase in George Creek from the RHCA fuels treatment (RHCA units 1 and 2). This fuels treatment would not be expected to prevent attainment or retard recovery of the water temperature Riparian Management Objective (RMO).

Monitoring would be used to evaluate the effects of RHCA thinning on water temperature (Chapter 2, p. 2-22).

Other Proposed Activities - Commercial harvest activities, activity fuels treatments, and landscape prescribed fire, would not occur inside of interim PACFISH RHCAs. RHCA widths range from 1-2 tree heights depending on flow regime and the presence and or absence of fish (Umatilla National Forest, 1990). Shade is controlled by about 1 tree height (FEMAT, 1993). There would be no effect to water temperature from these treatments.

Fire ignition for landscape prescribed fire or activity fuel treatments would not occur inside RHCAs but fire would be allowed to back into RHCAs. No ignition and increased moisture in RHCAs would cause fire intensity to drop and reduce fuel consumption. Shade would not be significantly reduced and potential effects to water temperature would be negligible.

Danger trees would be felled along all haul routes used for the proposed timber sales. They would be left on the ground inside RHCAs and commercially removed elsewhere. Most stream crossings on haul routes are ephemeral or intermittent with no or very low summer flows. Danger trees felled on haul routes within RHCAs of perennial streams would have a negligible effect on shade density for affected streams.

Sediment

RHCA Fuels Treatment-non-commercial mechanical thinning (RHCA units 1 and 2) - Special design features for tree removal in about 25 acres of RHCA are listed in Chapter 2, Table 2-5. Hand felling, full suspension tree removal systems with no yarding related soil disturbance in the RHCA, overall limit of 10 percent soil disturbance within RHCAs, and protection of bank and channel stabilizing trees would protect ground cover and prevent detectable erosion and sedimentation due to implementation of this project. No measurable effect to water quality would be expected.

Road Drainage on Haul Routes - Timber sale road maintenance work, in advance of timber sale use, would add drainage features and spot rock in areas that currently erode into surface waters on haul routes. The road surface approaching and leaving the culverts carrying water under FR 4302 would be resurfaced with gravel. The length of resurfacing would be approximately 200 feet either side of the culvert. Inlets of the perennial drainages would be armored also. Stream crossings on Forest Roads 4300 and 4304 would also be improved. These are ongoing sources of sedimentation into surface waters. Improved drainage provided by proposed timber sales would reduce this sedimentation and prevent or minimize additional sedimentation from timber haul. Armoring culvert headwalls on FR 4302 would also serve to harden some locations where cattle have traditionally watered from the road. This annual source of channel damage and sedimentation into streams would be reduced or eliminated.

A culvert on FR4300130 would be removed before haul. This undersized culvert has plugged from excessive erosion and sedimentation caused by unauthorized ATV use. This is an open road and the channel is an early season intermittent stream with no fish use. This culvert would be removed and the channel recontoured to natural dimensions after the stream has dried up for the year. A rock ford would be constructed to protect the channel. Completion of work after flow has ceased, and rocking the channel would minimize erosion and sedimentation from the culvert removal. Sedimentation caused by water flowing over the road due to the plugged culvert would be eliminated for a net benefit to water quality.

Coombs Canyon culvert on FR 4304060 has plugged in the past, causing the creek to cross on the surface of the road creating small gullies and washing sediment into the creek. This is a fish bearing stream with habitat above the culvert. For this sale and if necessary for post sale activities, normal drainage maintenance would be performed. After the completion of activities the culvert would be removed and the crossing reshaped to match the plan and profile of the stream. An existing gate would be moved from its current location past the culvert, back toward the beginning of the road. Culvert work would be done

during the instream work window and water would be diverted around the work site for the instream portion of the work as required by the memorandum of understanding (MOU) 2005 with Washington Department of Fish and Wildlife (WDFW) for instream work. Other specific design criteria in Attachment A of the MOU would be followed. Short term, less than one day, sedimentation and turbidity would occur during this work and as the flow of Coombs Canyon Creek was returned to the channel. Coombs Canyon has very low summer flows, less than 1 cfs. The channel has step-pool morphology with pools formed by downed wood (personal communication Del Groat, District Fish Biologist, 2010 field surveys) that provide a depositional environment. It is unlikely that measureable sediment would pass the National Forest boundary. Higher flows, associated with spring runoff would complete the process of washing fines from the new channel bottom. Sediment contribution from this very limited extent of channel disturbance, less than 30 feet, would not be detectable in the background sediment load of spring runoff.

Natural Fuels Treatments - Non-commercial mechanical thinning and ladder fuel removal would occur on about 800 acres, hand thinning and ladder fuel removal would occur on about 650 acres and landscape burning would occur on approximately 3,000 acres. No mechanical or hand thinning would occur in RHCAs (except for the area mentioned above in RHCA thinning). No ignition would take place inside RHCAs during landscape prescribed burning though fire would be allowed to back into RHCAs; there would be very little effect to existing down material and vegetation density in near channel positions. The potential for sediment to reach channels from these treatments is negligible.

Danger Tree Removal - This activity would occur along haul routes. Danger trees felled inside RHCAs would be left on the ground and no ground disturbance would occur. Removal of danger trees outside of RHCAs could lead to ground disturbance as equipment traveled off-road or trees were winched to the road. Slope distances would be short and erosion and sedimentation would be unlikely. Undisturbed RHCAs would protect channels and surface waters from sedimentation that might occur.

Alternative B – Proposed Action (Preferred Alternative)

Direct/Indirect Effects – Alternative B

Hydrologic Condition and Function

Roads - This alternative does not propose any change to the existing road system. Road density and proximity to channels would remain the same. Road maintenance as described in Chapter 2 would occur on haul routes. This maintenance would be expected to improve drainage as discussed above. Road density in Upper George Creek SWS is high. Stream crossings are used as an indicator of the degree of connectivity between the road system and the drainage network. To the degree that these roads are connected to the drainage network the risk of road sediments reaching surface waters is increased. The drainage network is lengthened and the potential for precipitation to drain more quickly with less residence time in the watershed is increased.

Three miles of temporary road would be constructed in Alternative B (see maps in Appendix A). The road locations would be upslope of channel formation on relatively flat ground with no hydrologic connectivity. Cut and fill construction would be negligible. Decompaction, pulling of berms, recontouring, camouflage of entrance, and revegetation would be used to completely decommission these roads at the completion of timber harvest. No effects to watershed function would occur.

Past road decommissioning in South Fork Asotin Creek SWS has reduced road densities and connectivity with channels. There has been little road decommissioning in Upper George Creek SWS.

Table 3-10 Road Density, Stream Crossings, and Road Decommissioning

		Alternatives A, B, and D				Alternative C After Road Decommissioning			
Subwatershed Number	SWS Name	Opened and Closed Roads (miles)	Previous Decom-missioned Roads (miles)	Rd. Density mi/ sq. mi. (open and closed)	# of Stream Cross-ings	Opened and Closed after Decom	Miles of System Road Decom	Rd. Density mi/ sq. mi (open and closed)	# of Stream Cross-ings
170601030203	S. Fork Asotin	46	15	2.5	42	39	7	2.1	30
170601030206	Upper George	48	2	3.5	40	24	23	1.8	12

GIS layers were used to generate a report of number of stream crossings which is used to indicate the level of connectivity between roads and streams. Limitations in the accuracy of the stream layer and in the degree of resolution (+- 30 ft.) make the data useful only as an indicator and not as an exact count of crossings.

Water Quality

Sediment -Alternative B would commercially harvest about 300 acres with helicopter systems, about 850 acres with skyline logging systems, and approximately 2,750 acres with conventional ground based logging systems with tops attached to the last log. Fuels treatments on these acres would include a mix of about 820 acres of grapple pile and burn, and about 2,030 acres of prescribed burning.

With the exception of the 25 acres of RHCA fuels treatment (RHCA units 1 and 2) design features (Chapter 2, Table 2-5) for these actions would include no harvest in RHCAs using PACFISH interim widths, and slope gradients that would not exceed 35 percent on ground based harvest units. These design features would prevent damage that could contribute to erosion and sedimentation into channels and streams (Belt et al. 1992). Slope gradients would not exceed 35 percent on ground based harvest units. In units logged with helicopter systems mineral soil exposure would be minor and scattered on an otherwise undisturbed ground surface. Skyline systems are low disturbance systems with an average trail spacing about 100 feet apart and at least one-end suspension. Ground disturbance in corridors would be expected from the bottom of the unit to the landing, one to two meters wide (Craig Busskohl, Forest Soil Scientist, personal communication). Erosion control consisting of waterbars and mulching where surface roughness was not sufficient to divert water from the corridor would reduce erosion but not eliminate erosion potential. Corridors typically fan out from a tower setting and do not concentrate runoff beyond their individual drainage. Generally infiltration would occur before surface runoff accumulated to the degree necessary for erosion. Waterbars would drain corridors at spacing which would normally prevent the development of erosive surface velocities. The combination of limited drainage area and erosion control would reduce and generally prevent surface erosion. Conventional logging systems with tops attached to the last log would have the potential for more soil disturbance. Average trail spacing would be 100 feet, which helps to reduce the overall quantity of disturbance. Infiltration and mulching with logging slash and/or water bars would prevent surface erosion. Surrounding undisturbed vegetation and RHCA protection would prevent transport of any eroded sediment into surface waters.

With the exception of the approximately 25 acres discussed above, no fuels treatment would occur in RHCAs. No ignition would occur in RHCAs during fuels treatments though fire would be allowed to back into them where they are adjacent to prescribed fire. There would be very little effect to existing down material and vegetation density in near channel positions. The potential for sediment to reach channels from these treatments is negligible.

Road maintenance would occur on about 79 miles of system roads used by timber sales and would include blading, ditch relief culvert cleanout, and ditch cleanout on portions of road where needed. Culvert cleanout and necessary ditch cleanout would lead to immediate reductions in risk from the road system. Closed roads would be left in a self-maintaining condition. Detrimental effects from ditch cleanout would be short-term, less than one year.

Erosion and sedimentation effects of log haul on forest roads have been the subject of numerous studies. Log haul has been demonstrated to increase sedimentation from hydrologically connected roads during precipitation events, with the effect decreasing as traffic is reduced or ends (Reid 1984). Dry season use of roads or restricting logging traffic during surface runoff from roads can reduce this effect by interrupting or reducing the road-stream connectivity. Design criteria include the halting of log haul when turbid water leaving roadways had a potential to enter surface waters.

In a study of sediment production from forest roads, newly cleaned ditches were found to have a sediment yield substantially more than blading of the road surface or traffic use (Luce and Black 2001). This is likely due to the disruption of armored or vegetated surfaces, leading to a larger supply of fine, erodible sediment in a feature that carries water during storms. Ditch clean out would be used only when ditch function was compromised and would minimize disturbance of existing vegetation and natural armoring, practices which are common on the Umatilla National Forest. Road use restrictions and minimized ditch cleanout would reduce sediment production from road use to the extent possible.

Cumulative Effects – Alternative B

Hydrologic Function and Condition

The current road system would not change in Alternative B, and temporary road construction would be located and managed such that there would be no effect to the drainage network. Projects proposed in Alternative B would have no measurable direct affects to hydrologic function and condition. There is some potential that harvest units may increase the accessibility of stream channels to cattle (BE and Report for Aquatic Species, Project File) which could lead to damage to stream banks and riparian vegetation. There would be negligible effects downstream of NFS lands therefore; cumulative effects with ongoing activities and effects on private lands would be negligible.

Water Quality

Water Temperature –The proposed RHCA fuels treatment (RHCA units 1 and 2) would have a low potential for measureable affect to water temperature in George Creek. Downstream of NFS lands some private home development, in the riparian area of George Creek downstream of NFS lands, may affect water temperature. It is unlikely that water temperature effects from the RHCA fuels treatment (units 1 and 2) would be measurable and cumulative water temperature effects would be negligible.

Sediment - Road work that would occur with proposed timber sales would reduce erosion and sedimentation from stream crossings that are currently causing localized impacts leading to a localized improvement in water quality. Short-term, less than one day, measurable turbidity is likely to occur during removal of the culvert on Coombs Creek, a perennial channel. This effect is not likely to be measurable below the Forest boundary, approximately 3 miles downstream.

There is some possibility that harvest units may increase the accessibility of cattle to stream channels which could lead to trampling in stream channels. Based on the magnitude and offsite effects currently seen on FR 4302 from cattle access to streams, sedimentation from increased cattle access would be small

and the small volume of water instream and the amount of woody debris in the channels of the area would prevent measurable quantities from traveling far. Current logging on private lands in Upper George Creek subwatershed drains into George Creek about 2 miles below the Forest boundary and there is negligible opportunity for cumulative sediment effects with direct or indirect effects of project activities proposed in South George Vegetation and Fuels Management Project.

Water Yield

Effects of past harvest and road building, proposed harvest, and landscape burning on water yield and peak flows were analyzed and cumulated with the Equivalent Treatment Acre (ETA) Model as described in the Affected Environment section above. Table 3-11 displays the results of the analysis. Harvest prescriptions have varying ETA coefficients depending on residual stand post harvest and activity fuel treatment. ETA percentages increase in the two subwatersheds of the South George project planning area. The increases are below levels at which effects have been seen to water yield, peakflows, or timing of peakflows, as discussed in the Affected Environment section above. Proposed harvest and landscape burning would have no measurable effect to hydrologic functions; capture, storage, and release of water.

Table 3-11 Equivalent Treatment Acres by Percent in 2010

Subwatershed Number	Subwatershed Name	Alt. A	Alt. B	Alt. C	Alt. D
170601030201	N. Fork Asotin Creek.	1.9%	1.2%	1.2%	1.2%
170601030202	Lick Creek	5.8%	4.1%	4.1%	4.1%
170601030203	***S. Fork Asotin Creek**	**3.1%**	**13.4%**	**13.2%**	**8.9%**
170601030204	**Charley Creek	12.9%	12.9%	12.9%	12.9%
170601030206	***Upper George Creek**	**3.1%**	**8.9%**	**8.2%**	**5.5%**
*** indicates SWS in project planning area**					
**calculated for Upper Charlie EIS, ongoing, not in harvested data base at this time					

Ongoing Activities and Future Foreseeable Projects - The Eastside landscape prescribed burning project will treat 4,500 acres over 10-year period. The list of design criteria for this project includes the stopping of ignition 600 feet from streams. Backing fire is very unlikely to enter RHCAs. No affect to shade or water temperature would occur and no measurable sediment would reach surface waters. Ongoing pre-commercial thinning projects totaling about 1,500 acres would not mechanically thin inside RHCAs and hand thinning would not remove any existing shade on channels. Grazing and unauthorized ATV use as described in the Affected Environment section above would continue.

South George project planning area overlaps the Asotin C&H Allotment. Restoration and protection measures would be implemented at spring sites and stream crossings to reduce impacts from cattle. It is expected that these projects would be implemented as money becomes available, over the next ten years.

Springs have been identified for protection and or restoration and ongoing efforts are making improvements. Cold Spring water trough was replaced and re-plumbed in 2010, ending the muddy conditions in the area. Other springs identified for improvement include Park Spring, Seven Sister's Spring, Round Prairie pond and spring, and Hostetler Springs. Actions would include as necessary: replacing troughs, moving troughs away from springs and stream channels, hardening areas around trough areas, revegetation work as needed. Spring protection would be replaced or improved as needed by rebuilding spring boxes and enlarging or rebuilding fenced out areas.

Several areas along the Hogback Road (FR 4302) and two other areas near problem culverts have been identified as sites where cattle watering at stream crossings cause localized bank disturbance. These sites

have been identified to be hardened with rock to reduce disturbance and improve bank conditions and localized water quality as funds become available. Some of these sites would be hardened as part of road maintenance and drainage improvement for proposed timber sales. Implementation of these projects would reduce ongoing, localized damage to springs and channels and improve localized watershed function (storage and release of groundwater) and improve water quality by reducing localized damage to stream banks and springs.

Alternative C

Direct/Indirect Effects – Alternative C

Hydrologic Function and Condition

Roads - Road maintenance would occur on haul routes, the same roads and mileage as in Alternative B. This would be expected to improve drainage as discussed above. There would be no temporary road construction.

Approximately 31 miles of system road decommissioning is proposed in Alternative C. Long-term storage standards would be used to decommission about 1.5 miles of these roads; FR 4304060 and 4305060. Culverts would be pulled, channels recontoured, ditches blocked, and any other work necessary to disconnect the roads from the hydrologic system. They would be subsoiled and revegetated but the templates would not be recontoured. An approximate additional 1.0 mile of decommissioning would be to a standard that would allow grazing permittee access to stock ponds, narrowing of road plus the long-term storage standards; FR 4304040. Other roads would be recontoured as needed. An additional 15.5 miles of unauthorized non-system roads and ATV trails would also be decommissioned with implementation of this alternative.

About 23 miles of system roads identified for decommissioning would be used by timber sales and post-sale activities such as, activity fuels treatments. Fuel treatments require specific weather conditions to implement and can take up to 10 years to accomplish. Improvement to hydrologic function due to reduced road density and reduced hydrologic connectivity would be achieved after completion of fuels treatments. About 8 miles of system roads and all of the approximately 15.5 miles of non system roads and trails would be available for decommissioning immediately.

Road density would decline noticeably, especially in Upper George Creek SWS, as would stream crossings (Table 3-10). Unauthorized roads and trails are not mapped and so have not been included in road density calculations. Using common estimates of 2 acres per mile of road, approximately 31 acres of current road beds would be rehabilitated to improve soil condition, reduce erosion and erosion potential, and improve vegetative cover.

Road and trail decommissioning would improve hydrologic function and condition by improving infiltration on nearly 100 acres of currently compacted lands, decreasing risks of erosion and soil damage. Reductions in hydrologic connectivity would reduce risks associated with sedimentation and drainage network expansion.

Water Quality

Sediment - Acres of harvest and activity and natural fuel treatments would remain the same as in Alternative B. No temporary roads would be constructed, and this would result in 250 acres identified as having a skyline harvest system in Alternative B changing to a helicopter system in this alternative. Activity fuel treatments would remain the same as in Alternative B. Design features for these actions would be the same as described in Alternative B (Chapter 2, Table 2-5). Effects would be substantially the same as discussed in Alternative B, with slightly less ground disturbance on about 250 acres that would be logged by helicopter rather than skyline systems.

Haul route use and maintenance would be the same as discussed in Alternative B. In addition to benefits from road maintenance as discussed in Alternative B, road and trail decommissioning would reduce ongoing erosion and sedimentation as projects are completed. Most channel recontouring would occur in ephemeral swales at the head of drainages and in ephemeral channels. No offsite effects would occur from these actions. Road decommissioning would remove culverts from about 10 intermittent streams. This work would be done after channels had dried-up for the year. Short-term localized effects could occur where culverts are removed. The culvert from a perennial stream would be removed on FR 4305060. Fish are found at the outlet of the culvert. Washington State Department of Fish and Wildlife standards, bypassing streamflows and working during the instream work period, would be used to minimize sedimentation and its effect to fisheries. Short-term increases in sediment could occur, for not more than one day. Reductions in annual sedimentation would be expected since the culvert has repeatedly plugged sending flows across the road. Cattle use of this road would continue and their use after culvert removal would cause an unknown, and not likely to be measurable, amount of erosion and sedimentation.

Cumulative Effects – Alternative C

Temporal and geographic scale of cumulative effects would be the same as described in Alternative B.

Hydrologic Function and Condition

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. The potential for effects of increased cattle access to riparian areas would remain the same as in Alternative B. Both beneficial and detrimental effects to hydrologic function and condition would be localized and unmeasurable downstream of NFS lands. Cumulative effects with actions downstream of the National Forest would be negligible.

Water Quality

Water temperature and sediment cumulative effects would remain the same as those discussed in Alternative B. It is unlikely that water temperature effects from the RHCA fuels treatments would be measurable and cumulative water temperature effects would be negligible. There is negligible opportunity for cumulative sediment effects with direct or indirect effects of proposed project activities in South George Project. Localized water quality would improve over other alternatives as road and trail decommissioning reduced erosion and sedimentation into surface

Water Yield

Cumulative effects would be similar for Alternative C harvest and fuels activities as discussed for Alternative B. Slightly lower ETA values reflect road decommissioning proposed in this alternative (Table 3-11).

Cumulative effects with ongoing activities and future foreseeable projects would be similar to those discussed in Alternative B. Some degree of reduction in unauthorized ATV use could be expected as the unauthorized trail system was rehabilitated.

Alternative D

Direct/Indirect Effects – Alternative D

Hydrologic Function and Condition

Roads - No change to the existing road system would occur with Alternative D. Road density and proximity to channels would remain the same. Fewer acres would be harvested in this alternative and about 10 percent fewer miles of road would be used for haul. Main haul routes would remain the same as other alternatives and road maintenance would occur on haul routes as discussed above. This would be expected to improve drainage as discussed above. Temporary road construction of approximately 2.20 miles would occur. No road decommissioning of system roads or of unauthorized roads and trails would occur in this alternative. Slightly fewer (2.25 miles) of temporary road construction would occur, and about 8 miles less of closed roads would be opened. No road decommissioning of system roads or unauthorized roads and trails would occur in this alternative. Beneficial effects of road decommissioning described in Alternative C would not occur.

Water Quality

Sediment - Alternative D would commercially harvest about 300 acres with a helicopter logging systems, 500 acres with skyline logging systems, and 1,800 acres with conventional ground based logging systems. Fuels treatments on these acres would include a mix of about 600 acres of grapple pile and burn, and approximately 1,400 acres of prescribed burning. These treatment acres are about one-third less than the other action alternatives.

Design features for this alternative would be the same as those described in Alternative B. Effects would be similar to, but somewhat less than those described in Alternative B.

Road maintenance would occur on about 71 miles of road. Main haul routes would remain the same as other alternatives and road maintenance would occur on haul routes as discussed above. Sediment reductions would be as described above.

Cumulative Effects – Alternative D

Temporal and geographic scale of cumulative effects would be the same as described in Alternative B.

Hydrologic Function and Condition

Projects proposed in Alternative D would have no measurable offsite affects to hydrologic function or water quality; water temperature or sediment load. Improvements in hydrologic function and condition as described in Alternative C would be foregone.

Water Quality

Water temperature and sediment cumulative effects would remain the same as those discussed in Alternative B. It is unlikely that water temperature effects from the RHCA fuels treatment would be measurable and cumulative water temperature effects would be negligible. There is negligible opportunity for cumulative sediment effects with direct or indirect effects of proposed project activities in the South George Project. Alternative D harvest and fuels activities would have similar water quality effects as discussed for Alternative B.

Water Yield

Slightly lower ETA values reflect reductions in harvest proposed in this alternative (Table 3-11).

Cumulative effects with ongoing activities and future foreseeable projects would be similar to those discussed in Alternative B.

FINDINGS OF CONSISTENCY

Clean Water Act Compliance

Umatilla National Forest incorporated protection of water quality as an important management goal and explicitly set ground disturbance and shade standards to protect it in the 1990 Land and Resource Management Plan (Forest Plan). In the mid 1990s PACFISH amended the plan by adding standards and guides and RHCA protections designed for, among other objectives, maintenance and recovery of shade and morphology components (including sediment regime) of water temperature. Managing to these standards has protected ground cover and existing shade and allowed for recovery of those elements at near natural rates for a decade. Restoration work aimed at reducing sediment sources through road decommissioning has been ongoing, much of it occurring since the floods of 1996 and 1997.

Umatilla National Forest has a high rate of compliance with BMPs. School Fire Salvage EIS RHCAs were monitored in 2006. Buffers on 18 units, 23 percent of identified RHCA influence units, were monitored in July and August 2006. Results are displayed in the table below. Average buffer widths exceeded standards for all stream categories.

Table -3-12 Average Buffer Width by Stream Category for School Fire Salvage Sales

	Average (ft)	Number of Measurements	PACFISH Standard
Fish Bearing Streams	325	32	300
Perennial Non Fish Bearing	187	59	150
Intermittent	150	87	100
Dissected Ephemeral	36	34	No standard BMP = 25'

RHCA effectiveness was also measured and reported in 2001 as follows: no cases of erosion or sedimentation were observed post harvest in RHCAs.

RHCA fuels treatment (RHCA units 1 and 2) would be unlikely to measurably affect water temperature in George Creek, a stream that has water temperature impairments. The fuels treatment prescription reduces over-story shade by 10 percent or less. Summer low flows in the treated tributary are very low, about one-half cfs, and make up about one-quarter of the flow of George Creek at their confluence which is

one- quarter mile downstream from the treated area. The potential for a very small change in water temperature in the fuels treatment area is unlikely to be transmitted downstream to George Creek. Water temperature monitoring on George Creek will begin during the summer of 2011, prior to the proposed fuels treatment and will be continued past the implementation of the treatment.

Identification of BMPs for the proposed projects has occurred (Appendix D) and any project which might occur in this planning area would be considered for monitoring in the Umatilla National Forest annual BMP monitoring plan. These activities would not detrimentally affect beneficial uses. Riparian and channel components that protect water quality would be maintained. Other design features (Chapter 2, Table 2-5) and BMPs would control disturbance that could lead to erosion and sedimentation. Effects of proposed actions would not adversely or measurably affect water temperature or dissolved oxygen (DO). Short-term measurable turbidity effects could occur during replacement of a culvert. Best management practices have been incorporated into project design criteria for the culvert replacement and will be monitored. This proposed project is in compliance with the Clean Water Act.

Forest Plan Compliance
Implementation of design features (Chapter 2, Table 2-5) and BMPs (Appendix D) as described above, Umatilla National Forest Road Use Rules, as well as standard timber sale contract specifications or the corresponding stewardship contract specifications would constitute compliance with the Forest Plan for hydrologic and water quality components.

THREATENED, ENDANGERED, SENSITIVE (TES) and MANAGEMENT INDICATOR (MIS) AQUATIC SPECIES

This section incorporates by reference the South George Biological Evaluation for TES Aquatic Species 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

Sub-watersheds affected by the project are the South Fork Asotin Creek (HUC 6-170601030203) and Upper George Creek (HUC 6-170601030206) of the 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 Table 3-5 in the Hydrology section and 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 that could affect TES aquatic species (pages 3-2 to 3-4).

Indicators used to analyze effects of proposed actions are as follows:

- Effects to TES (biological determinations) and MIS Aquatic Species

The entire South George project planning area contains about 21,000 acres with three fish bearing subwatersheds. South Fork Asotin and Upper George Creeks are classified as a Class I (anadromous), third order streams, which presently do not have anadromous habitat within National Forest boundaries.

Coombs Creek a tributary of George Creek is classified as a Class II (resident), third order stream. The lower end of this stream is important anadromous rearing habitat. Rainbow trout is the dominant fish species throughout George and South Fork Asotin Creeks. Rainbow trout was the only fish species found in the survey area. Bull Trout are historical and were found recently in a Washington Department of Fish and Wildlife survey of South Fork Asotin Creek, no recent surveys indicate the presence of Bull Trout in the project area.

The following table shows all listed and proposed, endangered, threatened, and sensitive vertebrate and invertebrate listed by the United States Department of Interior and all sensitive species included in the Regional Forester's (Region 6) list of species occurring on Umatilla National Forest for the project. Steelhead trout (anadromous) and rainbow trout (resident redband) are designated aquatic management indicator species (MIS) for Umatilla National Forest.

Table 3-13 Listed and Proposed Invertebrates and Vertebrates Occurring On Umatilla National Forest

SPECIES	*ESA STATUS *	HABITAT PRESENT IN WS**	HABITAT PRESENT WITHIN SWS**	SPECIES PRESENT IN PROJECT AREA
INVERTEBRATES				
Western Ridged Mussel	S	No	No	No
Shortface Lanx	S	No	No	No
Pristine Springsnail	S	No	No	No
Fir Pinwheel (Terrestrial)	S	Yes	Yes	Unknown
Hell's Canyon Land Snail (Terrestrial)	S	Yes	No	No
Humped Coin (Terrestrial)	S	Yes	Yes	Unknown
Barry's Hairstreak (Terrestrial)	S	Yes	No	No
Meadow Fritillary (Terrestrial)	S	Yes	Yes	No
Great Basin Fritillary (Terrestrial)	S	Yes	Yes	No
FISH				
Snake River fall Chinook Salmon	T	Yes/No	No	No
Snake River spring Chinook Salmon	T	Yes	No	No
Snake River summer Steelhead (MIS)	T	Yes	Yes/Unoccupied	No
Mid. Columbia River Steelhead (MIS)	T	No	No	No
Redband Trout - (MIS)	S	Yes	Yes	Yes
Columbia River Bull Trout	T	Yes	Yes	Not Found
Margined Sculpin	S	Yes	Yes	Yes
West-slope Cutthroat Trout	S	Potential	No	No
Pacific Lamprey	S	Re-introduced	Unknown	No
AMPHIBIANS				
Northern Leopard Frog	S	Yes	Unknown	Unknown
Columbia Spotted Frog (Oregon only, no further discussion)	S	Yes	Unknown	Unknown
Tailed Frog	S	Yes	Yes	Yes
Painted Turtle (Oregon only, no further discussion)	S	No	No	No

*ESA – Endangered Species Act - T = Federally listed Threatened species, S = Regional Forester's Sensitive Species List,
**WS-Watershed - SWS- Subwatershed

The species listed below will not be analyzed further in this section because they have no habitat present in the watershed or subwatershed, are not present or noted in any survey in the project area, or are only listed in Oregon (see Table 3-13). The species are as follows: Western Ridged Mussel, Shortface Lanx, Pristine Springsnail, Mid-Columbia River Steelhead, West-slope Cutthroat Trout, Pacific Lamprey, Northern Leopard Frog, Columbia spotted Frog, and Painted Turtle.

Effects to terrestrial invertebrates that have habitat present in the watershed and or subwatershed but are not present or unknown (Fir Pinwheel, Hells's Canyon Land Snail, Barry's Hairstreak, Meadow Fritillary, and Great Basin Fritillary) have a "*No impact*" biological determination except for Humped Coin which has a "*May Impact individuals or habitat …"* biological determination because if there were species present, it may be affected by ground disturbing activity.

The following table summarizes data collected using Hankin and Reeves stream survey techniques for proposed endangered, threatened aquatic species. This table highlights stream attributes relevant to these species. This data corresponds to Forest Service field surveys conducted typically in July and or August.

Table 3-14 Stream Survey Data in S. Fork Asotin Creek and George Creek Subwatersheds

Attribute	S. Fork Asotin Reach 1 8/9/93	S. Fork Asotin Rep Reach 10/10/08	George Creek Reach 1 7/22/93	George Creek Reach 1 8/01	PACFISH RMOs
Pools per Mile	10	30	16	45	**Varies by width**
Large Woody Debris per Mile (>12"dbh)	84	138	40	42	**> 20' x >12"**
Water Temperature (Maximum Surveyed)	48°F	58°F	58°F	63°F	**< 61° F**
Width to Depth Ratio (in feet)	8:1	8:1	9:1	10:1	**10:1or less**
Substrate Embeddedness	31%	18%	38%	<25%	**25% or less**
% Fines Wolmans* Average	None Taken	16%	None Taken	31%	**N/A**

Notes - * Wolman's survey attributes collected after 1996 survey years…

AFFECTED ENVIRONMENT - Snake River Spring/Summer/Fall Chinook Salmon (*Oncorhynchus tshawytscha)*

North Fork of Asotin is the primary location of spawning habitat in Asotin watershed. This habitat is located approximately seven miles downstream from the Forest Boundary of the project activities. It is also the primary habitat of rearing fish because temperature and sediments values are ideal for production. However, past activities and downstream habitat destruction has caused the population to be considered extirpated by Washington Department of Fish and Wildlife (WDFW) fish biologists. A great deal of restoration activity has been completed since the listing of the species. More recent surveys indicate occasional straying from other watersheds. Few redds have been observed but some juveniles have been seen in downstream WDFW survey traps. Chinook salmon spawning habitat was historically present in the waters above the confluence of the South Fork Asotin creek. Little spawning activity was noted below this point because of instream temperatures.

Fall Chinook are not present in the Asotin Watershed. Spring/summer Chinook salmon do not occupy George Creek for either spawning or rearing habitats. There is a thermal barrier (temperatures too high) that is unfavorable to Chinook salmon, the mouth of the stream is somewhat inaccessible, and there is a stretch of dry channel that acts as a fish barrier in George Creek about one-half mile upstream that would hinder upstream travels during low flows. Stream survey data from previous years concluded that there is no Chinook salmon in Upper George Creek subwatershed. No Chinook salmon were observed in Forest surveys.

South Fork Asotin Creek has no mid-summer migratory fish habitat because of thermal, low flow channel fish barriers. No Chinook salmon were observed in Forest surveys. There is some anecdotal information that concluded juveniles might use the lower one-quarter mile near the mouth.

ENVIRONMENTAL CONSEQUENCES - Snake River Spring/Summer Chinook Salmon

Alternative A – No Action

Direct/Indirect and Cumulative Effects – Alternative A

There would be no direct and or indirect effects from proposed activities. There would be no ground disturbance to affect either temperature or sediment. No beneficial effects would be achieved by the reduction of sediment from improved road conditions with improvements resulting from proposed timber sale activities.

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative. Conditions would not improve or decline further.

Effects Common to all Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

No direct effects to species and or habitat would occur. This determination is based on the premise that no Chinook and or habitat exists within the project planning area, and that available downstream habitat and species (nearly seven miles downstream) would not be adversely affected. Potential spawning occurs well below the Forest boundary at the confluence of South Fork Asotin.

Soils are well drained in the area and the erosion hazard is moderate to high.

Temperature would be unaffected because harvest units would not influence any stream shade. Equivalent Treatment Acres (ETAs) meet the desired future condition (DFC) of less than 20 percent for all alternatives in the drainage (see Table 3-11). Increased flow or timing of the runoff should remain unchanged. Instream temperatures would remain near the DFC for salmon.

Indirect effects from sediment potential (increased access to riparian habitats from cattle) are minimal because of the distance to potential spawning fish. Chinook spawn and occupy habitat seven miles downstream at the nearest point to project activity. Downstream temperatures would be unaffected because the activity would not influence any perennial stream shade. Increases in the flow or timing of the runoff should remain unchanged.

Burning occurring generally outside riparian areas (except for about 25 acres proposed for treatment, (RHCA units 1 and 2) which occur only in George Creek subwatershed, not chinook bearing habitat) have indirect effects on riparian areas by increasing the potential transport of sediment, biomass, or water through the riparian zone. Low intensity burning within a riparian area often top-kills most shrubs and deciduous trees, but due to these species being able to resprout, soil stability is not impaired. Large ponderosa pine, Douglas-fir, or western larch easily survive these low intensity fires, but if Engelmann spruce or subalpine fir is present (higher elevations) they are almost always killed (a project objective) (Agee, 1994).

Project design features (Chapter 2, Table 2-5) show that riparian buffers (PACFISH requirements for RHCAs) within the area will not be ignited. Black line or natural fuel breaks would be utilized to keep fire out of the buffers. Due to riparian buffers being used, and because burning would occur during early spring-like conditions (low-intensity burning) this project is expected to have no effect on riparian areas.

Cumulative Effects – Alternatives B, C, and D

Salmon have the potential to occupy habitat seven miles downstream. Even in the short-term, there is really no potential for the introduction of sediment and or other materials to the creek except during seasonal high flows, especially from fire projects or grazing impacts. The downstream reaches should, in the long-term (i.e. post-project ground disturbances that have erosion control measures implemented), see a reduction of the overall sediment produced and contributed to intermittent stream channels and the potential downstream migration. This is based upon the completion of Asotin Watershed restoration activities (i.e. meander reconstruction, road obliteration, trail relocations, shrub and tree plantings and bank stabilization, reconstruction of the road surfaces) occurring in the watershed.

For all action alternatives (B, C, and D) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

AFFECTED ENVIRONMENT -Snake River Summer Steelhead (*Oncorhynchus mykiss)*

Steelhead trout and rainbow trout[2] are designated aquatic management indicator species (MIS) for Umatilla National Forest. Stream surveys conducted in 1993, 2001 and 2008 concluded that O. mykiss that could be identified as steelhead were occupying South Fork and George Creeks. Steelhead are present at least to the Washington State and or Forest boundaries. However, non-anadromous O. mykiss were also observed during these surveys. WDFW surveys conclude South Fork Asotin Creek is one of the most prolific spawn areas for its stream size in the Washington State.

WDFW redd counts on South Fork of Asotin and Upper George Creek has revealed that steelhead reach nearly to the Forest boundary in each subwatershed. No redds were observed on Forest Service lands. However, rearing juveniles may migrate to upstream habitat. No distinction has been made to identify redband or steelhead.

[2] Steelhead trout (anadromous) and rainbow trout (resident redband) are designated aquatic Management Indicators Species (MIS) for Umatilla National Forest. Umatilla Forest Plan, prior to PACFISH/INFISH, mandated that MIS species was to be managed at 90 percent of the Smolt Habitat Capability Index. This is considered outdated science and PACFISH/INFISH which amended Umatilla Forest Plan established goals that are in place to restore near natural conditions which will ensure recovery. Streams surveys and broadscale efforts are in place to collect data and indicate very healthy populations. These watersheds have restricted access and no fishing allowed, protecting the species.

The North Fork of Asotin Creek is also known as occupied steelhead habitat. The spawning habitat range extends from the confluence of South Fork of Asotin Creek south as far as Middle Branch. The rearing habitat may extend further upstream.

ENVIRONMENTAL CONSEQUENCES - Snake River Summer Steelhead

Alternative A – No Action

Direct/Indirect and Cumulative Effects – Alternative A

Same as for Snake River spring/summer Chinook Salmon.

Effects Common to all Action Alternatives (B, C, and D)

Direct/Indirect Effects – Alternatives B, C, and D

No direct effects to species and or habitat would occur. This determination is based on the premise that no steelhead or habitat exists within the project planning area and that available downstream habitat and species (approximately one-half mile downstream at nearest point) would not be adversely affected. South Fork Asotin and Upper George Creeks have extensive spawning in the first two miles from the mouth and have been known to spawn within one-half mile of the National Forest boundary and juveniles occupy habitat up through the Washington State land and may range onto National Forest lands.

Temperature would be unaffected because harvest units would not influence any stream shade. Equivalent Treatment Acres (ETAs) meet the desired future condition (DFC) of less than 20 percent for all alternatives in the drainage (see Table 3-11). Increased flow or timing of the runoff should remain unchanged. Instream temperatures would remain near the DFC for salmonids.

Burning occurring generally outside riparian areas (except for about 25 acres proposed for treatment – RHCA units 1 and 2) have indirect effects on riparian areas by increasing the potential transport of sediment, biomass, or water through the riparian zone. Low intensity burning within a riparian area often top-kills most shrubs and deciduous trees, but due to these species being able to resprout, soil stability is not impaired. Large ponderosa pine, Douglas-fir, or western larch easily survive these low intensity fires, but if Engelmann spruce or subalpine fir is present (higher elevations) they are almost always killed (a project objective) (Agee, 1994).

Controlled burning on about 25 acres (RHCA units 1 and 2) in the RHCA, and road decommissioning activities within the project planning area are designed to comply with the Endangered Species Act-Section 7 Programmatic Consultation Biological and Conference Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation: Fish Habitat Restoration Activities in Oregon and Washington, CY2007-CY2012, by National Marine Fisheries Service, Northwest Region, re-issued June 27, 2008 (FS 2008/03505). Controlled burning is consistent with design criteria for Category 13 of the July 27, 2008 document, and road decommissioning is consistent with design criteria for Category 18 (see Appendix F).

Project design features (Chapter 2, Table 2-5) show that riparian buffers (PACFISH requirements for RHCAs) within the area will not be ignited. Black line or natural fuel breaks will be utilized to keep fire out of the buffers. Due to riparian buffers being used, and because burning would occur during early spring-like conditions (low-intensity burning) this project is expected to have no effect on riparian areas.

There is potential for the introduction of sediment and or other materials during the seasonal high flows in the short-term (season of disturbance before green-up). However, this is not expected to be measureable

above background levels. Projects proposed in all action alternatives would have no measurable offsite effects to hydrologic function or water quality; water temperature or sediment load. Road work that would occur with proposed timber sales would reduce erosion and sedimentation from stream crossings that are currently causing localized impacts leading to a localized improvement in water quality (S. Peterson, North Zone Hydrologist, 2009).

Indirect effects to aquatic species are minimal because of the distance to potential spawning fish and steelhead spawn in higher more turbulent flows in early spring when waters are naturally more turbid. Temperature would not be affected because proposed activities would not influence any perennial stream shade. Increases in the flow or timing of the runoff should remain unchanged.

Soils on slopes are shallow, coarse-textured residual soils and are well drained. Erosion hazard is moderate to high in these riparian zones. Dry channel and benching mitigates unfavorable degradation of occupied habitat downstream of the project planning area and from upslope and ridgetop activities.

Best Management Practices (BMPs) and timber sale contract clauses would be included to insure minimal ground disturbance and to provide adequate mitigation (Appendix D). Effectiveness and implementation monitoring would be performed by timber resource personnel (the presale technician will assure BMPs are met during sale preparation and the timber sale administrator will assure BMPs are met during timber sale operations.

The proposed 25 acres of RHCA treatments (RHCA units 1 and 2) have been designed to fall within the intent and project design criteria of Category 13, Riparian Vegetation Treatment (controlled burning) in ARBO (see Appendix F). These are specific and separate criteria from the BMP's for the rest of the project area.

Cumulative Effects – Alternatives B, C, and D

There are other ongoing and reasonably foreseeable activities (pages 3-2 to 3-4) in the area that have been determined to have an effect on critical habitats (i.e. timber harvest, burning, and grazing). This project may exacerbate these effects by increasing the accessibility of cattle to perennial waters. At this site specific level there may be cumulative adverse effects that could be added to effects to downstream critical habitats. Initially these may be negative in nature. If RMO values continue to improve positively, these effects may be negated. This rationale is based upon the completion of restoration activities (i.e. road obliteration, cutslope planting and stabilization, in-channel habitat restoration, reconstruction of the road surface and the culvert replacements).

For all action alternatives (B, C, and D) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

AFFECTED ENVIRONMENT - Redband Trout *(Oncorhynchus mykiss)*

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 Columbia. Steelhead trout (anadromous) and rainbow trout (resident redband) are the designated aquatic Management Indicators Species (MIS) for the Umatilla National Forest. Rainbow trout were found in the project area, although stream surveys conducted in 1993, 2001 and 2008 found no Redband trout (*Oncorhynchus mykiss*) in George and South Fork Creeks, (i.e. by definition - species could not be confirmed as not having hatchery origins). This small population seems to be spawning and rearing in the habitat present. This population is not isolated from hatchery populations from the North Fork and main Asotin creeks. Therefore, by definition, no Redband trout were found in, below, or directly above the project area. However, these are well defined prolific populations that have not had hatchery introduction for many years and should be considered redband.

ENVIRONMENTAL CONSEQUENCES – Redband Trout

Alternative A – No Action

Direct/Indirect and Cumulative Effects – Alternative A

Same as for Snake River spring/summer Chinook Salmon.

Effects Common to all Action Alternatives (B, C, and D)

Direct/Indirect Effects – Alternatives B, C, and D

Riparian areas would be buffered using PACFISH standards and guidelines (Chapter 2, Table 2-5) for implementation of proposed project activities in all action alternatives. Most of the existing habitat has geographic and or physical barriers (i.e. slope, downed wood, timber etc.) that curbs access to riparian areas and would not be affected by harvest activities. However, some interaction with these high elevation fish may be possible and quite likely in some areas. Seasonal use by cattle is outside the spawning period for these species.

Indirectly the loss of timber and wood that keep livestock from migrating to the riparian may be diminished. Cattle could then access riparian habitat, but terms and conditions in term grazing permits require permittees to move the animals upon their discovery in riparian areas. Indirectly in the short-term there is potential for the introduction of sediment and or other materials to the creek during the seasonal high flows, however, this is not expected to be measureable above background levels. Projects proposed in the action alternatives would have no measurable offsite effects to hydrologic function or water quality; water temperature or sediment load. Road work that would occur with proposed timber sales would reduce erosion and sedimentation from stream crossings that are currently causing localized impacts leading to a localized improvement in water quality (S. Peterson, North Zone Hydrologist, 2009).

Cumulative Effects – Alternatives B, C, and D

There are other ongoing activities in the area that have been determined to have an effect on critical habitats (i.e. timber harvest, burning, and grazing). This project may exacerbate these effects by increasing the accessibility of cattle to perennial waters. At these site specific levels there may be cumulative adverse effects that could add to effects to downstream critical habitats. With continued completion of restoration activities (i.e. road obliteration, cutslope planting and stabilization, in-channel habitat restoration, reconstruction of the road surface and the culvert replacements) and RMO values continue to improve positively these effects may be negated.

AFFECTED ENVIRONMENT - Bull Trout (*Salvelinus confluentus)*

Stream surveys conducted in 1993, 2001 and 2008 concluded that no Bull Trout were occupying South Fork Asotin and Upper George Creeks. No suitable spawning and rearing habitat were observed during the surveys. No Bull Trout occupy either stream on Forest Service lands. In the 1993 survey Bull Trout were initially thought to be present however, a subsequent survey to confirm was unsuccessful in finding Bull Trout, several other attempts were made to confirm presence and or absence. These additional attempts found no Bull Trout present. In 2008 a survey was conducted on Washington State lands of the South Fork, and an individual was recovered (Eco-Logical Research, Bennett 2008). Glen Mendle, Washington Department of Fish and Wildlife (WDFW) biologist confirmed that rarely do they find Bull Trout in either system (2009). The only known habitat within this watershed recedes in the North Fork Asotin above the confluences of South Fork Asotin. Spawning and rearing, along with over wintering habitat occur in these reaches. Some adfluvial migratory habitat is also present. The conclusion is for

these project subwatersheds of South Fork Asotin and Upper George Creek, is that individuals may be present, but no spawning and rearing habitat is currently occupied.

On January 14, 2010 the United States Fish and Wildlife Service proposed to revise the designation of critical habitat for Bull Trout in the coterminous United States (Federal Register, Vol. 75, No. 9; 50 CFR Part 17, p. 2270). This proposed designation includes habitat on Umatilla National Forest and within South George project planning area on Pomeroy Ranger District.

ENVIRONMENTAL CONSEQUENCES – Bull Trout

Alternative A – No Action

Direct/Indirect and Cumulative Effects – Alternative A

There would be no direct or indirect effects. There would be no ground disturbance to affect either temperature or sediment. However, no beneficial effects would be achieved by the reduction of sediment from improved road conditions projects derived from the sale.

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (page 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to all Action Alternatives (B, C, and D)

Direct/Indirect Effects – Alternatives B, C, and D

There would be no direct effects to species and or habitat with implementation of any action alternative. This is based on the premise that no Bull Trout and or habitat exist within project activity units, and available downstream habitat and species (approximately one-half mile downstream at nearest point) would not be adversely affected. South Fork Asotin and George Creeks contain no known spawning occurrences in either stream. Juveniles are known to occasionally occupy habitat up through Washington State land and may range onto FS lands. Most Bull Trout spawning occurs above Lick Creek confluence, about one mile upstream from the confluence of South Fork Asotin, located high in the watershed above Middle Branch on the North Fork which is outside the influence of this project. RMO's are at or near the natural or desired future condition (see Table 3-14). Proper Functioning Channels exist in fish bearing habitats for Rosgen B channel types.

Indirect effects from proposed project activities are minimal because of the distance and location to potential spawning fish. Water temperature would be unaffected because proposed activities would not influence any stream shade. Increased flow or timing of runoff should remain unchanged. The proposed fuels treatment on approximately 25 acres in the RHCA is not on a fishbearing stream and has benching occurring between the project and downstream designated critical habitat about one-half mile away. Bull trout have not been seen in George Creek subwatershed for approximately thirty years.

Indirectly the loss of timber and wood that keep livestock from migrating to the riparian may be diminished. Cattle then could access the habitat, but permittees are required, by their permit, to move the animals out of the riparian area if they are found to be located there. Most of the habitat has geographic and or physical barriers (i.e. slope, downed wood, timber etc.) that limit and or restrict the animal's access to riparian areas.

In the project planning area soils on the slopes are shallow, coarse-textured residual soils. The parent basalt is evident in numerous talus and outcrops. Draw bottoms and the mouths of canyons contain a deeper mixed soil from colluvial basalt, volcanic ash, and Palouse loess. Soils are well drained. Erosion hazard is moderate to high in those riparian zones. However, the species is not present in the project area. Dry channel and benching mitigate unfavorable degradation of possible downstream occupied or migration habitat.

Cumulative Effects – Alternative B, C, and D

In the short-term there is potential for the introduction of sediment and or other materials to the creek during the seasonal high flows, however, this is not expected to be measureable above background levels. Project activities proposed in the action alternatives would have no measurable offsite effects to hydrologic function or water quality; water temperature or sediment load. Road work that would occur with proposed timber sales would reduce erosion and sedimentation from stream crossings that are currently causing localized impacts leading to a localized improvement in water quality (S. Peterson, Hydrologist, 2009).

There are other activities in the area that have been determined to have an effect on critical habitats (i.e. timber harvest, burning, and private land grazing). It is assumed that Upper George and South Fork Asotin Creeks both have a few isolated individuals of Bull Trout due to migratory life history. At the site-specific level the proposed project's effects are negligible. Cumulatively there would be no added effects on downstream designated critical habitats. In the long-term these affected reaches should see an increase in the reduction of the overall sediment produced and contributed to intermittent stream channels and the potential of downstream migration. RMO values continue to improve positively outside the forest. This is based upon the continued completion of the restoration activities (i.e. road obliteration, cutslope planting and stabilization, in-channel habitat restoration, reconstruction of the road surface and the culvert replacements). Seasonal cattle use is outside the spawning period for these species on remaining public lands. Critical habitat would not be negatively affected by implementation of any action alternative.

For all action alternatives (B, C, and D) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

AFFECTED ENVIRONMENT - Margined Sculpin (*Cottus marginatus)*

In 1999 and 2000, WDFW confirmed the presence of margined sculpin in Asotin Watershed while conducting steelhead juvenile electro-fishing. Indications are that the species is prevalent along with Paiute sculpin (*cottus belldigi*). The species was not specifically found in South Fork, Coombs, or George Creek during WDFW's survey. Species were found during surveys taken by the Forest Service.

ENVIRONMENTAL CONSEQUENCES – Margined Sculpin

Alternative A – No Action

Direct/Indirect and Cumulative Effects – Alternative A

Since there would be no activities implemented, there would be no direct or indirect effects.

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (page 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to all Action Alternatives

Direct/Indirect Effects – Alternatives B, C, and D

Effects on margined sculpin are nearly the same as all other aquatic species that depend on cold clean water. Upper George, Coombs, and South Fork Asotin Creeks each have small populations of margined sculpins. By their presence, this is an indicator of cold clean water. Project activities would be buffered with PACFISH standards and guidelines (Chapter 2, Table 2-5). Indirectly the loss of timber and wood that keep livestock from migrating to the riparian may be diminished. Cattle then could access the habitat, but permittees are required, by their permit, to move the animals out of the riparian area if they are found to be located there. Most of the habitat has geographic and or physical barriers (i.e. slope, downed wood, timber etc.) that limit and or restrict the animal's access to riparian areas. However, some interaction with these high elevation fish may be possible and quite likely in some areas. This impact can be direct or indirect. Seasonal use by cattle is outside the spawning period for these species.

Cumulative Effects – Alternatives B, C, and D

In the short-term time frame during the seasonal high flows there is a potential for the introduction of sediment and or other materials to the creek. There are other ongoing activities in the area that have been determined to have an effect on critical habitats (i.e., timber harvest, burning, and grazing). This project may exacerbate these effects by increasing the accessibility of cattle to perennial waters. At these site specific levels there may be cumulative undesirable effects that could add to effects to downstream critical habitats. With continued completion of restoration activities (i.e. road obliteration, cutslope planting and stabilization, in-channel habitat restoration, reconstruction of the road surface and the culvert replacements) and RMO values continue to improve positively these effects may be negated.

AFFECTED ENVIRONMENT -Tailed Frog (*Ascaphus trucei)*

A Level II, Hankin and Reeves stream survey did indicate the presence of tailed frogs in Upper George and South Fork Asotin Creeks. None were found in Coombs Creek, Reach 1. The species was also found higher in the watershed of North Fork Asotin in Reach 3.

ENVIRONMENTAL CONSEQUENCES – Tailed Frog

Alternative A – No Action

Direct/Indirect and Cumulative Effects – Alternative A

Since there would be no activities implemented, there would be no direct or indirect effects.

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (page 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to all Action Alternatives (B, C, and D)

Direct/Indirect Effects – Alternatives B, C, and D

Effects on tailed frog are nearly the same as all other aquatic species that depend on cold clean water. Upper George and South Fork Asotin Creeks both have small populations of tailed frogs. By their presence, this is an indicator of cold clean water. Project activities will be buffered with PACFISH standards and guidelines (Chapter 2, Table 2-5). Indirectly the loss of timber and wood that keep

livestock from migrating to the riparian may be diminished. Cattle then could access the habitat, but permittees are required, by their permit, to move the animals out of the riparian area if they are found to be located there. Most of the habitat has geographic and or physical barriers (i.e. slope, downed wood, timber etc.) that limit and or restrict the animal's access to riparian areas. However, some interaction with tailed frogs may be possible and quite likely in some areas. This impact can be direct or indirect. Seasonal use by cattle is outside the spawning period for this species.

Cumulative Effects – Alternatives B, C, and D

As with all other aquatic species, in the short-term time frame there is potential for the introduction of sediment and or other materials to the creek during the seasonal high flows. There are other ongoing activities in the area that have been determined to have an effect on dependent habitats (i.e. timber harvest, burning, and grazing). This project may exacerbate these effects by increasing the accessibility of cattle to perennial waters. At these site specific levels there may be cumulative adverse effects that could add to effects to downstream critical habitats. With continued completion of restoration activities (i.e. road obliteration, cutslope planting and stabilization, in-channel habitat restoration, reconstruction of the road surface and the culvert replacements) and if RMO values continue to improve positively these effects may be negated.

BIOLOGICAL DETERMINATIONS

Because in the short-term (season of disturbance before green-up-usually one year) with implementation of proposed activities there is a potential for the introduction of sediment and or other materials to creeks during the seasonal high flows that could add to effects on downstream critical habitat, all action alternatives were given a "*May Affect, Not Likely to Adversely Affect*" biological determination for Snake River steelhead and Columbia River Bull Trout. For the same reason all action alternatives were given a "*May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species*" biological determination for Region 6 Sensitive Redband Trout, Margined Sculpin, and Tailed Frog. See Table 3-15 below for biological determinations by species.

Table 3-15 – Biological Determinations for TES and Proposed Species in South George Project Planning Area

SPECIES	*ESA STATUS	HABITAT PRESENT IN WATERSHED	HABITAT PRESENT IN SUBWATESHED	SPECIES PRESENT IN PROJECT AREA	**BIOLOGICAL DETERMINATION
INVERTEBRATES					
Western Ridged Mussel	S	No	No	No	(NI)
Shortface Lanx	S	No	No	No	(NI)
Pristine Springsnail	S	No	No	No	(NI)
Fir Pinwheel (Terrestrial)	S	Yes	Yes	Unknown	(NI)
Hell's Canyon Land Snail (Terrestrial)	S	Yes	No	No	(NI)
Humped Coin (Terrestrial)	S	Yes	Yes	Unknown	(MI)
Barry's Hairstreak (Terrestrial)	S	Yes	No	No	(NI)
Meadow Fritillary (Terrestrial)	S	Yes	Yes	No	(NI)
Great Basin Fritillary (Terrestrial)	S	Yes	Yes	No	(NI)
FISH					
Snake River fall Chinook Salmon	T	Yes/No	No	No	(NE)
Snake River spring Chinook Salmon	T	Yes	No	No	(NE)
Snake River summer Steelhead	T	Yes	Yes/Unoccupied	No	(ME-NLAA)
Mid. Columbia River Steelhead (Mid C Only) (MIS)	T	No	No	No	(NE)
Redband Trout (MIS)	S	Yes	Yes	Yes	(MI)
Columbia River Bull Trout	T	Yes	Yes	Not Found	(ME-NLAA)
Margined Sculpin	S	Yes	Yes	Yes	(MI)
West-slope Cutthroat Trout	S	Potential	No	No	(NI)
Pacific Lamprey	S	Re-introduced	Unknown	No	(NI)
AMPHIBIANS					
Northern Leopard Frog	S	Yes	Unknown	Unknown	(NI)
Columbia Spotted Frog (Oregon Only)	S	Yes	Unknown	Unknown	(NI)
Tailed Frog	S	Yes	Yes	Yes	(MI)
Painted Turtle (Oregon Only)	S	No	No	No	(NI)

* T = Federally listed Threatened species, S = Regional Forester's Sensitive Species List,
Determination of effects are as follows: **a)** No Effect **(NE), b)** No Impact **(NI), c)** May Effect - Not Likely To Adversely Affect **(ME-NLAA), d)** May Impact **(MI)** Individuals Or Habitat, But Will Not Likely To Contribute To A Trend Towards Federal Listing…

FINDINGS OF CONSISTENCY

Implementation of any alternative would be consistent with Umatilla Forest Plan, as amended (PACFISH), and Endangered Species Act (ESA).

This project is consistent with ESA listed fish recovery plans. Actions proposed for riparian vegetation restoration project (about 25 acres – RHCA units 1 and 2) are consistent with habitat actions identified in the draft Snake River Salmon Recovery Plan for SE Washington (Snake River Salmon Recovery Board 2006) (referred to as the LSR Recovery Plan). Habitat actions are grouped and define the approach to be taken to implement restoration or protection strategies. Upper George Creek is identified as a major spawning aggregation (MSA) in the lower reaches (LSR Recovery Plan Summary p. 51). The LSR Recovery Plan identifies large woody debris goals for the Upper George Creek MSA of one piece per channel width. To improve large woody debris requires improving channel and floodplains, improving riparian areas and improving instream habitat (LSR Recovery Plan Summary p. 48). Implementation of actions in units (about 25 acres) in the RHCAs should result in long-term restoration and improvement of riparian function.

This project adequately avoids, minimizes, or otherwise offsets any potential effect to designated Essential Fish Habitat and therefore fulfills our requirement under the Mangnuson Stevens Act (305 (b) (4) (A)).

See Appendix F for additional aquatic information.

VEGETATION

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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

Existing and historical vegetation conditions for National Forest Service (NFS) lands located within South George project planning area (approximately 21,000 acres).

Indicators used for comparison purposes between alternatives are:

- Species composition
- Forest structural stages
- Tree density

AFFECTED ENVIRONMENT

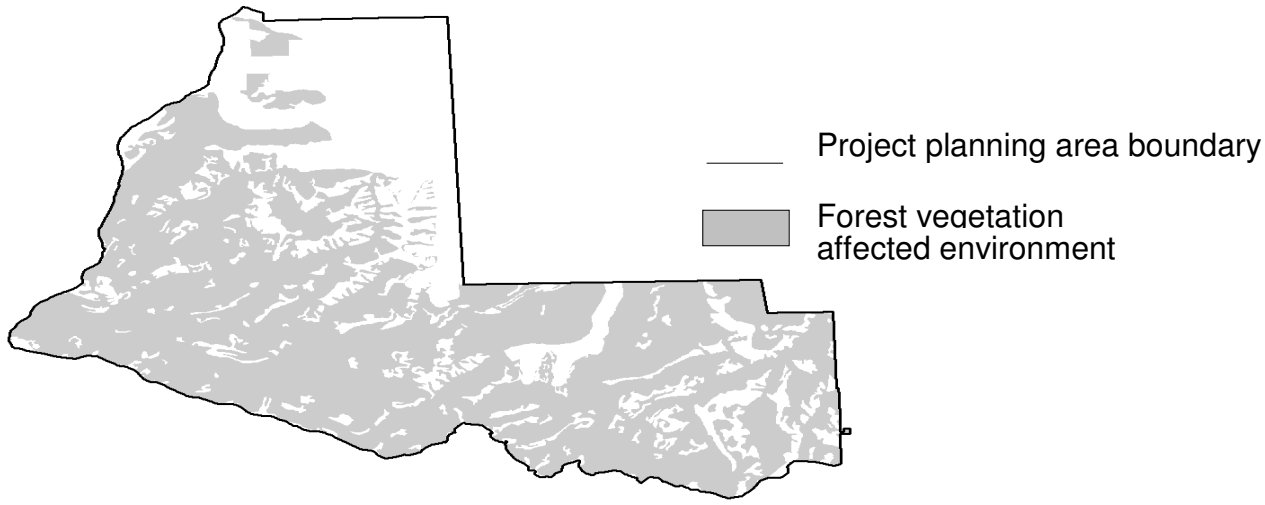
Forested acreage designated as suitable for timber production by the Forest Plan is used as the affected environment for the forest vegetation analyses described in this chapter (see Appendix J –NMFA Analysis - Existing and Historical Vegetation). The table below identifies forest vegetation affected environment in the project planning area by alternative. It shows that about 75 percent of National Forest System (NFS) lands in the project planning area are forested (15,430 acres) and about 91 percent of the forested acreage (14,060 acres) is included in Forest Plan management areas where forestland is suitable for timber production.

Table 3-16 Acreage Summary for Forest Vegetation Affected Environment

Approximate acreage of NFS lands within the South George planning area	21,000
Minus nonforested and nonvegetated lands[3]	5,200
Total forestland within the planning area[4]	15,430
Minus forestland in unsuitable management areas[5]	1,370
Total forestland in the forest vegetation affected environment	14,060
Affected environment included in Alternative A	0
Affected environment included in Alternatives B and C	3,900
Affected environment included in Alternative D	2,600

Forested acreage designated as suitable for timber production by the Forest Plan is used as the affected environment for the forest vegetation analyses described in this chapter. Figure 3-1 presents a map of the forest vegetation affected environment.

Figure 3-1 – Affected environment for the forest vegetation analyses. The gray area in this figure corresponds to the approximately 14,060 acres of NFS forested and suitable lands comprising the forest vegetation affected environment (see Table 3-16).



[3] Nonforested and nonvegetated lands have biophysical settings (as controlled by climate, soil depth, or other physical site factors) precluding development of a tree-dominated ecosystem. Nonforest areas are incapable of supporting tree canopy cover amounts of 10% or more

[4] Forestland has biophysical settings (as controlled by climate, soil depth, or other physical site factors) allowing development of a tree-dominated ecosystem. Forestland is capable of supporting tree canopy cover amounts of 10% or more.

[5] For management areas A6, C1, and C3A, forestland was not designated as suitable for timber production by the Forest Plan. Therefore, forestland in these management areas is unsuitable for timber production. RHCAS, a requirement of the PACFISH Forest Plan amendment, are also unsuitable; however, they were not mapped in a spatially explicit manner for the Forest Plan, so their acreage is not included in this line item. During project preparation, RHCAs are designated on the ground by using criteria from the PACFISH Forest Plan amendment (such as application of buffer widths varying by stream class or site-potential tree height). During this project layout phase, it is ensured that the entire extent of RHCAs is excluded from designated silvicultural activity units.

Potential Vegetation

The potential vegetation of the forest vegetation affected environment is characterized using potential vegetation groups (PVG), a higher-level taxonomic unit in a hierarchy of potential vegetation types (Powell et al. 2007). PVGs are named for a predominant or controlling temperature or moisture relationship.

Figure 3-2 presents a map showing the spatial distribution and configuration of upland forest PVGs for South George project planning area.

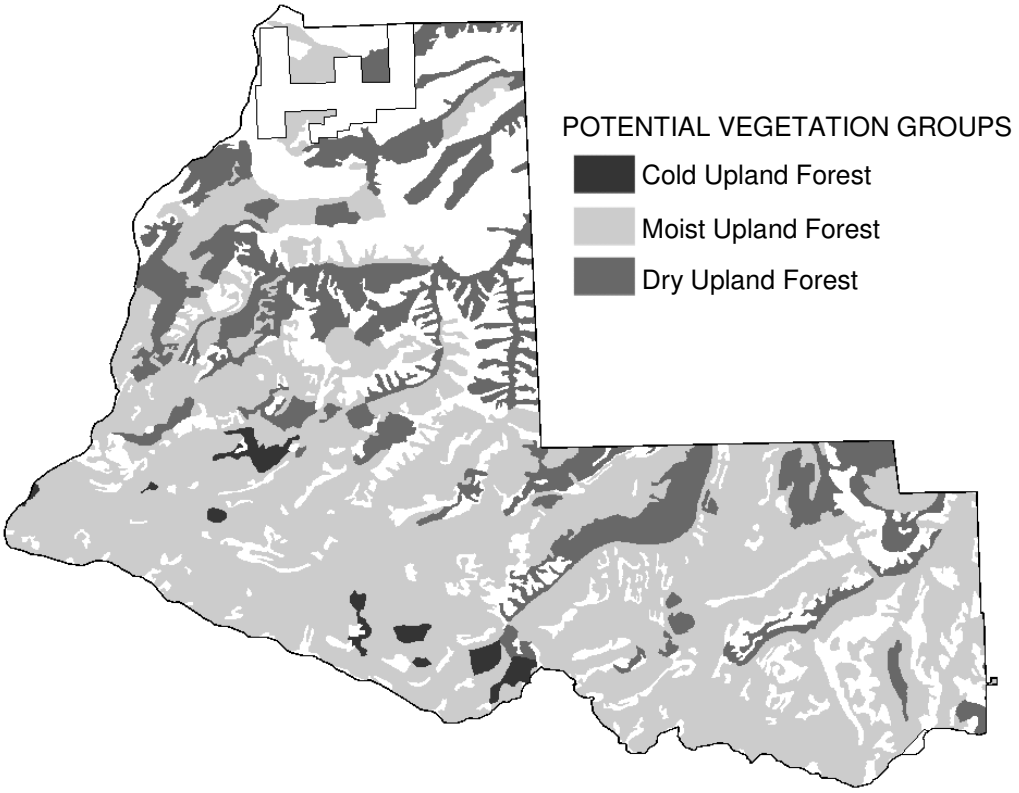


Figure 3-2 – Upland forest potential vegetation groups for the South George planning area. The historical range of variability (HRV) analyses presented later in this chapter stratify the results using dry and moist upland forest PVGs (cold is not used because it has too few acres in the planning area for a credible HRV analysis). White areas within the exterior planning area boundary include either private (non-NFS) lands, or nonforest vegetation types.

Table 3-17 summarizes the PVG composition of the forest vegetation affected environment (comprising 14,060 acres in total). It shows that the predominant PVG is moist upland forest (UF) is 78 percent, followed by dry upland forest at 21 percent. Very little of the forest vegetation affected environment consists of cold upland forest PVG (1 percent).

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).			

Species Composition

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).

An HRV analysis was completed for species composition of the forest vegetation affected environment. Because species composition varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Species composition HRV results are presented in Table 3-18.

The information presented in the table below suggests that dry forestland currently supports too much of the grand fir and Douglas-fir forest cover types, and too little of the ponderosa pine forest cover type. Moist forestland supports too much of the grand fir and spruce-fir forest cover types, and too little of the Douglas-fir, western larch, broadleaved trees, and lodgepole pine forest cover types.

Table 3-18 HRV Analysis of Species Composition for Forest Vegetation Affected Environment

Cover Type	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Herb-shrub	0-5	0-150	0	0	0-5	0-550	2	210
Shrub	0-5	0-150	0	0	0-5	0-550	0	0
Western juniper	0-5	0-150	0	0	—		—	
Ponderosa pine	50-90	1470-2650	32	940	5-15	550-1640	8	860
Douglas-fir	5-20	150-590	46	1,350	15-30	1640-3280	7	750
Western larch	0-10	0-300	0	0	10-30	1090-3280	3	310
Broadleaved trees	0-5	0-150	0	0	1-10	110-1090	0	0
Lodgepole pine	0-5	0-150	0	0	10-25	1090-2730	3	300
Western white pine	—		—		0-5	0-550	0	0
Grand fir	1-10	30-300	22	660	15-30	1640-3280	57	6,180
Spruce-fir	—		—		1-15	110-1640	21	2,320

Sources/Notes: Current amounts are summarized from the South George vegetation database (forested, suitable, NFS lands only). Gray shading indicates cover types that are either above or below the historical range of variability. Historical ranges are approximate and were adapted from Morgan and Parsons (2001); they are based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regimes.

Forest Structural Stages

Table 3-19 below summarizes existing forest structural stages for the forest vegetation affected environment. It shows that the predominant forest structural stage is understory reinitiation (30 percent of the affected environment), stem exclusion closed-canopy (21 percent) followed by stem exclusion open canopy (19 percent), and old forest single stratum (15 percent).

Table 3-19 Forest Structural Stages - Forest Vegetation Affected Environment

Code	Forest Structural Stage Name	Acres	Percent of Total
SI	Stand Initiation	570	4
SEOC	Stem Exclusion Open Canopy	2,710	19
SECC	Stem Exclusion Closed Canopy	3,000	21
UR	Understory Reinitiation	4,200	30
YFMS	Young Forest Multi Strata	310	2
OFMS	Old Forest Multi Strata	1,120	8
OFSS	Old Forest Single Stratum	2,140	15

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands only). Forest structural stages are described in O'Hara et al. (1996). Structural stage, a derived field in the database, was calculated using queries from Hessburg et al. (1999a).

An HRV analysis was completed for forest structural stages of the forest vegetation affected environment. Because forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Forest structural stage HRV results are presented in Table 3-20.

Table 3-20 HRV Analysis of Forest Structural Stages - Forest Vegetation Affected Environment

Structural Stage	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
SI	5-15	150-440	4	130	1-10	110-1090	4	400
SEOC	5-20	150-590	10	290	0-5	0-550	22	2,430
SECC	1-10	30-300	16	490	5-25	550-2730	23	2,510
UR	1-10	30-300	24	710	5-25	550-2730	31	3,350
YFMS	5-25	150-740	1	20	40-60	4370-6560	3	290
OFMS	5-20	150-590	18	520	10-30	1090-3280	5	600
OFSS	15-55	440-1620	27	790	0-5	0-550	12	1,350

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands only). Gray shading indicates structural stages that are above or below the historical range of variability. Historical percentages (H%) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Blackwood (1998). Forest structural stages are described in Table 3-19.

The information presented in Table 3-20 suggests that the SI, SECC, UR, and YFMS structural stages are outside of their historical ranges for the dry upland forest PVG, and that every structural stage except SI and SECC is outside of its historical range for the moist upland forest PVG.

Tree Density

Table 3-21 summarizes existing tree density classes for the forest vegetation affected environment. It shows that the predominant tree density class is moderate (37 percent), followed closely by low (36 percent) and then by high (27 percent).

Table 3-21 Tree Density Classes - Forest Vegetation Affected Environment

Tree Density Class	Acres	Percent of Total
Low	5,060	36
Moderate	5,200	37
High	3,800	27

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands only). Criteria for assigning polygons to tree density classes are provided in Powell (2009).

An HRV analysis was completed for tree density classes of the forest vegetation affected environment. Because tree density varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Tree density HRV results are presented in Table 3-22.

Table 3-22 HRV Analysis of Tree Density Classes – Forest Vegetation Affected Environment

Tree Density Class	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Low	40-85	1180-2510	30	890	20-40	2190-4370	37	4,010
Moderate	15-30	440-890	26	780	25-60	2730-6550	40	4,400
High	5-15	150-440	44	1,280	15-30	1640-3280	23	2,520

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands only). Gray shading indicates tree density classes that are above or below the historical range of variability.

The information presented in Table 3-22 suggests that the dry upland forest PVG portion of the forest vegetation affected environment has too little of the low density class and too much of the high density condition. For the moist upland forest portion of the affected environment, all three density classes are within their historical ranges of variability.

ENVIRONMENTAL CONSEQUENCES

This section discloses the environmental consequences of implementing the silvicultural activities proposed for each of the alternatives. Subsections discriminate between: (1) direct effects, which are caused by an activity (action) and occur at the same time and place; (2) indirect effects, which are caused by an activity (action) and are later in time or farther removed in distance than direct effects, but are still reasonably foreseeable; and (3) cumulative effects, which result from the incremental impact of an activity (action) when added to other past, present, and reasonably foreseeable future actions.

Three indicators are used to characterize the environmental consequences of implementing the silvicultural activities proposed for each of the alternatives: species composition (forest cover types), forest structural stages, and tree density classes. Potential vegetation is not used as an indicator because it is not affected by silvicultural activity or management treatment; however, the amount of potential vegetation included in each alternative does vary, as shown in Table 3-23.

Table 3-23 – Potential Vegetation Group Acreage by Forest Vegetation Affected Environment and by Alternative

PVG Code	Forest Vegetation Affected Environment (acres)	Alternative A (acres)	Alternatives B and C (acres)	Alternative D (acres)
Cold UF	180	0	0	0
Dry UF	2,950	0	930	930
Moist UF	10,930	0	2,970	1,670
Total	**14,060**	**0**	**3,900**	**2,600**

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands only). PVG Code is described in Table 3-17. Affected environment acreages are provided for comparison purposes only and were taken from Table 3-17.

Scale of Analysis

Geographical Context - The geographical context for estimating direct effects is forested, suitable, National Forest System (NFS) lands located within the forest vegetation affected environment (Figure 3-1) and directly affected by implementation of an alternative. Silvicultural activities included in Alternatives B and C would directly affect approximately 3,900 acres of the affected environment; silvicultural activities included in Alternative D would directly affect approximately 2,600 acres of the affected environment.

The geographical context for estimating indirect effects is forested, suitable, NFS lands located within the forest vegetation affected environment (Figure 3-1). The analysis of indirect effects considers the effects of activities (actions) occurring at a different time or place than the action causing an effect.

The geographical context for estimating cumulative effects is the entire South George project planning area (approximately 21,000 acres). There was no need to extend the cumulative effects analysis area beyond the project planning area boundary because forest vegetation conditions affected by the proposed action (various categories of species composition, forest structural stage, and tree density) are common and widely distributed throughout the planning area, the Pomeroy Ranger District in which it occurs, the Umatilla National Forest (Christensen et al. 2007) containing the Pomeroy Ranger District, and the Blue Mountains ecoregion containing the Umatilla National Forest.

Temporal Context - The temporal context for evaluating environmental effects includes past, present, and reasonably foreseeable actions in South George project planning area, as described below.

- Past actions (page 3-2) have influenced existing conditions in the project planning area. A database was developed by using Most Similar Neighbor imputation procedures to characterize existing vegetation conditions (Justice 2009). Existing conditions are current as of 2009, when the database was developed. Database information was validated by completing field reviews during 2009 and 2010. The field reviews found that existing conditions in the planning area appropriately reflect past changes resulting from three types of silvicultural activities: timber harvest, tree planting, and noncommercial thinning (see below). Existing conditions also reflect the historical influence of wildfire, insect and disease activity, fire exclusion, ungulate herbivory, and other non-silviculture changes.

- Present (ongoing) actions (page 3-3) were considered when evaluating cumulative effects. The main present action affecting forest vegetation conditions is the Park Ridge project involving noncommercial thinning and prescribed fire activities designed to increase residual tree vigor, address dwarf-mistletoe and other insect or disease issues, and reduce surface fuel loadings. The cumulative effects analysis also explicitly considers direct and indirect effects expected from implementation of actions included in any of the South George alternatives (Alternatives B, C, and D).
- Reasonably foreseeable actions (pages 3-3 to 3-4) were included in the cumulative effects analysis. Reasonably foreseeable actions include non-commercial thinning and fuel reduction activities on approximately 500 acres annually, and the Eastside prescribed fire project potentially affecting forest vegetation conditions by reducing ladder fuels and implementing similar treatments designed to address wildfire hazard (both actions are authorized by Decision Memos). Based on the Forest's schedule of proposed actions, no other actions potentially affecting vegetation conditions in the project planning area are anticipated over the next 5 years.
- For the purpose of cumulative effects analysis, future vegetation conditions incorporate direct and indirect effects from three sources: (1) implementation of proposed activities included in South George alternatives (Alternatives A, B, C, and D); (2) present (ongoing) activities; and (3) implementation of reasonably foreseeable actions. The timeframe for cumulative effects analysis is the same 5-year period described for the reasonably foreseeable actions.

Following is a summary of silvicultural activities that occurred on National Forest System lands in the South George project planning area (see page 3-2):

- Approximately 15,200 acres of timber harvest occurring between 1960 and 2009.
- Approximately 2,750 acres of tree planting occurring between 1996 and 2008.
- Approximately 2,400 acres of noncommercial thinning occurring between 1968 and 2008.

Note that historical activity acreage is not mutually exclusive, some acreage was affected more than once by different cutting methods (an initial harvest involving shelterwood seed cutting, and a subsequent harvest in the same area involving shelterwood removal cutting), or by different activities (such as tree planting occurring on an area where stand clearcutting had been completed, followed by noncommercial thinning when the planted trees were dense enough, and tall enough, to warrant thinning).

Alternative A – No Action

Direct/Indirect Effects – Alternative A – No Action

Alternative A is the No Action alternative. It allows any previously approved (on-going) activities to proceed, but none of the silvicultural activities identified as proposed actions in Chapter 1 would be implemented under this alternative.

The concept of this alternative is that ongoing disturbance and succession processes influencing vegetation conditions in South George project planning area would continue without human interference. If the purpose and need described in Chapter 1 could be addressed by Alternative A, it would occur as a result of vegetation changes induced by natural ecosystem processes, not as a result of implementing silvicultural activities specifically targeted at addressing forest vegetation issues and needs.

Since no new forest vegetation activities would occur under this alternative, it would not provide an opportunity to address species composition, forest structure, or tree density conditions that are either over-represented or under-represented (i.e., above or below the historical range of variability).

The analysis context of this section is that direct and indirect effects refer to the estimated environmental consequences of implementing the proposed silvicultural activities. Since Alternative A would not

implement any of the proposed silvicultural activities, it is not expected to have any direct effects on the forest vegetation affected environment.

Implementing Alternative A has the following implications for forest vegetation in the project planning area:

- No silvicultural activities would occur to change species composition, so the ponderosa pine cover type would continue to be under-represented on dry-forest sites, along with the Douglas-fir, western larch, broadleaved trees, and lodgepole pine cover types on moist-forest sites.
- No silvicultural activities would occur to change forest structural stages, so the stand initiation and young forest multi strata stages would continue to be under-represented on dry-forest sites, along with the young forest multi strata and old forest multi strata stages on moist-forest sites.
- No silvicultural activities would occur to change tree (stand) density levels, so the low-density condition would continue to be under-represented on dry-forest sites.
- No silvicultural activities would occur to change forest canopy biomass levels and interrupt canopy continuity, so the low canopy-biomass condition would continue to be under-represented on dry-forest sites, along with the low and moderate canopy-biomass conditions on moist-forest sites.
- No silvicultural activities would occur to change insect and disease susceptibility by modifying host-type conditions on dry-forest sites, so low and high susceptibility to bark beetles in ponderosa pine, low susceptibility to defoliating insects, low and high susceptibility to Douglas-fir beetle, low susceptibility to fir engraver, and low susceptibility to root diseases would continue to be under-represented.
- No silvicultural activities would occur to change insect and disease susceptibility by modifying host-type conditions on moist-forest sites, so low susceptibility to bark beetles in ponderosa pine, low and moderate susceptibility to defoliating insects, low and high susceptibility to Douglas-fir beetle, high susceptibility to Douglas-fir dwarf mistletoe, and low susceptibility to fir engraver would continue to be under-represented.

Cumulative Effects – Alternative A – No Action

Past actions, including timber harvest, tree planting, and noncommercial thinning, helped create existing conditions in the project planning area. Reasonably foreseeable future actions, which includes non-commercial thinning and prescribed fire activities, would reduce tree density and surface fuel loadings, and increase representation of early-seral tree species, on a limited portion of the project planning area

Because Alternative A does not include any silvicultural activities, it is not expected to result in direct or indirect effects on the analysis indicators: species composition, structural stages, and tree density. Since there are no direct or indirect effects of implementing this alternative on the forest vegetation indicators, there are also no cumulative effects associated with alternative A.

Species composition, forest structure, and tree density are expected to change in the future under a No Action scenario, but the changes would be unpredictable and derived from natural disturbance and succession processes, not from implementing any of the proposed activities (actions). Since change would relate primarily to the timing, magnitude, duration, and intensity of future disturbance, along with limited change caused by present (ongoing) and reasonably foreseeable future actions, and because consideration of unpredictable change is speculative and beyond the scope of this analysis, no attempt was made to estimate the future effects of disturbance.

If none of the proposed activities would be implemented to move existing conditions closer to desired conditions, then forest vegetation within the project planning area would remain overly dense and continue to be dominated by mid- and late-seral stages of species composition. Old forest (late-old) structure on moist-forest sites would continue to be deficient because proposed activities would not be used to increase tree growth and thereby promote large-diameter trees (trees whose diameter is 21 inches or greater), or to reduce stand density sufficiently for establishment of a new cohort (stratum) of understory trees.

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Direct and Indirect Effects Common to Alternatives B and C

Direct effects are assumed to occur only on the portion of the forest vegetation affected environment included in Alternatives B and C (approximately 3,900 acres). Alternatives B and C are discussed together because the silvicultural activities proposed for implementation are the same for both alternatives. Three indicators are used to present pretreatment and post-treatment trends for vegetation conditions: species composition, forest structural stages, and tree density classes. Direct effects on species composition, forest structural stages, and tree density are a consequence of implementing timber harvest silvicultural activities for Alternatives B and C: commercial (low) thinning (80 acres), improvement cutting (3,020 acres), seed-tree cutting with reserves (550 acres), and clearcutting with reserves (250 acres).

Indirect effects consider the impact of implementing Alternatives B and C on the larger forest vegetation affected environment in which they occur. The direct effects of implementing Alternatives B and C on their portion of the affected environment (approximately 3,900 acres) are applied to the entire affected environment (approximately 14,060 acres) to estimate the indirect effects.

Maps located in Appendix A show the geographical location and spatial juxtaposition of silvicultural activities in Alternatives B and C.

Direct Effects for Species Composition - Alternatives B and C

Species composition, as represented using forest cover types, is expected to change in response to implementation of silvicultural activities proposed for Alternatives B and C. Most of the forest cover types that would be affected by implementation of silvicultural activities included in Alternatives B and C are late-seral (grand fir and spruce-fir), and they are decreased as a direct effect of implementation; early or mid-seral cover types (ponderosa pine, Douglas-fir, and western larch) are either enhanced or get established by these alternatives, so they are increased as a direct consequence of implementation.

Table 3-24 Direct Effects for Species Composition - Alternatives B and C

	Pre- Implementation		Post- Implementation		Difference
Forest Cover Type	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
Ponderosa pine	290	7	440	11	+ 150
Douglas-fir	390	10	1,060	27	+ 670
Western larch	0	0	1,440	37	+ 1,440
Lodgepole pine	100	3	0	0	(–100)
Grand fir	2,450	63	520	13	(–1,930)
Spruce-fir	670	17	440	11	(–230)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternatives B and C- approximately 3,900 acres).

Indirect Effects for Species Composition - Alternatives B and C

Table 3-25 shows that the direct effects of implementing Alternatives B and C has a relatively minor indirect effect on species composition when spread across the entire forest vegetation affected environment. As a result of implementing Alternatives B and C, the representation of four cover types (herb-shrub, ponderosa pine, lodgepole pine, and spruce-fir) either has no change at all, or the change is small on a percentage basis (defined as less than a 5 percent change in an overall forest cover type percentage). The representation of three cover types, Douglas-fir and western larch (increases) and grand fir (decrease), is expected to change to a noticeable extent.

Table 3-25 Indirect Effects for Species Composition - Alternatives B and C

	Pre-Implementation		Post-Implementation		Difference
Forest Cover Type	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
Herb-shrub	210	1	210	1	No change
Ponderosa pine	1,910	14	2,060	15	+ 150
Douglas-fir	2,100	15	2,770	20	+ 670
Western larch	310	2	1,750	12	+ 1,440
Lodgepole pine	300	2	200	1	(– 100)
Grand fir	6,840	49	4,910	35	(– 1,930)
Spruce-fir	2,390	17	2,160	15	(– 230)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres), and reflecting the direct effects of implementing Alternatives B and C (affecting approximately 3,900 acres of the affected environment).

An HRV analysis was completed for species composition of the forest vegetation affected environment as it would exist after implementation of Alternatives B and C. Because species composition varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Species composition HRV results are presented in Table 3-26.

Table 3-26 HRV Analysis Of Species Composition For The Entire Forest Vegetation Affected Environment, Reflecting Direct Effects Of Implementing Alternatives B and C

Cover Type	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Herb-shrub	0-5	0-150	0	0	0-5	0-550	2	210
Shrub	0-5	0-150	0	0	0-5	0-550	0	0
Western juniper	0-5	0-150	0	0	—		—	
Ponderosa pine	50-90	1480-2660	37	1,090	5-15	550-1640	8	860
Douglas-fir	5-20	150-590	55	1,630	15-30	1640-3280	10	1,140
Western larch	0-10	0-300	0	0	10-30	1090-3280	16	1,750
Broadleaved trees	0-5	0-150	0	0	1-10	110-1090	0	0
Lodgepole pine	0-5	0-150	0	0	10-25	1090-2730	2	200
Western white pine	—		—		0-5	0-550	0	0
Grand fir	1-10	30-300	8	230	15-30	1640-3280	43	4,680
Spruce-fir	—		—		1-15	110-1640	19	2,090

Sources/Notes: Current amounts are summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres, except for 180 acres of cold upland forest not included in this analysis), and reflecting the direct effects of implementing Alternatives B and C (affecting approximately 3,900 acres of the affected environment). Gray shading indicates cover types that are either above or below the historical range of variability. Historical ranges were adapted by the author of this specialist report from Morgan and Parsons (2001); they are based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regimes.

Having an ecologically appropriate representation of forest cover types well distributed throughout the South George project planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 3-26 suggests that the silvicultural activities proposed for implementation in Alternatives B and C were marginally successful at changing the pre-implementation HRV results regarding species composition:

- Before implementation, the Dry UF PVG had 3 cover types that were outside of HRV and the Moist UF PVG had 6 cover types that were outside of HRV (Table 3-18).
- After implementation, the Dry UF PVG has 2 cover types that are outside of HRV and the Moist UF PVG has 5 cover types that are outside of HRV (Table 3-26).

For Moist UF PVG, comparing Tables 3-18 and 3-26 shows that implementing Alternatives B and C would result in western larch reaching the historical range (larch was below the range and needed to be increased to get within the range), and these alternatives make some progress toward reducing grand fir and spruce-fir representation toward their historical ranges (grand fir was substantially above the range before treatment, and still is after treatment). Douglas-fir representation increased slightly after treatment (from 7 percent to 10 percent), but the increase was not sufficient to get Douglas-fir within its historical range.

For Dry UF PVG, comparing Tables 3-18 and 3-26 shows that alternative implementation would increase the representation of ponderosa pine slightly (from 32 percent to 37 percent), but it is still below the historical range. Proposed dry-site activities also increased the representation of Douglas-fir (from 46 percent to 55 percent), pushing it even further above the historical range. Proposed activities reduced the abundance of grand fir substantially (from 22 percent to 8 percent), which means that grand fir would transition from being above the historical range (Table 3-18) to within the historical range (Table 3-26) after project implementation.

Direct Effects for Forest Structural Stages - Alternatives B and C

Forest structure, as represented using structural stages, is expected to change in response to implementation of silvicultural activities proposed for Alternatives B and C (Table 3-27). 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 after intermediate treatments are implemented.

(2) Improvement cutting is used to convert 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 DBH or larger in diameter) to qualify as old forest after treatment.

The stand initiation structural stage increases as a direct effect of implementing Alternatives B and C (Table 3-27), which improves the representation of this structural stage because stand initiation is either slightly below HRV (dry upland forest PVG) or in the bottom half of the historical range (moist upland forest PVG) for the forest vegetation affected environment (Table 3-20).

Table 3-27 Direct Effects for Forest Structural Stages - Alternatives B and C

	Pre-Implementation		Post- Implementation		Difference
Structural Stage	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
SI	0	0	800	21	+ 800
SEOC	760	19	1,440	37	+ 680
SECC	1,060	27	0	0	(–1,060)
UR	1,060	27	0	0	(–1,060)
OFMS	360	9	280	7	(–80)
OFSS	660	17	1,380	35	+ 720

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternatives B and C – approximately 3,900 acres). Refer to Table 3-19 for information about the structural stages and how they were derived.

Indirect Effects for Forest Structural Stages - Alternatives B and C

Table 3-28 below shows that the direct effects of implementing silvicultural activities associated with Alternatives B and C has obvious indirect effects on forest structure when spread across the entire forest vegetation affected environment. As a result of implementing Alternatives B and C, the representation of five structural stages (SI, SEOC, SECC, UR, and OFSS) is expected to experience enough change to modify their overall proportion of the affected environment by 5 percent or more. The representation of two structural stages either has no change at all (YFMS), or the change in overall proportion of the affected environment is only 1 percent OFMS.

Table 3-28 Indirect Effects for Forest Structural Stages - Alternatives B and C

	Pre-Implementation		Post- Implementation		Difference
Structural Stage	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
SI	570	4	1,370	10	+800
SEOC	2,720	19	3,400	24	+680
SECC	3,000	21	1,940	14	(–1,060)
UR	4,200	30	3,140	22	(–1,060)
YFMS	310	2	310	2	No change
OFMS	1,120	8	1,040	7	(–80)
OFSS	2,140	15	2,860	20	+720

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres), and reflecting the direct effects of implementing Alternatives B and C (affecting approximately 3,900 acres of the affected environment). Refer to Table 3-19 for information about the structural stages and how they were derived.

An HRV analysis was completed for forest structure of the forest vegetation affected environment as it would exist after implementation of Alternatives B and C. Because forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Forest structure HRV results are presented in Table 3-29.

Table 3-29 HRV Analysis of Forest Structural Stages for the Entire Forest Vegetation Affected Environment, Reflecting Direct Effects of Implementing Alternatives B and C

Structural Stage	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
SI	5-15	150-440	8	230	1-10	110-1090	10	1,100
SEOC	5-20	150-590	15	450	0-5	0-550	27	2,950
SECC	1-10	30-300	6	190	5-25	550-2730	16	1,750
UR	1-10	30-300	17	510	5-25	550-2730	23	2,490
YFMS	5-25	150-740	1	20	40-60	4370-6560	3	290
OFMS	5-20	150-590	5	160	10-30	1090-3280	8	880
OFSS	15-55	440-1620	47	1,390	0-5	0-550	13	1,470

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres, except for 180 acres of cold upland forest not included in this analysis), and reflecting the direct effects of implementing Alternatives B and C (affecting approximately 3,900 acres of the affected environment). Gray shading indicates structural stages that are above or below the historical range of variability. Historical percentages (H %) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Blackwood (1998). Forest structural stages are described in Table 3-19.

Having an ecologically appropriate representation of forest structural stages well distributed throughout the South George project planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 3-29 suggests that the silvicultural activities proposed for implementation in Alternatives B and C were moderately successful at changing the pre-implementation HRV results regarding forest structural stages:

- Before implementation, the Dry UF PVG had 4 structural stages that were outside of HRV and the Moist UF PVG had 5 structural stages that were outside of HRV (Table 3-20).
- After implementation, the Dry UF PVG has 2 structural stages that are outside of HRV and the Moist UF PVG has 4 structural stages that are outside of HRV (Table 3-29).

For the Moist UF PVG, proposed treatments resulted in the understory reinitiation (UR) structural stage reaching the historical range. UR was above the range at 31 percent of the pre-treatment affected environment and alternative implementation reduced it to 23 percent, which is within the historical range (Table 3-29).

For the Dry UF PVG, proposed treatments were more effective at changing the pre-implementation HRV situation for the affected environment. Stand initiation (SI) had been slightly below HRV; the proposed activities were successful at boosting its representation to within the historical range (Table 3-29). Stem exclusion closed canopy (SECC) was above the historical range before implementation the proposed activities were successful at bringing it down to within the historical range (Table 3-29).

Direct Effects for Tree Density - Alternatives B and C

Tree density classes are expected to change in response to implementation of silvicultural activities proposed for Alternatives B and C (Table 3-30). One direct effect of implementing the silvicultural activities is expected to be a consistent reduction in tree density for treatment units. All of the high density condition included in the portion of the affected environment used for Alternatives B and C is expected to be reduced to either the moderate or low density condition after implementation.

Table 3-30 Direct Effects for Tree Density Classes - Alternatives B and C

Tree Density Class	Pre-Implementation		Post-Implementation		Difference
	Acres	Percent	Acres	Percent	Acres
Low	280	7	2,270	58	+1,990
Moderate	2,000	51	1,630	42	(–370)
High	1,620	42	0	0	(–1,620)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternatives B and C – approximately 3,900 acres). Refer to Table 3-21 for information about the tree density classes and how they were derived.

Indirect Effects for Tree Density - Alternatives B and C

Table 3-31 shows that the indirect effects of implementing Alternatives B and C has an obvious impact on tree density when spread across the entire forest vegetation affected environment. As a result of implementing Alternatives B and C, the representation of all three tree density classes changes in one direction or another: the low density class increases from 36 percent to 50 percent, the moderate class decreases slightly from 37 percent to 34 percent, and the high class decreases from 27 percent to 16 percent

Table 3-31 Indirect Effects for Tree Density Classes - Alternatives B and C

Tree Density Class	Pre-Implementation		Post-Implementation		Difference
	Acres	Percent	Acres	Percent	Acres
Low	5,060	36	7,050	50	+1,990
Moderate	5,200	37	4,830	34	(–370)
High	3,800	27	2,180	16	(–1,620)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres), and reflecting the direct effects of implementing Alternatives B and C (affecting approximately 3,900 acres of the affected environment). Refer to Table 3-21 for information about the tree density classes and how they were derived.

An HRV analysis was completed for tree density of the forest vegetation affected environment as it would exist after implementation of Alternatives B and C. Because forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Tree density HRV results are presented in Table 3-32.

Table 3-32 HRV Analysis of Tree Density Classes For The Entire Forest Vegetation Affected Environment, Reflecting Direct Effects Of Implementing Alternatives B and C

Tree Density Class	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Low	40-85	1180-2510	47	1,380	20-40	2190-4370	50	5,510
Moderate	15-30	440-890	25	730	25-60	2730-6560	37	4,080
High	5-15	150-440	28	840	15-30	1640-3280	12	1,340

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres, except for 180 acres of cold upland forest not included in this analysis), and reflecting the direct effects of implementing Alternatives B and C (affecting approximately 3,900 acres of the affected environment). Gray shading indicates tree density classes that are above or below the historical range of variability.

Having an ecologically appropriate representation of tree (stand) density classes well distributed throughout the South George project planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 3-32 suggests that implementing Alternatives B and C would result in mixed results regarding tree density, at least in the context of HRV:

- Before implementation, the Dry UF PVG had 2 tree density classes that were outside of HRV and the Moist UF PVG had no density classes that were outside of HRV (Table 3-22).
- After implementation, the Dry UF PVG has 1 density class that is outside of HRV and the Moist UF PVG has 2 density classes that are outside of HRV (Table 3-32).

For the Moist UF PVG, proposed treatments resulted in the low density class increasing from 37 percent to 50 percent of the affected environment, which results in this class being outside of the historical range; the moderate density class had a slight reduction from 40 percent to 37 percent, both of which are within the historical range; and the high density class was reduced from 23 percent to 12 percent, which results in this class being slightly below the lower limit of the historical range after alternative implementation (compare Tables 3-22 and 3-32).

For the Dry UF PVG, proposed treatments resulted in the low density class increasing from 30 percent to 47 percent of the affected environment, which moves this class from being below HRV to within the historical range. For the moderate density class, proposed activities basically had no effect (from 26 percent to 25 percent); the high density class was reduced from 44 percent to 28 percent, which is a positive trend in this class' representation, but it still wasn't sufficient to move this class within the historical range (compare Tables 3-22 and 3-32).

In summary, the implementation of silvicultural activities associated with Alternatives B and C does not result in more of the forest cover types, forest structural changes, and tree density classes moving within their historical ranges because of the following two factors:

1. A relatively low proportion of area (acreage) is being treated, which limits the opportunity to change under- or over-represented forest cover types, forest structural changes, and tree density classes. Alternatives B and C only affect 25 percent of the forested portion of the planning area, and only 28 percent of the forest vegetation affected environment (see Table 3-16).
2. Proposed silvicultural activity units cannot generally address every issue 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.

Cumulative Effects Common to Alternatives B and C

Species Composition, Forest Structural Stages and Tree Density Alternatives B and C

Past actions (page 3-2), including timber harvest, tree planting, and noncommercial thinning, helped create existing conditions in the planning area. The proposed action is designed to address the project's purpose and need by improving forest health, vegetation vigor, and ecosystem resilience to fire, insects, and disease. Proposed silvicultural activities respond to the purpose and need by helping to move species composition, forest structure, and tree density back within their historical ranges of variability.

Present (ongoing) actions (page 3-3) include vegetation management activities in the Park Ridge portion of the planning area. Park Ridge activities were designed in such a way as to address similar issues and concerns as those influencing the South George project. Therefore, they represent incremental actions (beyond the proposed actions) that are also largely responsive to the South George project's purpose and need. Reasonably foreseeable future actions, which include non-commercial thinning and prescribed fire activities beyond what is included in the South George proposed action, would also contribute to the project's purpose and need by reducing tree density and surface fuel loadings, and by increasing representation of early-seral tree species, but only on relatively limited portions of the project planning area.

When considering the direct and indirect effects of the project's proposed action on forest health, vegetation vigor, and ecosystem resilience (as reflected by changes in species composition, forest structure, and tree density following implementation of proposed actions), and when evaluating how the direct and indirect effects of past actions, present (ongoing) actions, the proposed action, and reasonably foreseeable future actions overlap in both space and time, then the cumulative effects for Alternatives B and C are considered to be mostly positive (because present and reasonably foreseeable actions also utilize design criteria similar to those for Alternatives B and C proposed action). The estimated cumulative effects for Alternatives B and C are considered to be positive when compared with those for Alternatives A and D.

Alternative D

Direct effects are assumed to occur only on the portion of the forest vegetation affected environment included in Alternative D (approximately 2,600 acres). Three indicators are used to present pre-treatment and post-treatment trends for vegetation conditions: species composition, forest structural stages, and tree density classes. The direct effects on species composition, forest structural stages, and tree density are a consequence of implementing the four timber harvest silvicultural activities identified in Chapter 2 for Alternative D: commercial (low) thinning (80 acres), improvement cutting (2,420 acres), and seed-tree cutting with reserves (100 acres).

Indirect effects consider the impact of implementing Alternative D on the larger forest vegetation affected environment in which it occurs. The direct effects of implementing Alternative D on its portion of the affected environment (approximately 2,600 acres) are applied to the entire affected environment (approximately 14,060 acres) to estimate the indirect effects.

Maps located in Appendix A show the geographical location and spatial juxtaposition of silvicultural activities in Alternative D.

Direct Effects for Species Composition -Alternative D

Species composition, as represented using forest cover types, is expected to change in response to implementation of silvicultural activities proposed for Alternative D (Table 3-20). Most of the forest cover types that would be affected by implementation of silvicultural activities included in Alternative D are late-seral (grand fir and spruce-fir), and they are decreased as a direct effect of implementation; early- or mid-seral cover types (ponderosa pine, Douglas-fir, and western larch) are either enhanced or get established by these alternatives, so they are increased as a direct consequence of implementation.

Table 3-33 Direct Effects for Species Composition - Alternative D

	Pre- Implementation		Post- Implementation		Difference
Forest Cover Type	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
Ponderosa pine	290	11	440	17	+150
Douglas-fir	390	15	910	35	+520
Western larch	0	0	780	30	+780
Lodgepole pine	100	4	0	0	(–100)
Grand fir	1,260	48	260	10	(–1,000)
Spruce-fir	560	22	210	8	(–350)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternative D – approximately 2,600 acres).

Indirect Effects for Species Composition - Alternative D

Table 3-34 shows that the direct effect of implementing Alternative D has a relatively minor indirect effect on species composition when spread across the entire forest vegetation affected environment. As a result of implementing Alternative D, the representation of five cover types (herb-shrub, ponderosa pine, Douglas-fir, lodgepole pine, and spruce-fir) either has no change at all, or the change is small on a percentage basis (defined as less than a 5 percent change in the overall forest cover type percentage). The representation of two cover types, western larch (increase) and grand fir (decrease) is expected to change to an appreciable extent.

Table 3-34 Indirect Effects for Species Composition - Alternative D

	Pre-Implementation		Post-Implementation		Difference
Forest Cover Type	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
Herb-shrub	210	1	210	1	No change
Ponderosa pine	1,910	14	2,060	15	+150
Douglas-fir	2,100	15	2,620	19	+520
Western larch	310	2	1,090	8	+780
Lodgepole pine	300	2	200	1	(–100)
Grand fir	6,840	49	5,840	42	(–1,000)
Spruce-fir	2,390	17	2,040	15	(–350)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres), and reflecting the direct effects of implementing Alternative D (affecting approximately 2,600 acres of the affected environment).

An HRV analysis was completed for species composition of the forest vegetation affected environment as it would exist after implementation of Alternative D. Because species composition varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Species composition HRV results are presented in Table 3-35.

Having an ecologically appropriate representation of forest cover types well distributed throughout the South George planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 3-35 suggests that the silvicultural activities proposed for implementation in Alternative D were marginally successful at changing the pre-implementation HRV results regarding species composition:

- Before implementation, the Dry UF PVG had 3 cover types that were outside of HRV and the Moist UF PVG had 6 cover types that were outside of HRV (Table 3-18).
- After implementation, the Dry UF PVG has 2 cover types that are outside of HRV and the Moist UF PVG has 5 cover types that are outside of HRV (Table 3-35).

For Moist UF PVG, comparing Tables 3-18 and 3-35 shows that implementing Alternative D would result in western larch just barely reaching the historical range (larch was below the range and needed to be increased to get within the range), and it makes some progress toward reducing grand fir and spruce-fir representation toward their historical ranges (grand fir was substantially above the range before treatment, and still is after treatment). Douglas-fir representation increased slightly after treatment (from 7 percent to 9 percent), but this increase was not sufficient to get Douglas-fir within its historical range.

For Dry UF PVG, comparing Tables 3-18 and 3-35 shows that alternative implementation would increase the representation of ponderosa pine slightly (from 32 percent to 37 percent), but it is still below the historical range. Proposed dry-site activities also increased the representation of Douglas-fir (from 46 percent to 55 percent), pushing it even further above the historical range. Proposed activities reduced the abundance of grand fir substantially (from 22 percent to 8 percent), which means that grand fir would transition from being above the historical range (Table 3-18) to within the historical range (Table 3-35) after project implementation.

Table 3-35 HRV Analysis Of Species Composition For The Entire Forest Vegetation Affected Environment, Reflecting Direct Effects Of Implementing Alternative D

Cover Type	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Herb-shrub	0-5	0-150	0	0	0-5	0-550	2	210
Shrub	0-5	0-150	0	0	0-5	0-550	0	0
Western juniper	0-5	0-150	0	0	—		—	
Ponderosa pine	50-90	1480-2660	37	1,090	5-15	550-1640	8	860
Douglas-fir	5-20	150-590	55	1,630	15-30	1640-3280	9	990
Western larch	0-10	0-300	0	0	10-30	1090-3280	10	1090
Broadleaved trees	0-5	0-150	0	0	1-10	110-1090	0	0
Lodgepole pine	0-5	0-150	0	0	10-25	1090-2730	2	200
Western white pine	—		—		0-5	0-550	0	0
Grand fir	1-10	30-300	8	230	15-30	1640-3280	51	5,610
Spruce-fir	—		—		1-15	110-1640	18	1,970

Sources/Notes: Current amounts are summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres, except for 180 acres of cold upland forest not included in this analysis), and reflecting the direct effects of implementing Alternative D (affecting approximately 2,600 acres of the affected environment). Gray shading indicates cover types that are either above or below the historical range of variability. Historical ranges are approximate and were adapted from Morgan and Parsons (2001); they are based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regimes.

Direct Effects for Forest Structural Stages - Alternative D

Forest structure, as represented using structural stages, is expected to change in response to implementation of silvicultural activities proposed for Alternative D (Table 3-36). Although some of the existing old-forest stands (OFMS and OFSS) would be affected by proposed silvicultural activities in this alternative, 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 after intermediate treatments are implemented.
2. Improvement cutting is used to convert 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 DBH or larger in diameter) to qualify as old forest after treatment.

The stand initiation structural stage increases slightly as a direct effect of implementing Alternative D (Table 3-36), which improves the representation of this structural stage because stand initiation is either slightly below HRV (dry upland forest PVG) or in the bottom half of the historical range (moist upland forest PVG) for the forest vegetation affected environment (see Table 3-20).

Table 3-36 Direct Effects for Forest Structural Stages - Alternative D

	Pre-Implementation		Post- Implementation		Difference
Structural Stage	**Acres**	**Percent**	**Acres**	**Percent**	**Acres**
SI	0	0	100	4	+100
SEOC	690	27	1,430	55	+740
SECC	840	32	0	0	(–840)
UR	640	25	0	0	(–640)
OFMS	360	14	280	11	(–80)
OFSS	70	3	790	30	+720

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternative D – approximately 2,600 acres). Refer to Table 3-19 for information about the structural stages and how they were derived.

Indirect Effects for Forest Structural Stages - Alternative D

Table 3-37 shows that the direct effects of implementing silvicultural activities associated with Alternative D have an obvious indirect effect on forest structure when spread across the entire forest vegetation affected environment. As a result of implementing Alternative D, the representation of four structural stages (SEOC, SECC, UR, and OFSS) is expected to change enough to modify their overall proportion of the affected environment by 5 percent or more. The representation of three structural stages either has no change at all (YFMS), or the change in overall proportion of the affected environment is only 1 percent – SI and OFMS.

Table 3-37 Indirect Effects for Forest Structural Stages - Alternative D

	Pre-Implementation		Post- Implementation		Difference
Structural Stage	**Acres**	**Percent**	**Acres**	**Percent**	**(Acres)**
SI	570	4	670	5	+100
SEOC	2,720	19	3,460	25	+740
SECC	3,000	21	2,160	15	(–840)
UR	4,200	30	3,560	25	(–640)
YFMS	310	2	310	2	No change
OFMS	1,120	8	1,040	7	(–80)
OFSS	2,140	15	2,860	20	+720

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres), and reflecting the direct effects of implementing Alternative D (affecting approximately 2,600 acres of the affected environment). Refer to Table 3-19 for information about the structural stages and how they were derived.

Having an ecologically appropriate representation of forest structural stages well distributed throughout the South George planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 3-38 suggests that the silvicultural activities proposed for implementation in Alternative D were somewhat successful at changing the pre-implementation HRV results regarding forest structural stages:

- Before implementation, the Dry UF PVG had 4 structural stages that were outside of HRV and the Moist UF PVG had 5 structural stages that were outside of HRV (Table 3-20).
- After implementation, the Dry UF PVG has 2 structural stages that are outside of HRV and the Moist UF PVG has 5 structural stages that are outside of HRV (Table 3-38).

For Moist UF PVG, proposed treatments were not successful at reducing the amount of understory reinitiation sufficiently to move this structural stage within its historical range. UR was above the range at 31 percent of the pre-treatment affected environment (see Table 3-20) and alternative implementation reduced it to 27 percent, which is a positive trend but this stage still remains above the historical range Table 3-38).

For Dry UF PVG, proposed treatments were more effective at changing the pre-implementation HRV situation for the affected environment. Stand initiation (SI) had been slightly below HRV (Table 3-20); the proposed activities were successful at boosting its representation to within the historical range (Table 3-38). Stem exclusion closed canopy (SECC) was above the historical range before implementation (Table 3-20); the proposed activities were successful at bringing it down to within the historical range (Table 3-38).

Table 3-38 HRV Analysis Of Forest Structural Stages For The Entire Forest Vegetation Affected Environment, Reflecting Direct Effects Of Implementing Alternative D

Structural Stage	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
SI	5-15	150-440	8	230	1-10	110-1090	4	400
SEOC	5-20	150-590	15	450	0-5	0-550	28	3,010
SECC	1-10	30-300	6	190	5-25	550-2730	18	1,970
UR	1-10	30-300	17	510	5-25	550-2730	27	2,910
YFMS	5-25	150-740	1	20	40-60	4370-6560	3	290
OFMS	5-20	150-590	5	160	10-30	1090-3280	8	880
OFSS	15-55	440-1620	47	1,390	0-5	0-550	13	1,470

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres, except for 180 acres of cold upland forest not included in this analysis), and reflecting the direct effects of implementing Alternative D (affecting approximately 2,600 acres of the affected environment). Gray shading indicates structural stages that are above or below the historical range of variability. Historical percentages (H percent) were derived from Hall (1993), Johnson (1993), and USDA Forest Service (1995), as summarized in Blackwood (1998). Forest structural stages are described in Table 3-19.

Direct Effects for Tree Density - Alternative D

Tree density classes are expected to change in response to implementation of silvicultural activities proposed for Alternative D (Table 3-39). One direct effect of implementing the silvicultural activities is expected to be a consistent reduction in tree density for the treatment units. All of the high density condition included in the portion of the affected environment used for Alternative D is expected to be reduced to either the moderate or low density condition after implementation.

Table 3-39 Direct Effects for Tree Density Classes - Alternative D

Tree Density Class	Pre-Implementation		Post-Implementation		Difference
	Acres	Percent	Acres	Percent	Acres
Low	220	8	1,300	50	+1,080
Moderate	1,080	42	1,300	50	+220
High	1,300	50	0	0	(–1,300)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternative D – approximately 2,600 acres). Refer to Table 3-21 for information about the tree density classes and how they were derived.

Indirect Effects for Tree Density - Alternative D

Table 3-40 shows that the direct effect of implementing alternative D has a noticeable impact on tree density when spread across the entire forest vegetation affected environment. As a result of implementing Alternative D, the representation of all three tree density classes changes in one direction or another: the low density class increases from 36 percent to 44 percent the moderate class increases slightly from 37 percent to 39 percent and the high class decreases from 27 percent to 18 percent.

Table 3-40– Indirect Effects for Tree Density Classes - Alternative D

Tree Density Class	Pre-Implementation		Post-Implementation		Difference
	Acres	Percent	Acres	Percent	(Acres)
Low	5,050	36	6,140	44	+1,090
Moderate	5,200	37	5,420	39	+220
High	3,810	27	2,500	18	(–1,310)

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres), and reflecting the direct effects of implementing Alternative D (affecting approximately 2,600 acres of the affected environment). Refer to Table 3-21 for information about the tree density classes and how they were derived.

An HRV analysis was completed for tree density of the forest vegetation affected environment as it would exist after implementation of Alternative D. Because forest structure varies by biophysical environment, the HRV analysis was stratified by potential vegetation group: dry upland forest and moist upland forest. Note that the cold upland forest PVG is not included because it has too few acres (180 acres) for a credible HRV analysis. Tree density HRV results are presented in Table 3-41.

Having an ecologically appropriate representation of tree density classes well distributed throughout the South George planning area, each of which exists within its historical range of variability, is a desired future condition for forest vegetation. The information presented in Table 3-41 suggests that implementing alternative D would result in mixed results regarding tree density, at least in the context of HRV:

- Before implementation, the Dry UF PVG had 2 tree density classes that were outside of HRV and the Moist UF PVG had no density classes that were outside of HRV (Table 3-22).
- After implementation, the Dry UF PVG has 1 density class that is outside of HRV and the Moist UF PVG has 1 density class that is outside of HRV (Table 3-41).

For Moist UF PVG, proposed treatments resulted in the low density class increasing from 37 to 42 percent of the affected environment, which results in this class being slightly outside of the historical range; the moderate density class had a slight increase from 40 percent to 43 percent both of which are within the historical range; and the high density class was reduced from 23 percent to 15 percent, which results in this class being right at the lower limit of the historical range after alternative implementation (compare Tables 3-22 and 3-41).

For Dry UF PVG, proposed treatments resulted in the low density class increasing from 30 percent to 47 percent of the affected environment, which moves this class from being below HRV to within the historical range. For the moderate density class, proposed activities basically had no effect from 26 percent to 25 percent; the high density class was reduced from 44 percent to 28 percent which is a positive trend in this class' representation, but it still wasn't sufficient to move this class within the historical range (compare Tables 3-22 and 3-41).

Table 3-41 HRV Analysis Of Tree Density Classes For The Entire Forest Vegetation Affected Environment, Reflecting Direct Effects Of Implementing Alternative D

Tree Density Class	DRY UPLAND FOREST PVG				MOIST UPLAND FOREST PVG			
	Historical Range		Current Amount		Historical Range		Current Amount	
	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Low	40-85	1180-2510	47	1,380	20-40	2190-4370	42	4,600
Moderate	15-30	440-890	25	730	25-60	2730-6560	43	4,670
High	5-15	150-440	28	840	15-30	1640-3280	15	1,660

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the entire forest vegetation affected environment – approximately 14,060 acres, except for 180 acres of cold upland forest not included in this analysis), and reflecting the direct effects of implementing Alternative D (affecting approximately 2,600 acres of the affected environment). Gray shading indicates tree density classes that are above or below the historical range of variability.

In summary, implementation of the silvicultural activities associated with Alternative D does not result in more of the forest cover types, forest structural changes, and tree density classes moving within their historical ranges because of the following two factors:

1. A relatively low proportion of area (acreage) is being treated, which limits the opportunity to change under- or over-represented forest cover types. Alternative D only affects 17 percent of the forested portion of the planning area, and only 18 percent of the forest vegetation affected environment.
2. Proposed silvicultural activity units cannot generally address every issue simultaneously. Very few individual units address all three of the primary forest vegetation issue categories (composition, structure, density) simultaneously, so certain activity units directed toward a specific issue (such as composition) may have a neutral or negative effect on another issue (such as structure or density) depending on a unit's suitability for addressing issues and priority setting between units.

Cumulative Effects for Species Composition, Forest Structural Stages, and Tree Density- Alternative D

Past actions (page 3-2), including timber harvest, tree planting, and noncommercial thinning, helped create existing conditions in the planning area. The proposed action is designed to address the project's purpose and need by improving forest health, vegetation vigor, and ecosystem resilience to fire, insects, and disease. Proposed silvicultural activities respond to the purpose and need by helping to move species composition, forest structure, and tree density back within their historical ranges of variability.

Present (ongoing) actions (page 3-3) include vegetation management activities in the Park Ridge portion of the planning area. Park Ridge activities were designed in such a way as to address similar issues and concerns as those influencing the South George project. Therefore, they represent incremental actions (beyond the proposed action) that are also largely responsive to the South George project's purpose and need. Reasonably foreseeable future actions, which include non-commercial thinning and prescribed fire activities beyond what is included in the South George proposed action, would also contribute to the project's purpose and need by reducing tree density and surface fuel loadings, and by increasing representation of early-seral tree species, but only on relatively limited portions of the planning area.

When considering the direct and indirect effects of the project's proposed action on forest health, vegetation vigor, and ecosystem resilience (as reflected by changes in species composition, forest structure, and tree density following implementation of proposed actions), and when evaluating how the direct and indirect effects of past actions, present (ongoing) actions, the proposed action, and reasonably foreseeable future actions overlap in both space and time, then the cumulative effects for Alternative D are considered to be mostly positive (because present and reasonably foreseeable actions also utilize design criteria similar to those for the Alternative D proposed action), but they are considered to be less

positive than those associated with Alternatives B and C. The estimated cumulative effects for Alternative D are considered to be positive when compared with those for Alternative A – No Action.

FINDINGS OF CONSISTENCY

As described in this section, silvicultural activities proposed for implementation in the South George project are fully consistent with Umatilla National Forest Land and Resource Management Plan (Forest Plan), as amended, and all of its relevant components (management area allocations, standards, guidelines, objectives, desired future conditions, etc.).

Documentation of consistency with the Eastside Screens amendment and National Forest Management Act are located in Appendix C of this document.

INSECT AND DISEASE SUSCEPTIBILITY

An important objective of the proposed forest vegetation silvicultural activities is to address issues related to insect and disease susceptibility (refer to project file, Silviculture Report, Appendix B for susceptibility characterization results for six insect or disease agents for which the South George planning area provides habitat or host type). Susceptibility refers to the potential for a disturbance event (wildfire, insect outbreak, disease epidemic, etc.) as based on inherent or intrinsic stand characteristics such as species composition, tree density, forest structure, etc. (Schmitt and Powell 2005).

Although susceptibility was not used as an indicator when characterizing the forest vegetation affected environment, or when estimating the environmental consequences of alternative implementation this section reports how susceptibility ratings would be expected to change as a result of implementing the proposed silvicultural activities. Since existing susceptibility is particularly high in the South George project planning area for two insect or disease agents – defoliators (western spruce budworm and Douglas-fir tussock moth) and fir engraver pre- and post-treatment estimates of their susceptibility ratings would be reported below for the portion of the forest vegetation affected environment included in Alternatives B and C and in Alternative D.

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 for forest vegetation. The information presented in Table 3-42 suggests that implementing the alternatives would move a substantial proportion of the treated acreage from a high or moderate susceptibility condition (the pre-treatment condition) to a moderate or low condition (the post-treatment situation). The results presented in Table 3-42 suggest that the proposed silvicultural activities would be at least moderately successful at addressing the issues related to insect and disease susceptibility.

Table 3-42 Estimated Effect of Alternative Implementation on Susceptibility Ratings for Defoliating Insects (Budworm/Tussock Moth) and Fir Engraver

	*Pre-Treatment (Acres)			*Post-Treatment (Acres)		
	High	**Moderate**	**Low**	**High**	**Moderate**	**Low**
Defoliators						
Alternatives B and C	1,940	1,960	0	0	1,300	2,600
Alternative D	960	1,640	0	0	920	1,680
Fir engraver						
Alternatives B and C	2,500	1,090	310	0	1,800	2,100
Alternative D	1,360	940	300	0	1,270	1,330
* **All table values rounded to nearest 10 acres**						

Sources/Notes: Summarized from the South George vegetation database (forested, suitable, NFS lands on the portion of the forest vegetation affected environment included within Alternatives Band or C (approximately 3,900 acres) or Alternative D (approximately 2,600 acres)). Refer to Appendix A in the Siviculture Report, specifically the Insects and Diseases section, for information about the insect and disease susceptibility ratings and how they were derived.

CLIMATE CHANGE ANALYSIS

The proposed action (Alternative B) would affect approximately 3,900 acres of National Forest System lands by implementing commercial thinning, improvement cutting, seed-tree cutting, clearcutting, and tree planting silvicultural activities. The scope of the proposed action is minor because silvicultural activities are proposed for only 19 percent of the total planning area acreage (see Table 3-16), 1.1 percent of the Pomeroy Ranger District, 0.2 percent of Umatilla National Forest, and 0.08 percent of the Blue Mountain national forests (Malheur, Umatilla, Wallowa-Whitman). A project of this magnitude would contribute such minimal amounts of greenhouse gas that its impact on global or national climate change would be infinitesimal. Therefore, the proposed action's direct and indirect contribution to greenhouse gasses and climate change would be negligible.

In addition, because direct and indirect effects would be negligible, the proposed action's contribution to cumulative effects on greenhouse gasses and climate change would also be negligible.

The minor scope of the proposed action suggests it would be inappropriate to attempt to isolate climate change effects that are directly or indirectly attributable to implementation of South George project. Our current understanding of climate science suggests it is difficult, if not impossible, to establish a cause-and-effect relationship between silvicultural activities and climate change at a project scale. Therefore, climate change was not used as an issue during the NEPA process, and no indicators were established for comparing climate change effects between alternatives.

Certain principles and concepts of climate change, however, can be used to assess whether silvicultural activities included in the proposed action would be expected to maintain or enhance forest adaptation to the predicted effects of climate change. A discussion of additional climate change and carbon sequestration considerations is provided in the Appendix D, pages 111 to 130, in the Silviculture Specialist Report located in the project file.

Two general strategies are used to address climate change: mitigation and adaptation. Mitigation involves reducing greenhouse gas emissions now in order to minimize the current pace and magnitude of climate change. Adaptation accepts that climate change would occur (and already is occurring), so it involves making ecosystems more resistant and resilient to the predicted effects of future climate fluctuations.

Two silvicultural activities included in South George proposed action are considered to be compatible with a mitigation strategy (Baron et al. 2008, Nabuurs et al. 2007, Reyer et al. 2009, Salinger et al. 2005) – intermediate cutting (thinning and improvement cutting) and tree planting both contribute to a "maintain forest area" mitigation objective (i.e., ensure that lands currently supporting forest continue to support forest in the future) (Nabuurs et al. 2007).

While mitigation is crucial, adaptation to climate change is increasingly viewed as a necessary and complementary strategy to mitigation (Joyce et al. 2009). Table 3-43 includes a list of adaptation strategies proposed for the National Forest System as a whole, and pertaining to forest vegetation (these are shown in the left column). Table 3-43 also describes how silvicultural activities included in South George proposed action could be compatible with adaptation strategies (shown in right column).

The Intergovernmental Panel on Climate Change (IPCC) concluded with high confidence (8 out of 10 chance) that "disturbances such as wildfire and insect outbreaks are increasing and are likely to intensify in a warmer future with drier soils and longer growing seasons, and to interact with changing land use and development affecting the future of wildland ecosystems" (Parry et al. 2007, page 56). This IPCC conclusion demonstrates that climate change involves more than just the direct effects of warming temperatures and variable precipitation, it includes indirect effects of climate change on wildfire, insect outbreaks, and other biotic and abiotic disturbance processes.

Information in Table 3-43 indicates that silvicultural activities addressing stand vulnerability to uncharacteristic levels of wildfire, along with other climate-related changes in disturbance regimes, could meet multiple goals of near-term mitigation and mid-term adaptation if such practices also reflect goals for other ecosystem services such as late-old structure and water quality (Joyce et al. 2009).

Table 3-43 Compatibility of Silvicultural Activities and Climate Change Adaptation Strategies

Climate Change Adaptation Strategies That Are Related to Forest Vegetation	Predicted Compatibility of Strategy with South George Proposed Silvicultural Activities
Improve the capability of ecosystems to withstand uncharacteristically severe drought, wildfires, and insect outbreaks at landscape scales.	Rationale for silvicultural activity proposals is based largely on insect and disease susceptibility and the potential to reduce uncharacteristic fire hazard, particularly for dry-forest sites (see Chapters 1 and 2, and Appendix A of the Siviculture Specialist Report in the project file). The low thinning activity would be aggregated as large blocks to emulate the spatial extent produced historically by surface fire (Heyerdahl 1997).
Facilitate natural (evolutionary) adaptation through silvicultural treatments that shorten regeneration times and promote interspecific competition.	The proposed action includes regeneration cutting and tree planting, both of which are responsive to shortened regeneration times and promotion of interspecific competition. Planting emphasizes a mixed species composition and good representation of early-seral species, both of which are predicted to be more compatible with future climate conditions in the planning area.
Where ecosystems will very likely become more water limited, manage for drought- and heat-tolerant species.	Specifications for how silvicultural activities would be implemented account for species-specific life history traits influencing drought and heat resistance. Drought-tolerant species are preferentially retained during intermediate cutting, and they are also emphasized in the species mix to

Climate Change Adaptation Strategies That Are Related to Forest Vegetation	Predicted Compatibility of Strategy with South George Proposed Silvicultural Activities
	be planted after regeneration cutting.
Reduce homogeneity of stand structure and synchrony of disturbance patterns across broad landscapes by promoting diverse age classes and species mixes, stand diversities, and genetic diversity.	The rationale for proposing certain silvicultural activities is based on results from an HRV analysis, and several HRV components (composition and structure) properly account for age-class, species, and successional-stage diversity. Tree planting promotes a diverse species composition rather than single-species stands. Regeneration cutting introduces or enhances landscape heterogeneity by reducing homogeneity.
Reset ecological trajectories to take advantage of early successional stages that are adaptive to present rather than past climates.	Regeneration cutting would reset ecological trajectories for activity units in which it is proposed; the tree planting activity would use a mixed species composition featuring early-seral (early successional) tree species.
Use historical ecological information to identify environments buffered against climate change and which would be good candidates for conservation.	Although climate change could possibly affect the full range of biophysical environments, we believe that the historical structure associated with dry forests (e.g., a low-density cohort of large-diameter, fire-resistant trees featuring ponderosa pine) is likely to be resilient to predicted climate change. Proposed silvicultural activities are directed toward conserving this structure when it currently exists, or restoring it if important biological legacies (such as large trees) are still present. Using regeneration cutting and thinning would introduce heterogeneity on moist-forest sites and create resilient tree density levels on all biophysical environments.
Encourage local industries that can adapt to or cope with variable types of forest products because of the uncertainty about which tree species will prosper in the future.	It is anticipated that some portion of the silvicultural activity involving timber harvest (intermediate and regeneration cutting) would be accomplished using stewardship authority or another alternative that would not involve a standard timber-sale contract. Local stewardship or biofuel/bioenergy industries are capable of dealing with unconventional species or product types.
Reforestation after disturbance may require different species than were present before the disturbance to better match site-level changes associated with climate change.	The reforestation activity would utilize a mixed species composition emphasizing early-seral, drought-tolerant species. All of the species are currently present in the planning area; at the present time, there is no proposal to adapt to the future effects of climate change by introducing a non-native species.
After a disturbance event, use intensive site preparation activities to remove competing vegetation and replant with high-quality, genetically appropriate and diverse stock.	After implementation of the regeneration cutting silvicultural activities, the tree planting activity would be completed by using conventional (non-intensive) removal of competing vegetation (hand scalping), and the seedlings

Climate Change Adaptation Strategies That Are Related to Forest Vegetation	Predicted Compatibility of Strategy with South George Proposed Silvicultural Activities
	to be outplanted would be produced from genetically diverse (but local) seed sources.
To promote climate resilience for existing stands, use widely spaced thinnings or shelterwood cuttings and rapid response to forest mortality from fire or insects.	The intermediate cutting (thinning) and seed-tree cutting treatments would be implemented to the widest reasonable spacing; rapid response to forest mortality is not included in the proposed action for the South George Vegetation Management Project.
Plan for higher-elevation insect outbreaks, species mortality events, and altered fire regimes.	Silvicultural activities proposed for implementation on moist-forest sites anticipate accelerated mortality of subalpine fir (which is currently occurring at high levels due to an infestation of balsam woolly adelgid, an introduced, non-native insect species), Engelmann spruce, and other species that are predicted to not fare well under future climate conditions (Rehfeldt et al. 2006).

Sources/Notes: the climate change adaptation strategies pertain to forest vegetation only and were derived from Joyce et al. (2008, 2009) and West et al. (2009). The predicted compatibility of each adaptation strategy with silvicultural activities included in the South George proposed action was provided by the author of this specialist report.

SUMMARY: COMPATIBILITY OF SILVICULTURAL ACTIVITIES WITH PREDICTED CLIMATE CHANGE

Three categories of silvicultural activities are included in the South George proposed action: intermediate cutting (improvement cutting, low thinning), regeneration cutting (clearcutting with reserves, seed-tree cutting with reserves), and tree planting (see Chapter 2, pp. 2-5 to 2-11). Predicted changes in future temperature and precipitation for a large region containing the South George project planning area are expected to have varying interactions with silvicultural activities included in the South George proposed action.

1. **Intermediate Activities (improvement cutting, low thinning).** Climate modeling suggests that drought conditions will be more common in the future because mid-summer temperatures are expected to be substantially higher than at present. Dense tree stands exist in a sort of perpetual physiological drought because there is not enough soil moisture to meet the water needs of all trees; intermediate cutting is used to alleviate this moisture stress and allow the residual trees to survive and continue growing. It is expected that future climate conditions would have demonstrably more impact on dense stands than is produced by the current climate. Therefore, the need for thinning and related intermediate treatments is expected to be much greater in the future than at present because thinning improves physiological vigor, and trees with improved vigor produce more of the resins used to repel insect and disease attacks (Kolb et al. 1998, Mitchell et al. 1983, Pitman et al. 1982, Safranyik et al. 1998). Thinning also disrupts canopy fuel continuity, which could help address future crown-fire risk (Agee 1996, Powell 2010, Scott 1998). 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).

2. **Regeneration Activities (clearcutting, seed-tree cutting).** These silvicultural activities are expected to cause the greatest difference between pretreatment and post-treatment conditions by creating open, unshaded environments in the near-term. Since climate change is expected to cause warmer, dryer conditions in the mid-term, it would be useful to consider the life-history traits of native trees and how they might influence the fitness of a species to thrive in post-regeneration conditions and to persist under future climate conditions. The life-history traits of tree species in the South George project planning area suggest that ponderosa pine, western larch, western white pine, and lodgepole pine will be well-adapted to the open conditions created by regeneration cutting. When considering the predicted impact of climate change on temperature and precipitation, and when considering the indirect effects of climate change on wildfire and insects (Canadell and Raupach 2008, Westerling et al. 2006), it is likely that the same four species, along with Douglas-fir, will be best adapted to the future climate of the planning area. Table 3-43 also describes how regeneration cutting can be advantageous (in a climate change context) because it promotes early-successional stages that are adapted to present rather than past climates.

3. **Tree Planting.** This silvicultural activity would be used to reestablish tree cover in areas affected by regeneration cutting (clearcutting, seed-tree cutting). When considering the life-history traits of tree species in the South George planning area, many of which have a direct bearing on reproductive capacity, the species to be emphasized during implementation of the tree planting activity are: ponderosa pine, western larch, western white pine, lodgepole pine (only if natural regeneration is inadequate for this species), and Douglas-fir. These five species are the same ones identified above (item #2) as being most adaptable to future conditions affected by climate change. This means that species with optimal fitness for post-harvest environmental conditions are also predicted to have acceptable fitness for a warmer and dryer climate. Note that natural regeneration is expected to occur in areas receiving the regeneration cutting silvicultural activities, so the ultimate species diversity for these areas will likely be greater than just the five species being planted.

This climate-change review considering predicted temperature and precipitation changes at a broad scale (Washington State) suggests that silvicultural activities included in the proposed action adequately anticipate future climate change, appropriately provide for future ecosystem resiliency and integrity, and reasonably realign existing conditions to be more sustainable under future climate conditions (Dale et al. 2001).

FUELS

This section incorporates by reference the South George Fuels 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The South George project planning area is located on Pomeroy Ranger District and is approximately 21,000 acres in size. Project activities, in conjunction with past, ongoing, and reasonably foreseeable

activities, have effects on fuels and fuel continuity; therefore, the planning area is sufficient to display effects on the landscape[6].

Information for this fuels analysis was gathered and synthesized from field reconnaissance, the Umatilla National Forest's Geographic Information System (GIS), historical vegetation mapping, Umatilla National Forest Integrated Forest Resource Management System (INFORMS) vegetation database, and fire and fuels modeling software (FVS-FFE, Behave).

All acres in the project planning area were assigned a Fire Regime and Condition Class, as well as evaluated for crown fire potential.

Difference in alternatives will be displayed by:

- Acres of Fire Regime I, II, and III in Condition Classes 2 and 3, and historical range of variability (HRV) for both dry and moist forest.
- Acres of crown fire potential classified as medium and high[7].

Background

Fire Regime Condition Class - A natural fire regime is a classification of the historical role fire would play across the landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee, 1993, Brown, 1995). Fire regime condition class describes the amount of departure of the landscape from the historical fire regime. Fire regimes are described by fire frequencies and intensities that are defined by vegetation conditions such as composition, structure, and density. Condition class describes the condition of the landscape by characterizing the vegetation's departure from its historical range of variability. This characterization describes the landscapes vulnerability to uncharacteristic wildfire intensities, severities, and insect and disease susceptibility. South George project planning area is currently classified as 87 percent in Condition Class 2, and 12 percent Condition Class 3.

Historic Range of Variability (HRV) - Historical range of variability (HRV) is a conservation strategy used to establish reference conditions for managing landscapes (Thompson, 2009). These reference conditions describe the forest composition and structure that existed before Euro-American settlement. For example, the historical range of species distributions or the return interval for disturbance processes (Thompson, 2009). For the northern Blue Mountains, HRV uses a range of reference conditions pertaining to the pre-settlement era (mid 1800's). HRV was used with a wide variety of vegetation indicators, such as stand density, canopy biomass, and insect and disease susceptibility, when completing the National Forest Management Act (NFMA) of existing and historical analysis (Appendix J) for the South George planning area. Results of NFMA analysis showed dry forest types support too much of grand fir and Douglas-fir cover types, and too little of the ponderosa pine cover type; moist forest sites support too much of the grand fir and spruce-fir cover types, and too little of the Douglas-fir, western larch, broadleaved trees, and lodgepole pine cover types. Dry forests sites support too much high density forest, and both dry and moist forest support too much high canopy biomass condition, For the entire project planning area, existing insect and disease susceptibility is high for tree-defoliating insects and fire engravers (Silvicultural Specialist Report, project analysis file).

[6] The project planning area encompasses approximately 550 acres of Washington Department of Fish and Wildlife land. Only Forest Service acres in planning area were considered for this analysis.
[7] High crown fire potential includes high, very high, and extreme categories.

Crown Fire Potential - Crown fire potential describes a stands ability to initiate and sustain a crown fire. Some fire regimes experience crown fires under historic conditions (Fire Regime IV). Others, such as Fire Regime I and III, sustained crown fires are very uncharacteristic. Forty-eight (48) percent of the South George planning area is categorized as Fire Regime III, (mixed severity fire regime) and 18 percent Fire Regime I (low severity) (Table 3-45). Stand fire coverage developed to analyze crown fire potential for South George project planning area estimated that 64 percent of the planning area is susceptible to crown fire.

Figure 3-3 shows existing fire regimes in South George project planning area.

AFFECTED ENVIRONMENT

Fire Regime and Condition Class

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). Coarse scale definitions for historical fire regimes have been developed by Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Brunnell (2001). Fire regimes are classified based on the average number of years between fires (frequency) combined with the severity of the fire. There are five historical Fire Regimes, I, II, III, IV and V. Four historical fire regimes (I, II, III, and IV) commonly occur in the Blue Mountains (Powell, 2005), and are represented in the South George project planning area. Fire Regimes III and IV are defined with more detail based on region specific characteristics identified by local resource experts and regional fire ecologist, and are based on Umatilla National Forest historical fire data. They are described in Table 3-44 below (Powell, 2005, Evers, 2002).

Table 3-44 Fire Regimes of Oregon and Washington and Present in South George Planning Area (Powell, 2005 and Evers, 2002)

Fire Regime	Return Interval (years)	Severity	Potential Plant Communities	Historical Burned Area (%)
I	<25-35	Low, Surface Fire	Ponderosa pine, dry Douglas-fir	75
II	<35	Mixed, High	True grasslands	5
IIIA	<50	Mixed	Mixed conifer, dry Douglas-fir, dry grand fir	15
IIIB	50-100	Mixed	Warm, mesic grand fir	
IIIC	100-200	Mixed	Mesic grand fir and Douglas-fir	
IVC	100-200	High	Subalpine mixed conifer (spruce-fir), western larch	5

Table 3-45 below shows the acres and percent of area of fire regimes in South George project planning area.

Table 3-45 Fire Regimes and Acres Present in South George Project Planning Area

Fire Regime	Approximate Acres	Percent
I	3,650	18
II	5,200	25
III	9,870	48
IV	1,900	9

Prior to European settlement, dry forests of the inland northwest, ponderosa pine, and mixed conifer (grand fir and Douglas-fir), were burned by relatively frequent low and mixed severity fires (Hessburg et al. 2005). The low severity fires occurred frequently, usually every 1 to 25 years, and as a result less than 20 percent of the basal area was killed (Agee, 2004). The mixed severity fires occurred every 25-100 years and 20 to 70 percent of the basal area may have been fire killed, but in the context of dry fires, this mortality tended to be at the lower end of this overstory mortality (Hessberg et al. 2005).

In stands with low severity fires, fire-tolerant forest structures were maintained by removing the lower crown classes. These fires carried primarily by surface fuels; consumed litter, duff and downed wood; controlled establishment of fire intolerant species and eliminated ladder fuels; and elevated crown bases by killing the majority of trees in the suppressed and intermediate layers (Agee, 1994, Youngblood, 2008). This reduced the threat of running crown fires by continually thinning stands, eliminating ladder fuels and elevating crown bases (Hessberg et al. 2005). Crown fires rarely occurred under these conditions, which can be attributed to lack of surface fuel continuity, raised crown base heights, and reduced crown bulk densities.

Fire Regime Condition Class is a descriptor to characterize an area's departure from historical fire regimes (Powell, 2004). There are three condition classes for each fire regime and they are based on the degree of departure of the vegetation from the historical regimes (and historical range of variability). This departure results in changes to vegetation characteristics such as species composition (structural stages, stand age, and canopy closure), fuel composition, fire frequency, and severity, and other disturbances such as insect and disease. Condition Class 1 is considered low departure, and is considered to be within the historical range of variability, Condition Class 2 is considered moderate, and Condition Class 3 is high. Condition Classes 2 and 3 are considered to be outside the historical range of variability (see Table 3-46).

Table 3-46 Fire Regime Condition Class Descriptions

Condition Class	Description	Species Composition and Structure
1	Within the historical range of variability of the vegetation characteristics; fuel composition; fire frequency, severity and pattern	Species composition and structure are function within their historical range.
2	Fire regimes have been moderately altered from historical range. Fire frequencies have departed from natural historical frequencies by one or more return intervals. The result is moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns.	Species composition and structure have been moderately altered. For example: Grassland – Moderate encroachment of shrubs and trees or invasive exotic species. Forestland – Moderate increase in density, encroachment of shade tolerant trees species, moderate fire tolerant tree species.
3	Fire regimes have been substantially altered from their historical range. Fire frequencies have departed from natural frequencies by multiple return intervals. Dramatic changes occur to one or more of the following: fire size, intensity and severity, and landscape patterns.	Species composition and structure have been substantially altered from their historical range. For example: Grassland – High encroachment and establishment of shrubs, trees, or invasive exotic species. Forestland – High increases in density, encroachment of shade tolerant tree species, or high loss of fire tolerant tree species. High mortality or defoliation from disease and insect.

Approximately 87 percent of South George project planning area has moved, or is on the threshold of moving, into a Condition Class 2 fire regime, the remaining percentage of acres (approximately 13 percent) are in Condition Class 3. This indicates a transition to more complex fuel conditions than historically were present in the planning area. Fuels that would have historically been consumed during periodic wildfires have increased and in many areas, surface and aerial (within the canopy) fuel loadings are above historical levels. Table 3-47 groups the project planning area into the 3 condition classes by approximate acres and percent of planning area. The map above visually displays the condition class of the landscape within South George project planning area.

Table 3-47 Acres by Condition Class in South George Project Planning Area

Condition Class	Approximate Acres	Percent of Planning Area
1	65	<1
2	17,950	87
3	2,550	13

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).

Historical wildland fire data shows that very small acreages (less than 120 acres) have burned during the last 40 years in South George project planning area, with 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 an affected environment with 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 planning area have burned since 1960. Table 3-48 below displays wildfire acres in the project area by decade.

Table 3-48 – Past Wildfire Acres in South George Planning Area

Decade	Number of Fires	Acres Burned
1960	2	10-40
1970	20	2.9
1980	28	3.6
1990	19	27.2
2000-2006	16	2.5

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.

Historical Range of Variability (HRV) analysis for species composition (Table 3-18) shows that dry forestland currently supports too much of the grand fir and Douglas-fir forest cover types and too little of the ponderosa pine forest cover type. HRV analysis also shows moist forestland supports too much of the grand fir and spruce-fir cover types and too little of the Doulas-fir, western larch, broadleaved trees and lodgepole pine forest cove types. In dry upland forest, the HRV for ponderosa pine is 50-90 percent cover, Douglas-fir is 5-20 percent, and grand fir is1-10 percent (Silvicultural Specialist Report, project file)[8]. Currently ponderosa pine cover type is at 32 percent, Douglas-fir is 46 percent, and grand fir is at 22 percent.

For moist upland forest HRV is 5-15 percent ponderosa pine cover type, 15-30 percent Douglas-fir cover type, 10- 30 percent western larch, 15-30 percent grand fir and 1-15 percent spruce-fir. Current percentages are 8 percent ponderosa pine (within HRV), 7 percent Douglas-fir, three percent western larch, 57 percent grand fir, and 21 percent spruce-fir (Table 3-18).

Fire exclusion and fire suppression have also indirectly contributed advancing secondary succession by preventing fires of a size and frequency that allow establishment of early seral species (Hessburg et al., 2005). High tree densities in the South George project are above historical densities in dry upland forestland. High tree densities in dry upland forest historically occupied 5-15 percent of the area, but currently occupy 44 percent of the area in dry upland forest cover types.

[8] The total acres of Affected Environment utilized in the Silvicultural report were based on acres in the South George project planning area suitable for timber harvest. These acres may be different from acres of Affected Environment used in the Fuels analysis because all National Forest acres in the project planning area were assigned a Fire Regime and Condition Class, as well as evaluated for crown fire potential.

Timber harvest began in the Blue Mountains in the late 1800's and fire suppression began shortly thereafter with the inception of the Forest Service in early 1900s (Heyerdahl, 1997). Repeated selection cutting had an effect of advancing secondary succession (Hessburg et al. 2005). Fire tolerant species such as ponderosa pine, Douglas-fir, and western larch were the preferred commercial species by land area and timber volume (Hessburg et al. 2005). These early successional species would be the same species expected to colonize a site following a fire. The thick bark on large diameter ponderosa pine and Douglas-fir make them very tolerant to low severity surface fires (Agee, 1993). As these larger trees were harvested, small openings in the canopy were created and later filled in with fire intolerant, small diameter species.

Timber harvests have occurred in the project area since 1965. Since 1965, approximately 12 percent of the project area (2,575 acres) had regeneration harvest and 61 percent (12,960 acres) had intermediate harvest. Another 2,400 acres of non-commercial thinning has occurred in the project area. Timber harvests were generally followed by mechanical piling and burning to reduce slash. Regeneration harvests were restocked by both planting and natural seed source. Fuels such as needles and branches have slowly accumulated as the stands age. Heavier fuel loadings occur in stands that did not have post harvest fuels treatments.

These harvests have created their own vegetative mosaics on the landscape, especially the regeneration harvests. On a much smaller scale, past regeneration harvest has made incremental changes in disrupting fuel continuity. Road building associated with past timber harvest has provided accessibility for fire suppression forces.

Surface Fuel Loading - Across the project area, the absence of low and mixed severity fires has caused a substantial increase in surface fuel loading, understory vegetation, and stand density. There are areas with high fuel loadings caused by insects and disease, self thinning and overstory tree mortality. The loss of the fire-resistant large-tree component has reduced the fire resiliency of many stands. Past overstory removal and lack of fire has resulted in a shift from ponderosa pine forest cover type, on dry-forest sites, to Douglas-fir and grand fir. Moist-forest sites have shifted from Douglas-fir, western larch cover types to grand fir, spruce cover types in many stands, significantly increasing ladder fuels and decreasing canopy base height. If a fire occurs in these areas under good burning conditions, it is likely that torching and/or crowning would cause overstory mortality.

Surface fuel loadings vary throughout the project area. Fuel models contained within the proposed areas are described by Anderson (1982). The difference in fire behavior among fuel models is related to the fuel load and its distribution among the fuel particle size classes (Anderson, 1982). Fuel load and depth are significant fuel properties for predicting whether a fire will be ignited, rate of spread and intensity (Anderson, 1982).

The following fuel models are found in South George project planning area:

- **Fuel Model 1 (Short Grass) -** Surface fires that move rapidly through the continuous, cured or nearly cured herbaceous fuels. Surface fuel loading, less than 3 inches in diameter, is less than 0.74 tons per acre. Surface fuel bed depth is 1.0 foot.

- **Fuel Model 2 (Timber, Grass and Understory) -** Fire spread is primarily through the fine fuels, such as grass and pine needles. The stand is open where larger pine and Douglas-fir cover one-to two-thirds of the area. Surface fuel loading, less than 3 inches in diameter, averages 4 tons per acre. Surface fuel bed depth is 1 foot.

- **Fuel Model 5 (Low Brush) -** Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally less intense because surface fuel loads are light. Surface fuel loading, less than 3 inches in diameter, averages 3.5 tons per acre. Surface fuel bed depth is 2.0 feet.

- **Fuel Model 8 (Timber, Closed Timber Litter) -** A typical stand includes a closed canopy of short-needled conifers, such as Douglas-fir. The compact litter layer consists of needles, leaves, and occasional twigs. Surface fuel loading, less than 3 inches in diameter, averages 5 tons per acre. Surface fuel bed depth is 0.2 feet.

- **Fuel Model 9 (Timber, Closed Timber Litter) -** Fires that run through surface litter faster than model 8 and have longer flame heights. Long needle conifer stands are typical. Concentrations of dead-down woody material will contribute to possible torching, spotting, and crowning. Surface fuel loading, less than 3 inches in diameter, averages 3.5 ton per acre. Surface fuel bed depth is 0.2 feet

- **Fuel Model 10 (Timber, Litter and Understory) -** Fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Fuels in this model include greater quantities of dead and down material 3 inches and greater. Crowning, spotting and torching are more frequent in this fuel situation. Surface fuel loading, less than 3 inches in diameter, averages 12.0 tons per acres. Surface fuel bed depth is 1.0 feet.

Fuel models do not indicate potential for uncharacteristic wildfire behavior and effects, fire regime condition class, or departure from historical conditions. However, the combination of an indicator of departure from historical conditions, along with fuel models, can be of considerable value in determining if wildfire behavior and effects have departed from natural conditions (Hahn and Strohm, 2003). Intensity and duration of surface fires depend on the availability and condition of surface fuels (Graham et al. 2004). Woody fuel can greatly increase the energy released from surface fires and in some cases increase flame lengths sufficiently to ignite ladder and/or canopy fuels (Graham et al. 2004). In terms of fuels and fire potential, a majority of the closed stands proposed for commercial harvest treatment have fuel loads that are best represented as Fuel Model 10. Fuel Model 5 occurs in the more open stands. Areas proposed for landscape prescribed fire are represented by Fuel Models 1, 2 and 5 with minor inclusions of Fuel Models 8 and 10.

Fuel Models 2, 8, and 9 are models which would have abundantly existed in Fire Regime I and III dominated landscapes. The fire behavior of these representative models (except Fuel Model 8) is determined by accumulations of fine fuels. Some stands may not have changed enough to move into a different fuel model classification, but fire exclusion and the associated changes in stand condition have significantly increased the fire behavior potential. Table 3-49 below, contains the relative percentages of fuel models in the South George project planning area as they are currently classified.) As an example, many of the stands classified as Fuel model 8 are becoming older. As these stands have aged, numerous trees have been out competed for sunlight and nutrients and are now standing dead or have recently fallen, creating higher fuel loads in all fuel size classes. These higher surface fuel loads are more characteristic of a Fuel Model 10.

Table 3-49 Acres and Percent of Fuel Models in South George Project Planning Area

Fuel Model	Acres	Percent of Area
1	5,225	25%
2	2,255	11%
5	1,215	6%
8	3,535	17%
9	765	4%
10	7,635	37%

In South George project planning area, changes in forest stands and concurrent increases in down woody fuel loadings have caused a shift from a historical dominance of Fuel Models 1 and 2, to Fuel Model 5, and from Fuel Models 8 and 9 to the dominance of Fuel Model 10. This could potentially result in a shift of fire behavior during severe fire weather conditions from what were historically fast moving, low intensity, surface fires to fast moving, high intensity crown replacement fires.

Crown Fire Potential

Crown Fire Potential is the spatial continuity and density of tree canopies in combination with wind and physical setting provide the conditions for crown fires (Graham, 2004). Canopy base height[9], canopy bulk density[10], and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire (Albini, 1976, Rothermel, 1991). Canopy base height is important because it effects crown fire initiation and canopy continuity influences the spread of fire (Graham et al. 2004).

Ladder fuels, as they relate to canopy base height, provide avenues for fire to move from the ground to the tree crowns. Stands with low canopy base height are more susceptible to crown fires. Crown fires are high intensity wildfires that advance through a stand's canopy and can exhibit extreme fire behavior that is difficult and dangerous to suppress, and cause economic damage (Keyes and O'Hara, 2002). They occur when surface fires create enough energy to preheat and combust live fuels well above the ground or when ladder fuels, in the form of small seedlings, saplings and young trees with low hanging branches, carry fire into the upper canopy. There are two stages of crown fires: the initiation of crown fire activity, referred to as "torching" (also known as passive crown fire), and the process of active crown fire spread, where fire moves from tree crown to tree crown (Agee and Skinner, 2005). Torching commences when the surface flame length exceeds a critical threshold, defined by Van Wagner (1977) as a function of the moisture content of overstory foliage and the vertical distance to live crown, known as canopy base height (CBH). Once in the crowns, fire must maintain a minimum rate of spread to become an active crown fire and is primarily determined by topography and weather conditions. The spread rate required to keep fire in the crown hinges on the density of fuels in the canopy, called canopy bulk density (CBD) (Keyes and O'Hara, 2002). Torching and crowning also 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.

Under historical disturbance regimes, frequent surface fires consumed litter, duff, and down wood; controlled establishment of fire intolerant species; reduced density of small diameter stems; opened the stands to increased sunlight; led to vertical stratification of fuels by eliminating fuel ladders between the forest floor and overstory canopy; and maintained early seral plant associations. Crown fires rarely

[9] Canopy base height is the lowest point in the stand was there is sufficient available fuel to propagate fire vertically.
[10] Canopy bulk density is the canopy weight for a given volume.

occurred under these historical disturbance regimes. Consequently, the structure in these stands consisted of open, predominantly widely spaced medium to large, old trees, light and patchy ground fuels, and low and patchy cover of fire-tolerant shrubs (Youngblood, 2008).

It is estimated that with a properly functioning disturbance regime, influenced primarily by frequent surface fire (Agee, 1998), dry forestland had 60 percent of its acreage supporting low-density forest, 30 percent supporting moderate-density forest and 10 percent supporting high-density forest. As for mixed severity fire, moist forestland had 30 percent supporting low-density, 50 percent moderate density and 20 percent high density (Table 3-22).

Figure 3-4 Areas in South George project planning area that are at highest risk for crown fire are displayed in Crown Fire Potential Map.

Currently in the South George planning area, 44 percent of the dry upland forest acres are classified as high tree density, 26 percent moderate, and 30 percent low. Historically, 5-15 percent of dry upland forest would have been high tree density and 40 - 85 percent classified low. For moist upland forest 23 percent is currently in the high tree density category, 40 percent in the moderate class, and 37 in the low. For the moist upland forest, all three density classes are within their historical ranges of variability.

Research also shows that high canopy biomass causes forest stands to be more vulnerable to crown fire initiation, and extends the duration of a stand's exposure to crown fire hazard (Keyes and O'Hara, 2002). Approximately eighty-eight percent of the upland forest in the South George project planning area has sufficient forest canopy biomass to sustain crown fire (Silvicultural Specialist Report, p. 86, project file).

Crown fire potential in South George project planning area (Table 3-50) 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. The Forest Vegetation Simulator Fire and Fuels Extension

(FVS/FFE) utilizes a torching index[11] and a crowning index[12] to calculate crown fire potential and summarizes the potential into six categories, extreme, very high, high, medium, low, and non-forest.

Approximately 62 percent of dry and moist forest types in South George project planning area are classified as having high[13] crown fire potential. Another 11 percent of the area is categorized as medium crown fire potential, which without treatment, would presumably transition into a higher potential over time.

Table 3-50 Crown Fire Potential by PVG[14]South George Planning Area

Crown Fire Potential	Dry Upland Forest (Acres)	Moist Upland Forest (Acres)	Percent of Planning Area
High	2,760	10,035	62
Medium	840	1,470	11
Low	35	0	<1
Non-forest	5,215		25
No data	30		<1

ENVIRONMENTAL CONSEQUENCES

Alternative A – No Action

Direct/Indirect Effects – Alternative A

Fire Regime Condition Class (FRCC) and HRV

Taking no action in the project planning area would result in FRCCs to continue to be outside their historical range of variability (HRV) and further deviation from HRV would occur across the landscape. In dry upland forests as defined in Hessburg et al. (2005), fire severity, intensity, frequency, and vegetative characteristics would continue to place ecosystem function at risk in the event of an uncharacteristic wildfire (FRCC Handbook).

In the absence of treatment in South George project planning area, Fire Regimes I and III would continue to shift from frequent low/mixed severity fires to infrequent moderate/high severity fires characterized by increased fire return intervals and associated fire disturbance severities. The area would continue to develop dense, multi-storied stands with forest composition continuing to shift towards fire intolerant species dominance. Insects and disease would act as a surrogate to the historical fire disturbance, and the relative distribution of low, moderate, and high severity disturbance would continue to be outside HRV across the landscape.

[11] Torching index is the wind speed required to cause a ground fire to torch trees in the stand.
[12] Crowning index is the wind speed required to sustain a crown fire.
[13] A classification of high crown fire potential includes high, very high, and extreme categories.
[14] Crown fire potential for cold forest was not calculated because crown fire is typical in cold forest types.

Vegetation characteristics associated with condition classes would continue departure under the no action alternative. FRCC 1 represents the historical state of the landscape by definition and currently characterizes less than 1 percent of the planning area.

Taking no action in South George project planning area would result in species compositions remaining outside the historical range of variability. In dry upland forests, ponderosa pine cover type would continue to be under-represented, and on moist-forest sites Douglas-fir, western larch and associated species would also be under-represented.

No change would occur to tree density levels, so the low density condition would continue to be under represented on dry forest sites, as well as canopy biomass levels for both dry and moist forest-types.

Fuel loading would remain high and continue to increase. Standing dead fuel (snags) would continue to accumulate and add to the existing down fuel load leading to increased departure in FRCC and HRV.

Crown Fire Potential

Under the no action alternative approximately 62 percent of forest areas in South George project planning area would continue to be at risk of historically uncharacteristic crown fire. Crown fire is dependent upon stand structure, composition, density, and fuel loading. In the absence of treatment South George project planning area would continue to depart from historical conditions in all of the listed characteristics that contribute to the initiation of crown fire. Structure would remain multi-storied where it occurs and develop in areas not currently exhibiting multi-storied canopies. Density would increase in most areas under the no action alternative creating the ability of fire to spread from crown to crown. Fire intolerant species would be allowed to occupy a more dominant role in the forested stands leading to physical characteristics that increase torching and the ability to initiate and sustain crown fire. Accumulating surface and aerial fuels would increase fire intensity which is a major component driving initiation of crown fire.

Cumulative Effects – Alternative A

For Alternative A, the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to Action Alternatives

Direct/Indirect Effect - Alternatives B, C, and D

Fire Regime Condition Class (FRCC) and HRV

Proposed vegetation treatments (Chapter 2, Table 2-11) would affect FRCC by moving landscape conditions (fuel loads, canopy base height, stand structure, and composition) toward HRV represented by Condition Class 1 from Condition Classes 2 and 3. Recommended treatments would reduce fuel loading and ladder fuels, increase canopy base height, reduce canopy bulk density and favor fire tolerant species. Treatments under all action alternatives would serve to emulate the stand conditions anticipated under the historical fire regime.

Species composition, tree density, and canopy biomass would affect fire behavior and FRCC on the landscape as described above. Silvicultural prescriptions in all action alternatives include some form of treatment that would have a direct effect on species composition. Disease, insect, and fire resistant trees would be preferred. In each potential vegetative group (such as dry upland forest) species composition

would trend toward HRV. This shift in composition would increase the resiliency of the landscape and reduce the severity of effects during wildfire events. In dry upland forests, treatments would be designed to reduce tree density. Density influences the initiation of crown fire and canopy biomass and the ability of a crown fire to spread between tree crowns once it has initiated. In all action alternatives vegetation treatments would reduce density and stocking in the proposed units. Based on this canopy bulk density reduction, the ability of the forest to sustain a crown fire would be limited where it occurred.

The following table shows acres and percent of fire regime condition classes existing and after proposed treatments in action Alternatives B, C, and D in the project planning area.

Table 3-51 Fire Regime Condition Class (FRCC) – Acres and Percent of Project Planning Area

PVG	Existing Condition Alternative A (Acres – Percent)	Alternatives B and C (Acres – Percent)	Alternative D (Acres – Percent)
Fire Regime I (Dry Upland Forest)			
FRCC 1	0 - 0%	1,435 – 7%	1,090 – 5%
FRCC 2	2,490 – 12%	1,360 – 7%	1,700 – 8%
FRCC 3	1,150 – 6%	850 – 4%	855 – 4%
Fire Regime I (Dry Herbland)			
FRCC 1	14 – 0%	930 – 5 %	885 – 4 %
FRCC 2	3,720 – 18%	2,980 – 15%	3,020 – 15%
FRCC 3	1,400 – 7%	1,215 – 6%	1,245 – 6%
Fire Regime III (Moist Upland Forest)			
FRCC 1	37 – 0.2%	4,375 – 21%	2,510 – 12%
FRCC 2	9,840 – 48%	5,460 – 27%	7,360 – 36%
FRCC 3	0 – 0%	0 – 0%	0 – 0%
Fire Regime IV (Moist and Cold Upland Forest)			
FRCC 1	12 – 0%	1,210 – 6%	685 – 3%
FRCC 2	1,890 – 9%	680 – 3%	1,215 – 6%
FRCC 3	0 – 0%	0 – 0%	0 – 0%
Percentages are calculated based on approximately 21,000 acres within the project planning area			

The table above summarized post-treatment condition class by FRCC. This analysis is based on the definition of FRCC 1 representing HRV for all dry upland forest types defined by Hessburg et al. (2005). Overall, Alternative B and C would move approximately 45 percent (6,969 acres) of upland forest towards a more resilient and historical representative condition. Overall, Alternative D would move approximately 27 percent (4,240 acres) of upland forest towards a more resilient and historical representative condition.

Fuel Loading - Fuel loads under all action alternatives would be reduced by bringing fuel load levels within treated areas closer to historical levels. Treatments would reduce down and dead fuels in Fuel Model 10 areas to more closely resemble historical Fuel Model 8 levels. In areas historically dominated by grasses treatments would set back the encroachment of trees and shrubs to more closely resemble fire behavior and intensities associated with Fuel Model 1. Areas historically dominated by Fuel Model 2 that have shrub encroachment and now resemble a Fuel Model 5, would also see a reduction in shrub the shrub component.

Crown Fire Potential

Under all action alternatives, crown fire potential in all treated areas would be reduced to better represent historical fire behavior and intensity. In mechanical treatment units, surface and ladder fuel removal would occur, therefore reducing probability of crown fire initiation. There would also be a reduction of canopy bulk density in the mechanical fuels units and commercial thin units which directly reduces the ability of crown to crown spread in the occurrence of crown fire initiation (torching). Prescribed fire and non-commercial thinning would remove understory ladder fuels which increases height to live crown and would require longer flame lengths to reach the aerial fuel and initiate crown fire behavior. Silvicultural treatments that alter species composition would reduce the number of fire intolerant species such as grand fir and Engelmann spruce, and favor fire tolerant species such as ponderosa pine, western larch, and Douglas-fir.

The fuels and vegetative structure that initiates and spreads crown fire would be changed under action alternatives. Treatments would increase height to live crown, reduce surface fuel loading, shift the landscape towards fire adapted species, and reduce canopy bulk density in the treated areas. Proposed commercial harvest and subsequent fuels treatments would significantly reduce the crown fire potential by decreasing stem and crown densities, and reducing surface fuel loadings. Ladder fuels are significantly reduced through timber harvest and slashing (non-commercial thinning) followed by underburning or grapple piling.

In dry upland forests, proposed activities in Alternatives B and C would move approximately 54 percent of forest areas into low potential for crown fire increasing that rating 5,705 percent within the PVG. Crown fire potential in the moderate and high categories would be reduced by 20 percent and 66percent respectively, bringing the planning area closer to historical fire behavior and severity levels. Table 3-52 below summarizes the change in abundance of crown fire potential in dry upland forest.

In dry upland forests, proposed activities in Alternative D would move approximately 29 percent of the forest areas into low potential for crown fire increasing that rating 2,980 percent within the PVG. Crown fire potential in the moderate and high categories would be reduced by 13 percent and 33 percent respectively, bringing the planning area closer to historical fire behavior and severity levels. The table below summarizes the change in abundance of crown fire potential in dry upland forest.

Table 3-52 Change in Distribution of Crown Fire Potential in Dry Upland Forest

Crown Fire Potential	Alternative A Existing Acres	Alternatives B and C Acres and Percent Change	Alternative D Acres and Percent Change
Low	35	1,975 5,705%	1,045 2,980%
Medium	840	670 (-20%)	730 (-13%)
High	2,760	955 (-66%)	1,855 (-33%)
There is a total of approximately 3,645 acres of dry upland forest in the South George planning area.			

In moist upland forests, proposed activities in Alternatives B and C would move approximately 36 percent of forested areas to a low potential for crown fire. That shift represents a 4,155 percent increase within the moist upland forest potential vegetation group. There would be a decrease in both moderate

and high potential for crown fire by 36 percent. Table 3-53 below summarizes the change in abundance of crown fire potential in moist upland forest under Alternatives B and C.

In moist upland forests, proposed activities in Alternative D would move approximately 18 percent of the forested areas to a low potential for crown fire. That shift represents a 2,085 percent increase within the moist upland forest potential vegetation group. There would be a decrease in both moderate and high potential for crown fire by 29percent and 27 percent respectively. Table 3-53 below summarizes the change in abundance of crown fire potential in moist upland forest under Alternative D.

Table 3-53 Change in Distribution of Crown Fire Potential in Moist Upland Forest

Crown Fire Potential	Alternative A Existing Acres	Alternatives B and C Acres and Percent Change	Alternative D Acres and Percent Change
Low	0	4,155 4,155%	2,085 2,085%
Medium	1,470	935 (-36%)	1,050 (-29%)
High	10,035	6,415 (-36%)	7,375 (-27%)
There is a total of approximately 11,505 acres of moist upland forest in the South George planning area.			

Cumulative Effects - Alternatives B, C, and D

Activities considered for cumulative effects are those that further modify indicators used in this analysis. The indicators utilized to measure changes in conditions for this analysis are Fire Regime Condition Class, associated HRV, and crown fire potential. Past actions, including fire suppression, timber harvest, non-commercial thinning, and personal use firewood gathering were considered and addressed in the affected environment section above. The following reasonably foreseeable activities (prescribed fire projects, RHCA mechanical fuels treatment, non-commercial thinning, and danger tree removal) are recognized as having potential cumulative effects relating to fuels activities disclosed in the direct and indirect effects portion of this analysis. All of the following activities listed below are expected to occur within the same time frame (5-10 years) as implementation of the South George project, and are located within the project planning area. The geographic boundary for this cumulative effects analysis for fire and fuels is the South George project boundary, because effects are not expected to move outside the project planning area.

Prescribed Fire Projects - Three prescribed fire projects, with signed NEPA decisions, that would occur within the same time frame as the South George project are as follows: Eastside Prescribed Fire Project, Red Hill Prescribed Fire Project, and Park Ridge Prescribed Fire Project.

Eastside Prescribed Fire project would treat approximately 4,500 acres, Red Hill would treat approximately 225 acres, and Park Ridge would treat approximately 245 acres within the South George project planning area with prescribed fire. The purpose and goal of these projects is to maintain and increase quality and quantity of forage, reduce ladder fuels, and reduce ground fuel accumulations.

All three prescribed fire projects would contribute to the reduction of stands in Condition Class 2 and 3 in Fire Regimes I, II, and III, and would reduce acres of moderate and high crown fire potential. Tables below display the amount of acres that would be affected in Fire Regimes I, II, and III in Condition Classes 2 and 3, and Crown Fire Potential categories low, moderate, and high. These affected acres are in addition to acres listed above in the direct and indirect effects analysis.

Table 3-54 Fire Regime Condition Class Additional Treatment by PVG

PVG	FRCC 1 Acres	FRCC 2 Acres	FRCC 3 Acres
Fire Regime I	0	840	480
Fire Regime II	0	1,690	270
Fire Regime III	0	900	0

Table 3-55 Prescribed Fire - Additional Acres Treated for Crown Fire Potential

Crown Fire Potential	Dry Upland Forest Additional Acres Treated	Moist Upland Forest Additional Acres Treated
Low	35	0
Medium	500	107
High	795	798

Riparian Habitat Conservation Areas (RHCA) Fuels Treatment - The purpose of this treatment is to reduce the probability of crown fire initiation in about 25 acres of RHCA by treating ladder fuels, and reducing crown fire spread by using thinning treatments to disrupt canopy continuity in dry forest RHCAs. Prescribed fire would be used to reduce existing and created ground fuels. Trees from 4 inches to 18 inches DBH would be mechanically thinned. This treatment is proposed to occur simultaneously with all action alternatives. This treatment would reduce an additional 18 acres of upland forest in the high crown fire potential category and 6 acres in the moderate category. It would also move an additional 12 acres of Fire Regime I Condition Class 2 and 12 acres of Fire Regime III Condition Class 2 to Condition Class 1.

Non-commercial thinning - Treatment would thin understory to reduce ladder fuels and decrease stand density on 1,355 acres in the South George planning area[15]. Removal of ladder fuels would increase canopy base height and deter the initiation of a crown fire within the treated stand. Increased spacing of trees (reduced canopy bulk density) would result in bringing a crown fire that was initiated outside the stand back to the ground. Stands that are mechanically thinned would have an increased fire hazard until the resulting fuels abated either naturally or with prescribed fire.

Table 3-56 Fire Regime Condition Class Additional Treatment by PVG

PVG	FRCC1 Acres	FRCC2 Acres	FRCC3 Acres
Fire Regime I	0	25	60
Fire Regime III	0	640	0
Fire Regime IV	0	135	0

[15] Total acres proposed for treatment in the Pomeroy Ranger District Non-Commercial Thinning and Fuels Reduction CE for fiscal years 2008-2012 is 1,335. Acres used to calculate changes in effects were 995 acres. The difference is due to a subtraction of original CE acres that overlap with South George commercial thinning units.

Table 3-57 Non-Commercial Thinning - Additional Acres Treated for Crown Fire Potential

Crown Fire Potential	Dry Upland Forest Additional Acres Treated	Moist Upland Forest Additional Acres Treated
Low	0	0
Medium	16	47
High	42	727

Danger Tree Removal - Danger trees would be felled and removed along all haul routes used for timber sale activity. Trees with an imminent failure potential and those deemed likely to fail within a 5-10 year period would be felled along open system roads. Only danger trees with an imminent failure potential would be felled on closed system roads. If considered economically feasible, these trees would be sold as part of a timber sale. Danger trees within RHCAs would be felled and left to provide additional coarse woody debris. Due to increased surface loading, an increase in fire hazard would result until the resulting residual fuels are abated by piling and burning or chipping. Removal of danger trees is not expected to have any additional effect on Fire Regime Condition Class, historical range of variability, or crown fire potential.

FINDINGS OF CONSISTENCY

Implementation of proposed activities for any action Alternative (B, C, or D) would be in compliance with Forest Plan standards and guidelines and desired future condition for fire and fuels. Actions proposed in the project planning area are within Forest Plan management areas A6 – Developed Recreation, C1 – Dedicated Old Growth, C3 – Big Game Winter Range, C3A – Sensitive Big Game Winter Range, C4 – Wildlife Habitat and C5 - Riparian.

Forest Plan direction with regards to fire suppression strategy for management areas within the project planning area is to control in management areas A6 and C1, the suppression strategy for management area C5 is to control and/or contain, and either one or combination of confinement, containment, or control strategies is designated for management areas C3, C3A, and C4 for moderate or high intensity wildfire (flame lengths over two feet).

For fuel reduction activities in all action alternatives, project implementation would meet the following Forest Plan standards and guides:

- A6 – Slashing resulting from hazard tree removal will be made available for firewood to campground users (FP p. 4-120).

- C1 – Natural fuel treatments are permitted to maintain or enhance old growth habitat characteristics or reduce the potential for a high number of and/or severely burned acres. Prescribed burning is the preferred method of fuel treatment. Natural fuels should not exceed an average of about 12 tons per acres in the 0 to 3-inch rise class and average residue depth of 6 inches (FP p. 4-146).

- C3 – Fuels should not exceed an average of 9 tons per acre in the 0 to 3-inch size class and an average residue depth of 6 inches (FP p. 4-154).

- C3A – Fuels should not exceed an average of 9 tons per acre in the 0 to 3-inch size class and an average residue depth of 6 inches (FP p. 4-157).

- C4 – Fuels should not exceed an average of 12 tons per acres in the 0 to 3-inch and average residue depth of 6 inches (FP p. 4-161).

- C5 – Fuel management activities will be designed and executed to maintain or enhance the anadromous fish and wildlife habitat within the constraints of 10 percent exposed mineral soils and 80 percent surface shading. Fuels should not exceed an average of 9 tons per acre in the 0 to 3-inch size class and an average residue depth of 6 inches (FP p. 4-166).

Implementation of any action alternative would also meet the Forest Plan forest-wide goal of providing and executing a fire protection and fire use program that is cost efficient and responsive to land and resource management goals and objectives (FP p. 4-87). Specific to fuels management – Levels and methods of fuels treatment will be guided by the protection and resource objective of the management area. Emphasis will be on intensive utilization of wood residues using a marketing strategy to reduce fuel loadings; and prescribed fire will be utilized to meet management objectives and maintain fuel profiles in all ecosystems (FP 4-88).

Implementation would also be consistent with the National Fire Plan, Federal Wildland Fire Management Policy, and Healthy Forest Restoration Act (Fuels Report – project file).

AIR QUALITY

This section incorporates by reference the South George Air Quality 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

National Forest system land; Class I airsheds and towns and cities that may be affected by smoke intrusion (50 to 60 mile radius). This scale of analysis is used for direct, indirect, and cumulative effects analysis.

Differences in alternatives will be displayed by:

- Carbon monoxide (CO) and particulate matter $PM_{2.5}$ produced by fuel treatments.

AFFECTED ENVIRONMENT

Currently, all prescribed burning that occurs on the Pomeroy Ranger District adheres to Washington State and Federal air quality regulations (see Air Quality Report pages 2 to 5 for listing of regulatory framework). All prescribed burning is regulated by Washington State Department of Natural Resources (DNR) as defined by the Washington State Clean Air Act and is done in accordance with the Washington State DNR Smoke Management Plan. Prescribed burning must be, and is, approved on a day by day basis by the DNR smoke management meteorologist. By using current and predicted air quality conditions, current and forecasted weather conditions, knowledge of the local topography, wind patterns, and BlueSky Rains Smoke Dispersion modeling the DNR meteorologist determines if prescribed burning projects would meet State smoke management guidelines on any given day. Pomeroy Ranger District personnel also monitor for effects from smoke produced, and if negative effects occur they notify DNR and discontinue ignition.

Outdoor air quality in Washington is influenced predominantly by smoke from agricultural and outdoor burning, woodstoves and motor vehicles (EPA, 2011). It is monitored utilizing Air Quality Index (AQI) levels. The higher the AQI, the greater the level of air pollution and the higher the health concerns (see Air Quality Report, page 5 for list of categories). Wildfires are not considered as a cause for violations of air quality standards or visibility protection goals because they are considered natural events, but prescribed fires are considered active management so the smoke produced is considered as an impact on air quality and visibility standards. Any area that violates air quality standards is designated as a non-attainment area. There is currently no non-attainment areas located in or near the project area.

Two Federal Class 1 airsheds are within about 60 miles of the South George project planning area. Hells Canyon National Recreation Area is 55 miles to the southeast, and Eagle Cap Wilderness is 50 miles to the south. Prevailing wind patterns (winds normally blow from southwest to the northeast) would be utilized to preclude the smoke from having any influence on these airsheds. There is no record of any Pomeroy Ranger District's burn projects affecting these areas.

Wenaha-Tucannon Wilderness is not a mandatory Federal Class 1 airshed, but is located two air miles southwest of the project planning area.

Cities of Lewiston, Idaho (approximately 30,000 people) and Clarkston, Washington (approximately 25, 000 people) are the largest population areas located approximately 15 miles northeast of the project planning area. The towns of Asotin and Anatone, WA could also be affected by smoke emissions.

ENVIRONMENTAL CONSEQUENCES

Burning projects are not approved and/or shut down if:

- "Intrusion" of smoke into sensitive areas such as population centers is likely.
- Any state or federal air quality regulations, laws, or rules would be violated.
- Another state's published air quality standards would knowingly be violated.
- Smoke is not expected to be dispersed in a timely manner

If a burning project is initiated and smoke emissions becomes a problem in populated areas for unforeseen reasons, ignition is discontinued and the fire is suppressed as necessary until the project is in compliance with smoke management regulations. Ignition is only re-initiated when environmental factors dictate that smoke produced will be in compliance with air quality regulations once again. Prescribed fire projects are implemented under a prescribed fire plan, which specify how and where prescribed fires can be put out to comply with smoke management regulations.

A prescribed fire is a combustion process that has no pollution control devices to remove pollutants (Achtemeier 2001). Smoke intrusions and visibility reduction may result from the direct impact of the smoke plume. Intrusions of smoke can cause numerous nuisance impacts, as well as specific safety hazards. The vast majority of prescribed burns occur without negative smoke impacts, but wildfire smoke can be problem (Achtemeier 2001). Prescribed fires produce smoke, but less for the same acre as does a wildfire. Table 3-58 estimates and compares smoke emissions for particulate matter 2.5 ($PM_{2.5}$) and carbon monoxide (CO) during prescribed fire and wildfire for various fuel types. Carbon monoxide and $PM_{2.5}$ are considered criteria pollutants; these are pollutants that are deemed most harmful to public health and welfare and can be effectively monitored (Hardy et al. 2001).

Table 3-58 Estimated Smoke Emissions (pounds/acre) for Various Fuel Types

	Wildfire pounds/acre	Prescribed Fire pounds/acres
Dry Forest (Interior Ponderosa Pine)		
$PM_{2.5}$	285	255
CO	3,688	3,292
Moist Forest (Interior Douglas Fir)		
$PM_{2.5}$	522	468
CO	6,896	6,174
Cold Forest (Engelmann Spruce – Subalpine fir)		
$PM_{2.5}$	1,723	N/A[16]
CO	22,903	N/A
Grass/Shrub (Idaho Fescue – Bluebunch Wheatgrass)		
$PM_{2.5}$	5	5
CO	12	12

Alternative A – No Action

Direct/Indirect Effects – Alternative A

This alternative would have no immediate direct adverse effects on air quality, however; fuel, including ground fuel accumulations and stand densities in the project planning area would continue to increase. This increase in fuel loading, and understory (ladder fuels) and overstory biomass would have an increase in smoke emissions if wildfire were to occur. Wildfires typically burn with a higher intensity and burn more acres creating emissions that are higher than that of prescribed fire. Consumption is also higher during wildfires than prescribed fires, contributing to the greater production of emissions than prescribed fire. Wildfires may also occur under weather conditions which limit smoke dispersal.

In the year 2000 wildfire smoke concentrations in Montana were many times higher than monitored previously including nearly a decade of prescribed fire smoke and wildfire smoke. Based upon this incident in 2000, PM 2.5 concentrations can be expected to range between 100 and 600 $\mu g/m^3$ (micrograms per cubic meter) (24-hour average) up to 100 miles from the fire. Also, smoke concentration can increase during the night due to inversions, but may decrease during the afternoons due to dispersion. Wildfire smoke may last for several weeks depending on fire behavior and meteorology. Additional data is available at the following web site:

http://www.fs.fed.us/r1/gallatin/resources/air/index.shtml

[16]Not any - Any prescribed fire in cold forest type would be incidental and would only be included to provide secure holding locations.

Cumulative Effects – Alternative A

For Alternative A, the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

In total, over the 5 to 10 year life of implementing project activities, approximately 2,030 acres of activity fuels would be treated in Alternatives B and C, and about 1,370 acres in Alternative D. Prescribed fire would be used to treat about 3,000 acres of natural fuels in each of these three alternatives. Pile burning of grapple piles is proposed on about 870 acres in Alternatives B and C, and about 540 acres in Alternative D. Smoke from burning activities would temporarily cause impacts to air quality usually during the spring and fall months.

With the use of prescribed burning, there will be a notable increase in the amount of smoke produced during weather conditions conducive to underburning. Spring burning generally produces a blue haze smoke and reduces visibility to 20 miles or more. Spring time smoke will normally last only a few days and dissipate. Fall burns, which are conducted when fuels are much drier, will consume greater portions of the available fuel on the ground, and reduce visibility to 15 miles or less. Residual smoke tends to last between 2-5 days depending on the fuel conditions and the scale of the area that was burned. To minimize smoke impacts and protect public health, air regulators and burners work together to match burning with appropriate atmospheric conditions.

Estimated potential amounts of smoke emissions (tons) produced during fuel treatments are shown in the table below. All prescribed burning ongoing projects and this project would be governed by Washington State and Federal air quality regulations (see Affected Environment). These particulate emissions would be produce over the 5 to 10 year life of implementing project activities.

Table 3-59 Total Particulate Emissions produced by Acres of Fuel Treatment

ALTERNATIVE	Alternative B	Alternative C	Alternative D
Activity Fuels Burning	2,030 acres	2,030 acres	1,370 acres
• **$PM_{2.5}$ (tons)**	1,035 tons	1,035 tons	699 tons
• **CO (tons)**	12,813 tons	12,813 tons	8,647 tons
Landscape Burning	3,000 acres	3,000 acres	3,000 acres
• **$PM_{2.5}$ (tons)**	364 tons	364 tons	364 tons
• **CO (tons)**	4,740 tons	4,740 tons	4,740 tons
Piling Burning[17]	870 acres	870 acres	540 acres
• **$PM_{2.5}$ (tons)**	478 tons	478 tons	297 tons
• **CO (tons)**	6,045 tons	6,045 tons	3,752 tons

[17] Pile consumption computations in FOFEM are the same as for natural fuels, therefore smoke emission may be under estimated.

Redistributing emissions can be accomplished by burning during good dispersion conditions, burning when wind directions are favorable, burning smaller areas and frequent burning. Burning during good dispersion conditions can reduce smoke concentrations by diluting the smoke through a greater volume of air. Wind direction must be considered during all phases of burning to avoid smoke impacts to smoke sensitive areas. Dividing large areas into smaller burn areas and burning over multiple days would also reduce short term emission impacts. Burning more frequently does not allow fuels to accumulate, thus there are less emissions with each burn. This project would comply with Washington DNR process for smoke approval, multiple emissions filtering into the same airshed will be mitigated, and impacts reduced. This is accomplished in accordance with the Washington DNR Smoke Management Plan. Under this plan, each day of planned ignition must be approved by Washington DNR smoke management meteorologist.

Cumulative Effects – Alternatives B, C, and D

Present and reasonably foreseeable activities include the Red Hill Project (landscape prescribed fire), Park Ridge Project (landscape prescribed fire), the Non-commercial Thinning and Fuels Reduction Project, and the Eastside Prescribed Burn Project.

The Washington DNR Smoke Management Plan permits burning only when atmospheric stability allows for good smoke dispersion. They also regulate the daily amount of burning to reduce impacts and negative effects of smoke. Prescribed burning competes with other burning in the airshed. The Washington DNR is responsible for managing all burn activities on a given day. The Forest Service is responsible for establishing burn priorities for its actions. The Washington State DNR Smoke Management Plan would be followed and no burning would take place if restricted by the plan, or any restrictions were forecasted by the Washington smoke management forecasters.

The Washington State DNR Meteorologist would take into consideration the cumulative effects of burning activities occurring on other government or private land before approving an ignition by the Forest Service for this project. Cumulative effects would not exceed Washington State allowable levels of smoke emissions.

FINDINGS OF CONSISTENCY

Implementation of any action alternative would remain consistent with the Forest Plan management goal #18 - to maintain air quality at a level of adequate for protection and use of forest resources and which meets or exceeds applicable Federal and state standards (FP p. 4-2). Air quality standards would be maintained at a level to meet Washington State and Federal standards (Clean Air Act) through coordination and compliance with Washington State DNR guidelines and approval process. Available predictive and management methods and models would be used to minimize the effects of smoke on any smoke sensitive areas.

WILDLIFE SPECIES AND HABITAT

This section incorporates by reference the South George Wildlife 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The quantity and quality of wildlife habitat was primarily assessed using a Geographic Information System (GIS), district records, and field reviews. The best available science (Literature Cited) was used to determine effects to wildlife species in a manner appropriate for the circumstances. Vegetation information used in habitat evaluation was obtained from the project Silviculturist or from GIS databases.

The scale of analysis for direct, indirect, and cumulative effects to wildlife habitat is the South George project planning area (approximately 21,000 acres), as identified on the project planning area map, with two exceptions: 1) Snags and down wood are assessed at the Asotin Watershed scale and 2) Elk habitat is assessed for Forest Plan management area (MA) C3- Big Game Winter Range and management area C4-Wildlife Habitat separately because Forest Plan standards are different for each. The analysis area for management area C3 extends slightly beyond the project planning area.

Time frames considered for direct, indirect, and cumulative effects to wildlife habitat are short-term (within 10 years), mid-term (10-50 years) and long-term (more than 50 years). These spatial and temporal scales (professional opinion of North Zone Wildlife biologist) are appropriate given the parameters of the proposed activities and the duration of potential effects to all wildlife species addressed in this document.

Proposed timber harvest and fuels reduction treatments would potentially change wildlife habitat parameters (forest stand structure and composition) over a large area (on approximately 5,000 acres) and may indirectly affect the character of adjacent wildlife habitats. These changes would result in improved wildlife habitat for some species and a reduction in wildlife habitat for other species.

The following categories of wildlife or habitats are discussed: old forest habitat; management indicator species; threatened, endangered and sensitive (TES) species; northern goshawk; and priority bird habitats.

AFFECTED ENVIRONMENT – Old Forest (Key Issue)

Indicators for comparison purposes between alternatives are:

- Acres of old forest affected by proposed activities
- Acres of old forest connective corridors affected by proposed activities
- Acres where trees $\geq$21 inches DBH may be removed.
- Acres converted to old forest stand structure

Old forest is a stand structural stage and is not equivalent to an old growth successional stage. For the purposes of this document, old forest is defined as a stand with a predominance of large trees (> 21 inches DBH) with one or more canopy layers or strata. On warm or hot sites with frequent, low-intensity fires, a single stratum may be present (Old Forest Single Stratum or OFSS). A minimum of 15 percent canopy closure of large trees is present on dry potential vegetation sites. On cold or moist sites without recurring underburns, multi-layer stands with large trees in the uppermost stratum may be present (Old Forest Multi Strata or OFMS). A minimum of 30 percent canopy closure of large trees is present on moist potential vegetation sites. Decaying fallen trees may also be present that leave a discontinuous overstory canopy.

Dedicated Old Growth

The Forest Plan allocated specific areas as management area C1-Dedicated Old Growth or C2- Managed Old Growth to provide old growth forest habitat across the Forest. Dedicated old growth areas were initially classified as suitable and/or capable habitat for selected management indicator species. Stand size and distribution are variable and depend on the vegetation type and target management indicator species (USFS 1990).

Two Dedicated Old Growth (C1) areas are within the project planning area (see Table 3-60). At the time these areas were designated, they were classified as capable pileated woodpecker habitat.

Table 3-60 Dedicated Old Growth Areas (C1) in the Project Planning Area

ID No.	General Area	MA-C1 Acres	Stand characteristics
2622	Redhill Gulch	500	Dry Douglas-fir, grand fir, larch and pine, two layers, closed canopy, riparian.
0192	George Creek	330	Moist grand fir, larch and spruce, two layers, closed canopy, riparian on west side.

Old Forest Stands

Umatilla National Forest Plan Amendment #11 established interim riparian, ecosystem, and wildlife standards for timber sales (the Eastside Screens) (USFS 1995). It requires that certain categories of timber sales be screened to evaluate their potential impact on riparian habitat, historical vegetation patterns, and wildlife habitat fragmentation and connectivity. The Interim Wildlife Standard restricts the harvest of timber in stands with a predominance of large trees (>21 inches DBH) if the amount in the area is below the historical range. Umatilla Forest uses the silvicultural terms Old Forest Multi Strata (OFMS), and Old Forest Single Stratum (OFSS) structural stages to assess where and how much large tree habitat is available.

Old forest is present on about 4,800 acres, or about 31 percent of the total forested portions of the entire project planning area (of 15,430 acres). There are several larger patches of old forest (> 300 acres). About 10 percent of the moist forest contains old forest in patches greater than 300 acres, and about 22 percent of the dry forest contains old forest in patches greater than 300 acres.

The amount of old forest in South George project planning area is within the historical range of variability (HRV) in dry upland forest, but is below the historical range in moist upland forest, multi story. Therefore, harvest may occur in dry old forest as long as the area stays within HRV. However in moist old forest, stands can only be manipulated if the goal is to preserve or enhance old forest character.

Old Forest Connectivity

Connectivity between blocks of old forest (OFMS, OFSS) has been assessed for the project planning area. Connective habitat does not necessarily need to meet the same description of old forest, but provides free movement between old forest stands for various wildlife species associated with these stand conditions.

For the majority of the project planning area, old forest stands and C1 management areas are connected to each other with medium (9-15 inches DBH) to large tree (>15 inches DBH) stands with widths greater than 400 feet, and attached with 2 or more different connections. Connective stands are primarily in the Young Forest Multi Strata (YFMS), Stem Exclusion open and closed canopy (SEOC/SECC), and Understory Reinitiation (UR) structural stages. The least connected areas are separated by grassy ridges or areas that have not yet grown back to maturity since the last timber harvest.

ENVIRONMENTAL CONSEQUENCES – Old Forest (Key Issue)

Alternative A - No Action

Direct/Indirect Effects

In the NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

Existing Dedicated Old Growth (C1) and other old forest structure would remain in its current state in the short-term. No trees $\geq$ 21 inches DBH would be removed. Over time, some stands would develop habitat characteristics that would result in additional old forest and connective corridors.

The area would continue to develop dense, multi-storied stands with forest composition continuing to shift towards fire intolerant species dominance (Silvicultural Specialist Report, project file). Where dry forest stands continue to have fir encroachment, they would be less attractive for use by species that prefer open pine stands. Tree disease and insect infestations could reduce old forest and connectivity corridors in the mid and long term.

Without any fuel reduction treatments, much of the area would remain at risk for historically uncharacteristic crown fire (Fuels Report, project file). There is an associated risk that old forest structure and connectivity could be lost on a large scale in the event of an uncharacteristically large-scale, high severity fire.

Cumulative effects

For the No Action alternative, South George project would not be authorizing any actions; therefore, it would not be adding anything to the effects of past, present and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

Dedicated Old Growth

Prescribed landscape burning could creep into C-1 Dedicated Old Growth areas but would likely be stopped by the streams along their border. No other activities are proposed within management area C1. The existing abundance and distribution of Dedicated Old Growth meets Forest Plan standards. The current composition, structure, and function of these areas would be maintained under all of the proposed alternatives in the short-term. In the mid and long-term, these dedicated areas may deteriorate to the point they no longer provide old growth habitat.

Old Forest and Connectivity

While the amount of old forest treated by timber harvest varies by action alternatives (Table 3-61), the resulting net change in the amount of old forest does not (Table 3-62). There would be a decrease in the amount of dry OFMS, and an increase in all other old forest categories. The result is a 640 acre net increase in total old forest in all action alternatives (B, C, and D).

The fact that all alternatives result in the same 640 acre net increase in old forest is because the same OFMS would be converted to OFSS in all alternatives, and the same amount of non old forest stands (SECC and UR) would be converted to OFSS.

Table 3-61 Acres Of Old Forest, Connective Corridors, and Potential Large Tree Removal Areas Affected By Proposed Harvest By Alternative

Measure (Acres)	Alternatives B and C	Alternative D
Old forest affected	1,010	430
Connective corridors affected	180	180
Cutting of trees ≥ 21 inches DBH allowed	620	620
Other stand Structure converted to Old Forest	640	640

Table 3-62 Changes To Old Forest Stucture (Acres)

Old Forest Type	Existing	Change	Alts B/C/D Result
OFMS - Dry Forest	520	(-360)	160
OFSS - Dry forest	790	+600	1,390
OFMS - Moist Forest	600	+280	880
OFSS - Moist Forest	1,350	+120	1,470
Total Old Forest	**3,260**	**+640**	**3,900**

In dry forest, thinning is proposed in 360 acres of OFMS in all action alternatives. These stands would be converted to OFSS. The majority of trees in these stands are dry grand fir and Douglas-fir, so thinning would not be of great benefit to wildlife species that prefer dry, open pine stands. Two small OFMS stands with large ponderosa pine would be converted to single story (22 acres). An additional 70 acres of dry OFSS would be thinned, resulting in open pine and Douglas-fir stands. These stands would remain classified as dry OFSS after treatment. Therefore, overall about 92 acres of dry pine forest with large trees would be treated to reduce fuels and enhance growth of ponderosa pine, which would benefit wildlife species favoring this types of habitat, such as white-headed woodpecker.

Stand thinning outside of old forest would improve the health and resilience of stands that are overstocked and/or developing heavy fuels. Reduced stocking levels would decrease stress and associated insect and disease susceptibility on overstory trees that remain. Timber harvest prescriptions would tend to favor leaving early seral species such as ponderosa pine and western larch. This would likely result in more old forest in the long-term.

In all action alternatives, canopy would be reduced in some of the connective corridors between old forest stands (180 acres) (Table 3-61). These areas would be thinned, but would remain fully stocked and would continue to provide for the free movement of various wildlife species.

Trees greater than or equal to 21 inches DBH

No trees ≥21 inches DBH would be removed in moist forest except for danger trees.

Trees ≥ 21 inches DBH may be removed in any units proposed in dry forest. Trees ≥ 21 inches DBH would most likely be removed in dry OFMS (360 acres) in order to create old forest single story (OFSS) (Table 3-62). The resulting cover type in these OFSS stands would be Douglas-fir, except for a 16 acre stand of ponderosa pine. Removal of grand fir in these stands would improve the vigor of remaining trees and promote long-term old forest conditions.

Trees ≥ 21 inches DBH could also be removed in other structural stage stands where necessary to achieve desired conditions, but this would be uncommon.

Other effects

All harvest units would maintain snags and down wood in excess of Forest Plan standards (see Chapter 2, Table 2-5). The healthiest large trees and the soundest large snags would remain as the building blocks for present and future stand and wildlife habitat development.

Landscape prescribed fire is intended to reduce fuels, improve forage quality for big game, and lessen the impact of a future wildfire. Although efforts would be made to avoid overstory stands, individual tree and group torching would likely occur in areas where there are sufficient ladder fuels and high occurrences of mistletoe. If fire creeps into old forest, some tree mortality would be expected, and more snags would be created.

Proposed temporary roads would have a minimal impact to forest wildlife. All are along the edges of stands in open areas, and generally are short extensions of existing roads. Temporary roads would be re-vegetated after use. Since these roads would be closed to the public, access to old forest stands for activities such as firewood cutting would not increase.

Road maintenance, road and trail decommissioning, and removal of danger trees along roads would have little to no effect to old forest stands.

Proposed non-commercial thinning outside of timber harvest units would affect 100 acres of old forest, in several areas of less than 30 acres each. Only trees less than 10 inches DBH would be removed to reduce ladder fuels. This would slightly change the stand structure and wildlife habitat function of old forest in these areas, and result in healthier and potentially longer lasting old forest wildlife habitat.

Effects That Differ by Action Alternative

Direct/Indirect Effects - Alternatives B and C

No harvest would take place in moist OFMS because it is already below the historical range of variability (Table 3-63). Intermediate harvest is proposed in some of the largest patches of old forest. These are primarily OFSS stands in mixed conifer grand fir. Thinning in moist OFSS (580 acres) would not reduce large tree densities to the point that these stands would no longer be classified as old forest.

Table 3-63 Acres Of Old Forest Treated By Type and Structure Class

Old Forest Type	Alternatives B and C	Alternative D
Dry Forest OFMS	360	360
Dry forest OFSS	70	70
Moist Forest OFMS	0	0
Moist Forest OFSS	580	0
Total Old Forest	1,010	430

Direct/Indirect Effects - Alternative D

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.

Cumulative Effects - Alternatives B, C, and D

Cumulative effects are evaluated at the project planning area scale. Past timber harvest and roading is reflected in the existing condition. The amount of old forest in the South George project planning area would remain within the historical range of variability.

Most of the ongoing non-commercial thinning treatments are within previously harvested areas that are in a Stand Initiation (SI) phase, but there are a few places where fuel reduction would occur in old forest. About 170 ongoing acres would add to the proposed 100 acres of small tree removal within old forest stands, resulting in 270 acres of non-commercial thinning within old forest. The intent of these treatments is to reduce tree stress and ladder fuels which should improve the health and resilience of the old forest stands.

The proposed spring protection project would not affect old forest.

The planned Eastside burn and ladder fuel reduction areas would help return the landscape to a fire resilient setting that is appropriate for the area, and reduce the risk of losing large amounts of existing old forest in the mid and long term.

Personal use firewood cutting may occasionally remove large snags (up to 24 inch stump diameter) within 300 feet of open roads. Since open road density is low in this area, and cutting is restricted to 300 feet off of open roads, the effects to snag availability would be very minor.

Ongoing cattle grazing, recreational activities, other non-commercial thinning, and weed treatment would not have cumulative effects to old forest habitat.

MANAGEMENT INDICATOR SPECIES (MIS)

The following table lists wildlife management indicator species and their habitat types as described in Umatilla Forest Plan (page 2-9). All of these Management Indicator Species could be present in the South George project planning area.

Table 3-64 Wildlife Management Indicator Species and Habitat Types

Species	Habitat Types
Rocky Mountain elk	general forest habitat and winter ranges
pine marten	mature and old growth stands at high elevations
pileated woodpecker	dead/down tree habitat (mixed conifer) in mature and old growth stands
northern three-toed woodpecker	dead/down tree habitat (lodgepole pine) in mature and old growth stands
primary cavity excavators	dead/down tree (snag) habitat

AFFECTED ENVIRONMENT – Rocky Mountain Elk

Rocky Mountain elk was selected as a management indicator species in the Forest Plan to represent general forest habitat and winter ranges for big game. South George project planning area is located withinWashington Department of Fish and Wildlife's(WDFW) Lick Creek Game Management Unit. Surveys conducted by WDFW in 2010 indicated that there are an estimated 914 elk in the Lick Creek Unit, which is within population management guidelines listed in the Blue Mountains Elk Herd Plan (Fowler and Wik 2011).

The scale of analysis for elk habitat in management area (MA) C4-Wildlife Habitat is that MA-C4 which is within the planning area, and intermixed or adjacent Dedicated Old Growth (MA-C1) and Riparian Areas (MA-C5), totalling 17,000 acres. The scale of analyis for management area C3-Big Game Winter Range is that MA-C3 which is within the planning area, plus contiguous MA-C3 west of the planning area, totalling 3,800 acres.

Forest Plan standards are designed to evaluate effects of management actions on elk habitat, which includes percent tree cover, open road density, and elk habitat effectiveness. The elk habitat effectiveness index (HEI) is a model that assesses the ratio and configuration of elk cover and forage areas, and incorporates open road density to provide an 'effectiveness rating' from 0 to 1.

Forest Cover

Forested stands with relatively closed canopies are often used by elk disproportional to their availability and can function as security cover or reduce the difference between an animal's body temperature and ambient air temperature. Research from the nearby Starkey Experimental Forest (Cook et al. 1998) and other studies suggest that the presumed thermal benefits of cover could not be substantiated, but recognized that multi-story forested stands are important to elk because of their heavy use throughout the year.

The Forest Plan defines satisfactory cover as a stand of trees at least 40 feet tall and providing 70 percent or more canopy closure. Marginal cover is defined as a stand of trees > 10 feet tall and providing 40 percent or more canopy closure. Both types should have sufficient understory structure to obscure 90 percent of a standing elk at a distance of 200 feet. Marginal cover provides hiding and escape cover, but the tree canopy may be less dense and often provides less security. There is no Forest Plan standard for marginal cover; rather it is added to satisfactory cover for the total cover standard.

The number of acres in each condition is calculated as a percentage of the entire management area. Currently, satisfactory cover occurs on approximately 5,800 acres, or 34 percent of the MA C4 in the project planning area, which exceeds desired conditions. Satisfactory cover occurs on about 630 acres, or 17 percent of the total MA C3 acres, which is within desired conditions (see Table 3-65).

Table 3-65 Forest Plan Standards and Existing Condition for Rocky Mountain elk

Management Area (Forested Acres)	Cover Type	Forest Plan Desired Condition	Forest Plan Standard	Existing Condition
MA C4 - Wildlife Habitat (17,000 acres)	Satisfactory	20%	15%	34%
	Total	NA	30%	48%
MA C3 – Big Game Winter Range (3,750 acres)	Satisfactory	15-20%	10%	17%
	Total	NA	30%	31%

Forage

Although past timber harvest may have provided short-term increases in elk forage, the amount and quality of forage is largely controlled by year to year weather (Wisdom et al. 2005). Other factors to consider in this project area include livestock grazing and invasive plants. The project planning area is within Asotin Allotment, for which 413 cow/calf pairs are permitted between June 15 to October 15, at a stocking rate of 18 acres/AUM. Monitoring indicates that forage utilization is within Forest Plan standards (Range Specialist Report). These utilization standards were calculated to provide forage for both livestock and big game. Once an area has reached full utilization, livestock must move out in order to reserve remaining forage for big game.

Several species of noxious weeds are found in the South George project planning area, including spotted and diffuse knapweed (Invasive Plant Report). Work is ongoing to monitor and control invasive weeds on the district, and so far these weeds have not spread to the point that forage resources are affected.

Roads

Roads influence habitat effectiveness by taking habitat out of production, reducing the effectiveness of cover, and increasing disturbance to elk and other wildlife. Elk have been found to select habitats preferentially based on increasing distance from open roads (Rowland et al. 2000). Vulnerability and hunting mortality have been found to be higher in forested stands with greater road densities and less hiding cover (Weber et al. 2000).

With existing closures, the open road density is 1.6 mi/mi^2 in MA-C4, and 0.8 mi/mi^2 in MA-C3. This is within the desired condition of an average of 2 miles per square mile or less, forest-wide (Forest Plan p. 4-11). About 4 miles of unauthorized roads have been identified, which are unplanned roads, abandoned travelway, and off-road vehicle tracks.

Although overall open road densities are low, one road in particular is affecting use by elk. The Hogback Road (FR 4302) was constructed through prime elk habitat at the heads of basins. This road is closed during hunting season, but because the road is easily accessed by ATVs behind the closure, unauthorized ATV use has progressively increased. Likely due to vehicle disturbance, a large number of the elk now congregate on Harlow Ridge in the summer, or remain on the Smoothing Iron winter range year round. This has led to an increase in landowner complaints (Pat Fowler, personal communication).

Habitat Effectiveness Index

The elk habitat effectiveness index model (HEI) is used to predict the influence of forest management activities on elk and other big game species. This model uses the distribution of cover and forage areas,

cover quality, and road factors to help indicate how effective an area will be in supporting big game (Thomas et al. 1988). It is intended to be a relative measure of habitat, and does not consider other factors such as, topography, forage quality, weather, predation, and hunting. The HEI model provides an index rating from 0 to 1, with 0 indicating the least effective elk habitat and 1 indicating optimal effective habitat. The index number is multiplied by 100 to get a whole number for comparison purposes.

In the MA-C4 analysis area (17,000 acres), the HEI index value is 71, which is above the minimum Forest Plan standard of 60 (Table 3-66). In MA-C3 analysis area (winter range, 3,800 acres), the HEI index value is 80, which is well above Forest Plan standard of 70. All roads in MA-C3 analysis area are closed in winter, which results in a high HEI value. The interspersed Washington State-owned areas in this winter range (1,800 acres) are similar in regard to cover and roads. The table below lists Forest Plan HEI standards and the existing condition for analysis areas for this project.

Table 3-66 Forest Plan HEI Standards and Existing Condition

Management Area	Minimum Plan Standard	Existing Condition
MA C4 Wildlife Habitat	60	71
MAC3/C3A Big Game Winter Range	70	80

ENVIRONMENTAL CONSEQUENCES – Rocky Mountain elk

Alternative A - No Action

Direct/Indirect Effects – Alternative A

Under the NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground will remain static, they will in fact, continue to change as disclosed below.

Forest Cover

The amount and distribution of elk cover would not likely change in the short-term. Over the mid and long-term (beyond 20 years), stands would continue to develop a multistory structure, increasing the amount of satisfactory, marginal, and total cover above what is currently present. The development of more hiding and thermal cover would be beneficial to elk since this area is already broken up by past timber harvest.

Forage

Grassland on ridges and open slopes need to burn occasionally to invigorate plant growth. Without proposed controlled burns important forage species may become more decadent and less nutritious or palatable to ungulates. Burning is ongoing in adjacent areas, so postponing the proposed burning in this project would be a very minor setback to forage resources for elk until a future decision is made to implement additional burning..

Roads

Road densities are not expected to change so human disturbance factors should remain static. Unauthorized ATV trails would not be decommissioned at this time, and the Hogback road (FR 4302) would remain open in late summer.

Cumulative Effects – Alternative A

For the No Action alternative, the South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

Cover and HEI

Satisfactory cover and HEI values would remain within Forest Plan standards in all action alternatives.

Forage

Landscape prescribed burning in the grassy ridges and canyons would improve forage quality for big game. Activities would be spread over multiple years. Upon completion of each burn area, there would be a mosaic of unburned, lightly burned, moderately burned, and intensely burned patches. As green-up occurs the following spring and summer; the new sprouts would be highly palatable and rich in nutrients.

Roads

Some closed roads would be opened temporarily for harvest and fuels activities; however they would remain closed to the public. Motorized vehicles using roads that have been closed for many years would likely cause elk to avoid these areas and expend more energy moving around. Since proposed activities would take place gradually over several years, activities would be spread out in space and time, and should not cause undue stress. Activities will be restricted in units located within elk winter range from December 1 through March 30 (Chapter 2, Table 2-5).

Effects That Differ by Action Alternative

Alternative B

Direct/Indirect Effects – Alternative B

Forest Cover

Harvest and fuels treatments proposed in MA C4 would reduce the amount of satisfactory cover by 15 percent (2,400 acres), and total cover by 9 percent. Generally all intermediate harvest in satisfactory cover would retain enough trees to provide marginal cover. Likewise, in MA C3, the amount of total cover would not change, but some satisfactory cover would be converted to marginal cover (Table 3-67).

Roads

No changes in open road densities would occur. The project would utilize about 79 miles of existing road, of which approximately 32 miles are currently closed. These roads would not be open to the public during project activities and would remain closed after the project is completed. About 3 miles of

temporary road would be built, which would be decommissioned once the project is completed, and vegetation would eventually grow back. Although use of these roads would cause some short-term disturbance to elk and other wildlife, effects would be spread out in time and space.

Habitat Effectiveness Index

The HEI values would drop three (3) points in both MA-C3 and MA-C4, but remain within Forest Plan standards (Table 3-68).

Alternative C

Direct/Indirect Effects – Alternative C

Cover

Effects to the amount and distribution of cover would be the same as Alternative B (Table W7). Unique to alternative C is a timing extension on the Hogback road closure, which would help to counter the temporary loss of hiding cover.

Roads

Alternative C contains provisions to change the way the area is accessed by vehicles and ATVs. The closure period on the Hogback Road (FR 4302) would change to provide additional elk security habitat during late summer and fall, and reduce property damage on private lands. The fall closure would be moved up to August 1, such that the road would be closed from August 1 to November 30.

In addition, 15 miles of non-system roads and unauthorized ATV trails would be decommissioned and access would be blocked. The Hogback road (FR 4302) closure would be more effective when ATV access from adjacent ridges is reduced. This would considerably reduce the amount of harassment that elk receive from ATVs.

About 4.3 miles of forest system open roads would be decommissioned. Overall, these changes would be highly beneficial to elk because open road densities would decrease and unauthorized access would be curtailed.

Activities proposed in Alternative C would utilize the same roads as in Alternative B (about 79 miles of existing road, of which approximately 32 miles are currently closed). However, there would be no temporary road construction. Although use of these roads would cause some short-term disturbance to elk and other wildlife, effects would be spread out in time and space.

Habitat Effectiveness Index

Because 4.3 miles of open system road would be decommissioned, the HEI value in MA-C4 would be slightly higher than that in Alternative B (Table 3-68).

Alternative D

Direct/Indirect Effects – Alternative D

Cover

Effects to winter range cover (MA C3) would be the same as Alternatives B and C.

Harvest and fuels treatments proposed in MA-C4 would reduce the amount of satisfactory cover by 10 percent (1,660 acres), and total cover by 2 percent. This substantial difference from the other alternatives

is due to the reduction in old forest treatments. Many old forest stands that would not be treated under this alternative also qualify as big game cover. This alternative would maintain more big game security cover and old forest while reducing fuels and improving forest stands on a smaller scale.

Roads

Alternative D would require the use of fewer roads for project activities, and less temporary road construction. Activities proposed for Alternative D would utilize about 70 miles of existing road, and approximately 2.25 miles of temporary road would be built. About 24.5 miles of the existing roads are closed. These roads would not be open to the public during project activities and would remain closed after the project is completed. The temporary roads would be decommissioned and vegetation would eventually grow back. Although this would cause some disturbance to elk and other wildlife, road use activities would be spread out in time and space.

Habitat Effectiveness Index

HEI values would be the same as in Alternative B because although less cover would be affected, the cover to forage spacing is slightly more effective in Alternatives B and C, according to the model.

The following tables show comparisons of Elk cover and HEI by Alternative.

Table 3-67 Comparison of Effects to Elk Cover By Alternative (Percentage)

Management Area (Forested Acres)	Cover Type	Forest Plan Desired	Forest Plan Standard	Alt A (existing condition)	Alt B	Alt C	Alt D
MA C4 (17,000 acres)	Satisfactory	20	15	34	19	19	24
	Total	NA	30	48	39	39	46
MA C3 (3,750 acres)	Satisfactory	15-20	10	16	12	12	12
	Total	NA	30	31	31	31	31

Table 3-68 Forest Plan Habitat Effectiveness Index (HEI) Standards and Alternative Comparison

Management Area	Minimum Forest Plan Standard	Alt A (existing condition)	Alt B	Alt C	Alt D
C4 Wildlife Habitat	60	71	68	69	68
C3 Big Game Winter Range	70	80	77	77	77

Cumulative Effects – Alternatives B, C, and D

Cumulative effects are assessed at the South George project planning area scale because it is a large area and includes both summer and winter habitat. Ongoing projects in the area include previously planned landscape prescribed burning (4,500 acres), non-commercial thinning (1,500 acres), ongoing livestock grazing, and a proposal to protect springs from cattle.

The total 7,500 acres of landscape prescribed burning would occur over the next decade, at most burning about 2,000 acres per year. The area should see a vast improvement in forage quality for big game. Upon completion of each burn area, there would be a mosaic of unburned, lightly burned, moderately burned, and intensely burned patches. As green-up occurs the following spring and summer; the new sprouts would be highly palatable and rich in nutrients.

Ongoing non-commercial thinning typically reduces hiding cover for big game. In combination with the proposed actions, hiding and security cover would be reduced on about 5,500 acres in Alternative B and C, and 4,500 acres in Alternative D. At the same time, forage quantity and quality would likely increase in some treated areas. These changes in habitat would occur gradually over 10 years, and hiding cover should grow back within 10-20 years. Behind closed roads, the loss of hiding cover would have a smaller effect. Extending the closure on the Hogback Road (FR 4302) in Alternative C would also help to counter the temporary loss of hiding cover.

Monitoring indicates that cattle forage utilization on the Asotin Allotment is within Forest Plan standards (Range Specialist Report). These utilization standards were calculated to provide forage for both livestock and big game. No effects to elk are expected as long as utilization standards are being met.

Domestic livestock can also exacerbate weed spread, reducing forage for elk if left unchecked. Past efforts to control weed sites have been successful and monitoring and treatments will continue. Controls to reduce or eliminate potential noxious weed spread via logging operations would be in place (Table 2-5). Any new weed sites will be treated as established through the forest weed program.

A future proposed project to protect springs from cattle would enhance habitat for big game and other wildlife.

Cumulatively the effects of proposed activities in combination with other existing and potential future effects are not expected to have lasting negative effects to Rocky Mountain elk and other big game species. Many other factors besides habitat influence elk numbers, such as weather, predation, and hunter success. In general, little change in elk and deer numbers would be expected with the current hunting strategies set forth by WDFW.

FINDINGS OF CONSISTENCY

The overall direct, indirect, and cumulative effects would result in a minor negative habitat trend. Forest Plan standards for elk habitat would be met, and no changes to the elk population are expected. This project is consistent with Umatilla Forest Plan, and continued viability of Rocky Mountain elk is expected on Umatilla National Forest.

AFFECTED ENVIRONMENT - American Marten (pine marten)

The American marten (*Martes americanus*) was selected as a management indicator species in the Forest Plan to represent mature and old growth stands at high elevations (Table 3-64).

Marten are found throughout Canada and Alaska, south through the Rockies, Sierra Nevada, northern Great Lakes Region, and northern New England. In Washington, they occur in the north Cascade Mountains, Olympic Mountains, Blue Mountains in the southeast region of the state, and the mountains in the northeast region (Marcot et al. 2003).

The global conservations status of marten is considered ‘widespread, abundant, and secure’ (NatureServe 2010) and in Washington, ‘apparently secure’.

American marten are typically associated with late-seral coniferous forests with closed canopies, large trees, and abundant snags and down wood (Zielinski et al. 2001). Wisdom et al. (2000) lists subalpine and montane forests in old multi- and single-story, and unmanaged young multi-story structural stages as providing source habitat for American marten in the Columbia Basin. A study in northeastern Oregon showed that martens selected for areas with denser canopy, more canopy layers, larger diameter live and dead trees, larger down logs, and closer proximity to water as compared to what was available in the area (Bull et al. 2005).

Marten use a variety of structures for rest and den sites, such as tree cavities, mistletoe brooms, and accumulations of down logs (Bull and Heater 2000). Bull et al. (2005) found density of potential rest sites was significantly higher in marten home ranges than in unoccupied areas. In addition to providing rest and den sites, down wood is an important component of marten habitat because the primary prey of martens is small mammals associated with down wood. These small mammals include voles, snowshoe hares and squirrels in northeast Oregon (Bull and Blumton 1999). In the winter, they forage beneath the snow in downed wood for prey.

In a comparison of historical versus current conditions in the Blue Mountains, marten habitat appears to be strongly increasing (Wisdom et al. 2000). Suitable environments for marten are broadly distributed and of high abundance on Umatilla National Forest, and there has been little change from historical to current conditions (Wales et al. 2011). Umatilla National Forest provides roughly 100,000 acres of marten source habitat. Source habitat is defined as those habitats contributing to long-term population persistence (Widsom et al. 2000).

South George project vegetation data was used to determine the amount and distribution of marten habitat in the project planning area. The project planning area provides about 2,800 acres of well-distributed marten habitat. Areas with more contiguous habitat include Coombs Canyon and Hogback areas.

It is possible that South George project planning area could support one or more reproducing marten. Of 19 radio-collared marten in Eastern Oregon, the average home range size for males was about 6,700 acres, and the average for females was about 3,500 acres (Bull and Heater 2001). Home ranges typically include both source habitat as well as foraging areas and nonhabitat. The authors suggest that a marten reproductive pair would likely have higher success where an average of 6,700 acres are available for foraging and denning.

Marten are an elusive species, rarely observed, and difficult to detect. No marten observations have been reported in the project planning area, but they may be present.

ENVIRONMENTAL CONSEQUENCES – American Marten

Alternative A - No Action

Direct/Indirect Effects – Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground will remain static, they will in fact, continue to change as disclosed below.

Existing marten habitat would remain in its current state in the short-term. In the long-term, some stands would develop into complex, mature stands, which would provide more marten habitat. Because marten

utilize areas of high down wood densities, they would benefit from an increase in snags and down wood as stands mature.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects That Differ by Action Alternative

Direct/Indirect Effects – Alternatives B and C

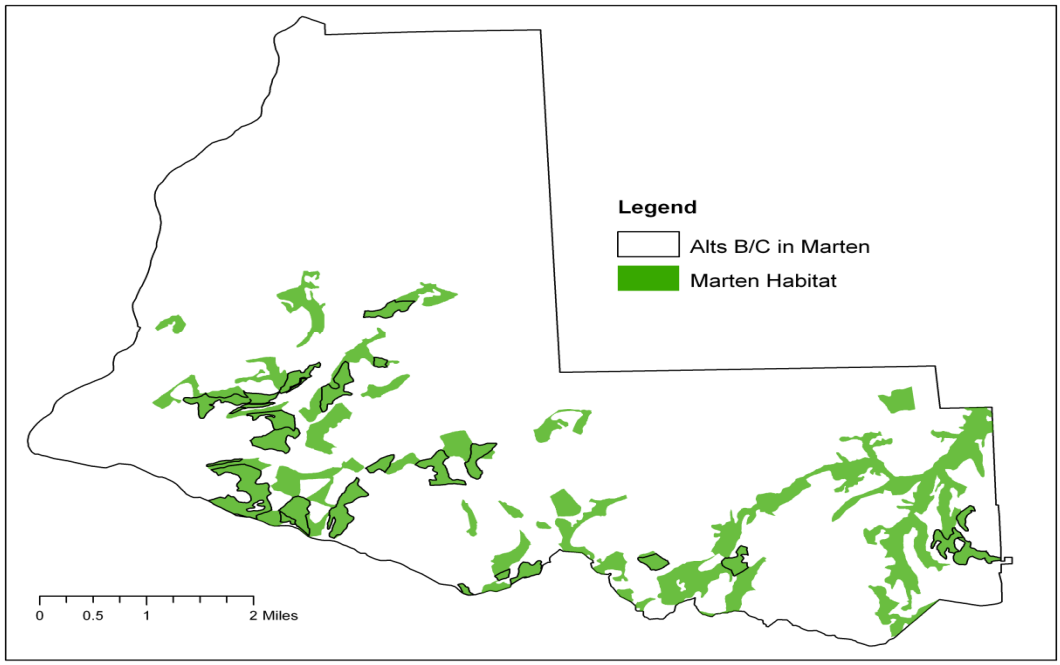
Approximately 25 percent of available marten habitat in the planning area would be affected by harvest (735 acres). Trees ≥ 21 inches DBH would not be removed in these areas, but modifications to the stand structure would make them unsuitable for marten denning in the short and mid-term. The majority of these stands would be thinned, and about 75 acres would have a regeneration type harvest.

Most of the units affecting marten habitat are concentrated in the Hogback region, which could result in the loss of one of the major marten habitat areas in the project planning area (Figure 3-5). After harvest, remaining habitat in that area would occur in smaller blocks and would be less contiguous.

Landscape fire, non-commercial thinning, temporary roads, and danger tree removal would have very little or no effect to marten or their habitat.

Over 2,000 acres of marten habitat would not be affected by proposed activities.

Figure 3-5 Marten habitat and proposed harvest in the South George project planning area.



Cumulative Effects – Alternatives B and C

Cumulative effects are assessed at the project planning area scale because it is a large area that potentially could provide habitat for one or more reproducing female marten. Proposed activities in combination with other past, ongoing, and potential future projects are not expected to cause cumulative effects to marten or their habitat. Past timber harvest and road construction has occurred throughout the project planning area, which is reflected in the existing condition. Ongoing cattle grazing, non-commerical thinning projects, and weed treatments generally do not affect marten habitat. Forest recreation activities such as hunting, hiking, sightseeing, and berry picking take place during the day time when marten are less active. Open road densities would remain low, which restricts the amount of human disturbance.

Direct/Indirect Effects – Alternative D

Marten habitat would not be affected by harvest because no harvest would occur in moist old forest and no trees $\geq$ 21 inches DBH would be removed in moist stands of any structure.

Cumulative Effects – Alternative D

There would be no cumulative effect from past, ongoing, or future foreseeable projects because Alternative D would not affect marten habitat.

FINDINGS OF CONSISTENCY

The overall direct, indirect, and cumulative effects would result in a small negative habitat trend for marten. Because the project impacts less than 1 percent (.007) of the marten habitat on the forest, the the amount of effect from this project is too small to cause changes to the population. South George project is consistent with the Forest Plan and thus continued viability of marten is expected on Umatilla National Forest.

AFFECTED ENVIRONMENT - Pileated woodpecker

Pileated woodpecker (*Dryocupus pileatus*) was selected as a management indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth mixed conifer stands (Table 3-64). Pileated woodpeckers are important because the large cavities that pileated woodpeckers create in trees provide nests for many of the larger secondary cavity nesters.

Two Dedicated Old Growth areas (C1) set aside for pileated woodpecker fall within South George project planning area. In general, Dedicated Old Growth areas are providing good habitat for pileated woodpecker. In 1992, biologists surveyed 100 Dedicated Old Growth areas in the Blue Mountains, including 20 on Umatilla National Forest (NF). All of the old growth areas surveyed on the Umatilla NF (100%) were occupied by pileated woodpecker at that time (Bull and Carter 1993). In more recent years, pileated woodpeckers have been incidentally observed in the South George planning area.

Pileated woodpecker are widely distributed in forested areas of eastern North America, westward across a large swath of forest in Canada, and then southward into Montana, Idaho, Washington, Oregon, and California (Nature Serve 2010).

The species is ranked as ‘widespread, abundant, and secure’ globally; more specifically in Oregon it is ranked as ‘apparently secure’ (Nature Serve 2010). The state of Washington lists pileated woodpecker as a ‘priority‘ species. The PIF database (Partners in Flight 2011) indicates an increasing population and expect future ongoing stability.

Suitable environments for pileated woodpecker have declined slightly, but are broadly distributed and of high abundance on the Umatilla National Forest (Wales et al. 2011). Umatilla National Forest provides roughly 200,000 acres of pileated woodpecker source habitat. Source habitat is defined as those habitats contributing to long-term population persistence (Widsom et al. 2000). Overall there is little risk to pileated woodpecker viability (Wales et al. 2011).

Pileated woodpeckers tend to prefer large blocks of grand fir and mixed conifer stands in multi strata forest with large diameter snags and down wood (Bull and Holthausen 1993). Approximately 90 percent of the diet of these birds consists of carpenter ants, which are associated with large standing and downed wood. Ponderosa pine, Douglas-fir and western larch were preferred species for foraging substrate (Bull and Holthausen 1993).

Pileated woodpeckers typically nest in tall, large diameter snags with broken tops and little remaining bark (Bull 1987). Within mixed conifer forest, pileated woodpeckers nested preferentially in ponderosa pine and western larch in northeast Oregon (Bull 1987, Nielsen-Pincus and Garton 2007). The majority of roost trees were hollow grand fir infected with Indian paint fungus and large ponderosa pine snags (Bull et al. 1992). Densities of nesting pairs of pileated woodpeckers were positively associated with the amount of late structural stage forest (Bull et al. 2007).

Pileated woodpecker habitat in South George project planning area is primarily closed canopy grand fir, Douglas-fir, and mixed conifer stands with a large tree component. A query of the vegetation data resulted in about 7,800 acres of pileated woodpecker foraging habitat, distributed throughout the project planning area. About half of that (4,000 acres) would have large enough trees to support pileated woodpecker reproduction. Therefore, South George project planning area contributes about 2 percent (4,000 acres) to the total source habitat on the forest.

Mean home range size for paired birds in northeastern Oregon was 1,180 acres (Bull and Holthausen 1993), which would include both reproductive and foraging habitat. South George project planning area could reasonably support 4 to 6 pair of pileated woodpeckers.

The density of large snags (>20 inches DBH) was the best predictor of density of pileated woodpeckers (Bull and Holthausen 1993). An average of 8 snags per acre > 20 inches DBH were present at pileated woodpecker nest and roost sites in Eastside Mixed Conifer at the 50 percent tolerance level (DecAID Table EMC_S/L.sp-22 (Mellen-McLean et al. 2009)). Snags used for foraging, roosting, and nesting averaged 20, 28 and 30 inches DBH, respectively (DecAID Tables EMC_L.sp-17, 18, 19, & 25 (Mellen-McLean et al. 2009)).

This density of large snags (4 to 12 per acre) occurs on about 16 percent of the moist upland forest snag analysis area (see snag section below, Figure W7). Areas of lower snag densities (greater than zero but less than 4 per acre) would likely be used as foraging areas. (Figures 3-9 and 3-11).

Most of the CVS snag data was collected in the 1990's in this area. Since that time, activity by Douglas-fir beetle, fir engraver, and other insects has been noted in the area (Silviculture Report, pp. 90 to 103), and has likely resulted in additional snags.

ENVIRONMENTAL CONSEQUENCES – Pileated woodpecker

Alternative A - No Action

Direct/Indirect Effects – Alternative A

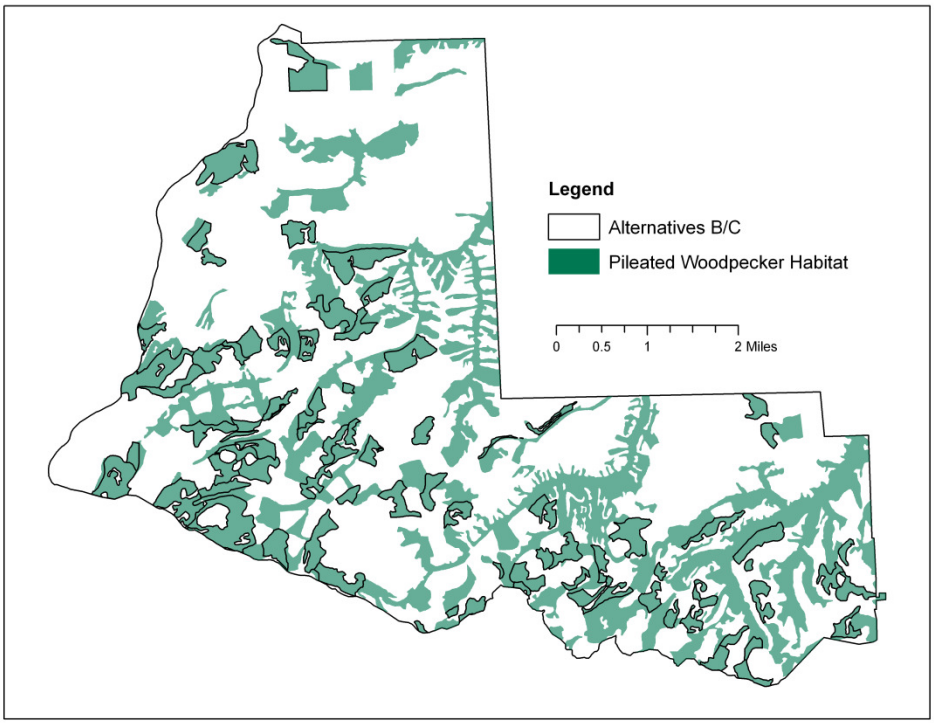
Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground will remain static, they will in fact, continue to change as disclosed below.

Existing pileated woodpecker habitat would remain in its current state in the short term. In the mid and long-term, more snags would be created as trees die. Stands that are not currently in an old forest condition could develop into mature stands, which would provide additional habitat.

Cumulative Effects – Alternative A

For the No Action alternative, the South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Figure 3-6. Pileated woodpecker habitat and proposed harvest in the South George project planning area.



Effects That Differ by Action Alternative

Direct/Indirect Effects – Alternatives B and C

About 2,800 acres of existing pileated woodpecker habitat (36 percent of habitat in the project planning area) would be affected by timber harvest and fuels treatments. About 1,000 of these acres are potential nesting habitat.

Some larger contiguous blocks of pileated woodpecker habitat would be broken up by harvest, particularly in the Hogback area (southwest portion of above map).

Thinning in moist forest stands would retain all trees $\geq$ 21 inches DBH in pileated habitat except for danger trees (2,200 acres). Many moist stands are even-age with little understory, and thinning would allow sunlight onto the forest floor so understory vegetation would develop. These areas would continue to be used by pileated woodpeckers, because the stands would be fully stocked, trees $\geq$ 21 inches DBH and snags would remain, and some would develop into multi-story stands.

Shelterwood and seed tree harvest would remove approximately 675 acres of foraging and 16 acres of potential nesting habitat primarily in moist forest.

In dry forest, removal of trees $\geq$ 21 inches DBH would be allowed (as needed to meet stand objectives) on 620 acres of pileated woodpecker foraging and nesting habitat, which could reduce potential nesting opportunities. Actual amounts would be less because numerous trees $\geq$ 21 inches DBH do not occur on every acre of these stands.

Overall, stand thinning and fuels treatments would reduce tree density, snag density, and down wood abundance in the short and mid-term. There would likely be a decrease in snags but at least 3 large snags per acre in dry forest and 2 large snags per acre in moist forest would remain. In addition, all functioning snag habitat (broken top, signs of excavation, etc) would be retained wherever possible. Most trees and snags $\geq$ 21 inches DBH would be retained, as well as an adequate number of replacement trees for future snag development.

Other proposed activities such as landscape fire, non-commercial thinning, and constructing about 3 miles of temporary road would have no effect to pileated woodpeckers or their habitat.

The remaining 5,000 acres of pileated woodpecker habitat in the project planning area would not be affected by timber harvest and fuels reduction activities. In addition, over the long-term, thinned stands as well as other areas that currently do not quite qualify as habitat now would eventually develop into complex, mature stands and provide more pileated woodpecker habitat.

Cumulative Effects – Alternatives B and C

Cumulative effects are assessed at the project planning area scale because it is a large area that potentially could provide habitat for several pair of reproducing pileated woodpeckers.

Past fire suppression, salvage logging, and harvest in old growth forest has undoubtedly reduced the densityof snags in the project planning area. This is reflected in the existing condition. However, insect related tree mortality is also occurring in the area, creating additional snags.

Personal firewood collection and roadside hazard tree removals would contribute to snag reductions, however the overall effects on pileated woodpecker habitat would be small because removal typically

occurs only along open roads, and removal is limited to trees with less than 24 inches stump diameter.

Ongoing activities such as grazing, non-commercial thinning and weed treatments would have no effect to pileated woodpeckers or their habitat and therefore would not cause cumulative effects in combination with the proposed projects.

When the expected effects from proposed activities are combined with residual, present, and foreseeable future actions in the analysis area, they would all add to past reductions in snag densities. Commercial harvest and prescribed buring would result in a minor incremental effect because new snags would also be created by prescribed burning.

Direct/Indirect Effects – Alternative D

Harvest and fuels treatments would affect approximately 1,300 acres of potential pileated woodpecker habitat. About 300 of these acres are primary nesting habitat. The overall effects to pileated woodpecker habitat would be less than half that of Alternatives B and C. However, the same number of trees $\geq$ 21 inches DBH would be removed in dry forest as Alternative B.

Seed tree harvest with reserves would remove approximately 80 acres of foraging habitat for pileated woodpecker.

The remaining 6,500 acres of potential pileated woodpecker habitat would not be affected by timber harvest and fuels reduction. In addition, in the long-term, thinned stands as well as other areas that currently do not quite qualify as habitat now would eventually develop into complex, mature stands and provide more pileated woodpecker habitat.

Other proposed activities such as landscape fire, non-commercial thinning, and constructing about 2.25 miles of temporary road would have no effect to pileated woodpeckers or their habitat.

Cumulative Effects – Alternative D

Cumulative effects are the same as Alternative B.

FINDINGS OF CONSISTENCY

The overall direct, indirect and cumulative effects would result in a small negative habitat trend for pileated woodpecker. Because the project impacts one percent or less of the pileated woodpecker habitat on the forest, the amount of effect from this project is too small to cause changes to the population. South George project is consistent with the Forest Plan and thus continued viability of pileated woodpecker is expected on the Umatilla National Forest.

AFFECTED ENVIRONMENT - American Three-toed Woodpecker

American three-toed woodpecker (*Picoides dorsalis*) (formerly known as the northern three-toed woodpecker) was selected as a management indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth lodgepole pine stands (Table 3-64). They primarily eat the larvae of mountain pine beetles in lodgepole pine and tend to prefer recently dead trees (Imbeau and Desrochers 2002).

The three-toed woodpecker is a year-round resident throughout forested regions of Canada and Alaska, south into the northern New England states, Minnesota and Michigan, and south into Washington, Oregon, Idaho, and Montana, the Black Hills of South Dakota, Wyoming, Utah, Colorado, eastern Nevada, central Arizona, and southern New Mexico (Nature Serve 2010).

The global status of three-toed woodpecker is 'secure' due to it's wide distribution, but considered 'vulnerable' in Oregon and Washington (Nature Serve 2010). The Umatilla forest has very few records for three-toed woodpeckers, and none in the South George planning area.

Three-toed woodpecker distribution can be patchy and may change frequently as they follow in the path of insects outbreaks, making it very difficult to determine population trends. North American Breeding Bird Survey (BBS) data for 1980–1998 indicate a significant annual decrease in populations across the species' range in North America, however, this data should be viewed with caution given the low number of routes and low abundance of three-toed woodpeckers per route (Leonard 2001).

Potential habitat for three-toed woodpeckers in South George project planning area was identified by querying the vegetation database for dense, moist mixed conifer, spruce, subalpine fir, and lodgepole pine. Query results indicate that there are about 7,000 acres of potential foraging habitat for three-toed woodpeckers in the project planning area. Habitat is well-distributed and well-connected throughout the planning area.

Current estimates indicate there are 170,000 acres of three-toed woodpecker habitat on the forest (Wales, personal communication). South George project planning area contributes about 4 percent to the forest-wide habitat for three-toed woodpeckers.

Three-toed woodpecker nests are preferentially created in mature trees with heart rot (Goggans et al. 1988), and it is suggested that 500 acres of mature/overmature lodgepole pine may be needed per pair of birds. Virtually all of the possible three-toed woodpecker nesting habitat in South George project planning area is fir and spruce rather than lodgepole pine. In general, the southern end of the Umatilla National Forest has more lodgepole pine habitat, and likely provides the majority of the forest's three-toed woodpecker nesting habitat. However, several recent large fires have also created vast foraging areas about 10 miles to the west of South George project planning area (e.g. School and Columbia Complex). With about 2,800 acres of old forest in spruce and fir in the project planning area, a rough estimate based on the above factors is that there may be enough nesting habitat for 3 to 5 pair of three-toed woodpeckers.

ENVIRONMENTAL CONSEQUENCES – Three-toed woodpecker

Alternative A - No Action

Direct/Indirect Effects – Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alternative. This does not mean conditions on the ground would remain static, they would in fact, continue to change as disclosed below.

Existing three-toed woodpecker habitat would remain in its current state in the short-term. There may be increases in insect outbreaks, which would benefit three-toed woodpecker.

Cumulative Effects – Alternative A

For the No Action alternative, the South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects That Differ by Action Alternative

Direct/Indirect Effects – Alternatives B and C

About 2,530 acres foraging habitat (36 percent of habitat in the project planning area) and about 540 acres of possible nesting habitat (19 percent) would be affected by timber harvest and fuels treatments. No regeneration harvest is proposed in these stands. Stand thinning and fuels treatments would reduce tree density, snag density, and down wood abundance. Treatments would likely result in less potential for insect disturbances that three-toed woodpeckers depend upon in the short and mid-term.

No lodgepole pine cover types would be affected, but possible nesting opportunities in spruce and fir stands would be reduced by about 19 percent in the project planning area.

The remaining 4,470 acres of potential three-toed woodpecker habitat would not be affected by timber harvest and fuels reduction, and would continue to provide foraging and nesting opportunities.

Other proposed activities such as landscape fire, non-commercial thinning, and constructing about 3 miles of temporary road (Alternative B only) would have no effect to three-toed woodpeckers or their habitat.

Cumulative Effects – Alternatives B and C

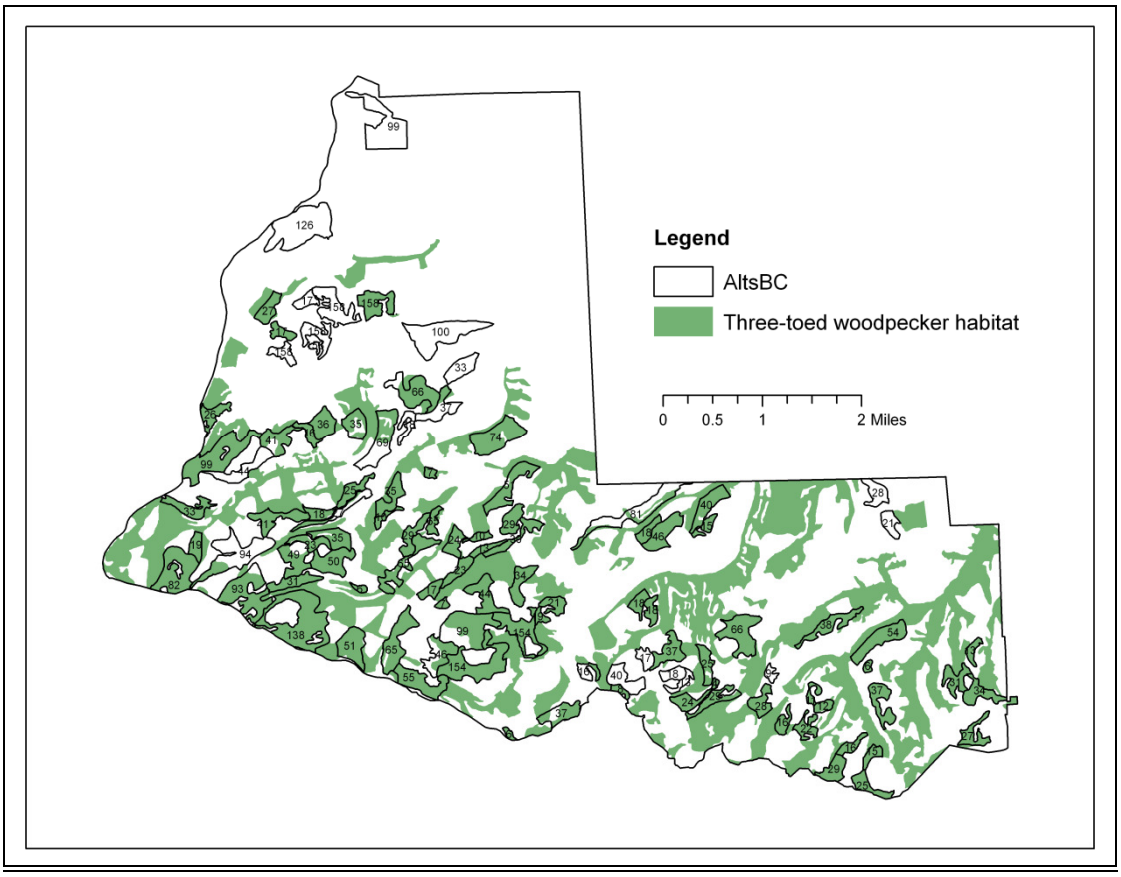
Cumulative effects are assessed at the South George project planning area scale because it is a large area that potentially could provide habitat for one or more pair of reproducing three-toed woodpeckers. Past fire suppression, salvage logging, and harvest in old growth forest has undoubtedly reduced the amount of three-toed woodpecker habitat in the project planning area. Past timber harvest is reflected in the existing condition. Cumulatively the effects of proposed activities in combination with other past, ongoing, and potential future projects are not expected to have lasting negative impacts to three-toed woodpecker populations. There is little to no old forest lodgepole pine nesting habitat in this area. In addition, recent large fires on the forest (e.g. School and Columbia Complex) have created large amounts of habitat elsewhere on the forest.

Ongoing cattle grazing, non-commercial thinning projects, and weed treatments, and recreation activities do not affect woodpecker habitat.

FINDINGS OF CONSISTENCY – Alternatives B and C

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.

Figure 3-7 Three-toed woodpecker habitat and proposed harvest in the South George project planning area.



Alternative D

Direct/Indirect Effects – Alternative D

Approximately 1,250 acres of northern three-toed woodpecker habitat would be affected by timber harvest and fuels reduction (18 percent of available habitat). No likely nesting areas would be affected.

Stand thinning and fuels treatments would reduce tree density, snag density, and down wood abundance. A minimum of 2 large snags per acre would be retained in units within three-toed woodpecker habitat . In addition, all functioning snag habitat (broken top, signs of excavation, etc) would be retained wherever possible. These areas may not be used by three-toed woodpecker in the short term due to the reduction in canopy, but they would likely become suitable again over the mid and long-term.

The remaining 5,750 acres of foraging habitat, of which 2,800 acres also provide nesting opportunities would be unaffected. Other proposed activities such as landscape fire, non-commercial thinning, and building 2.25 miles of temporary road would have no effect to three-toed woodpeckers or their habitat.

Cumulative Effects – Alternative D

Cumulative effects are the same as Alternatives B and C.

FINDINGS OF CONSISTENCY – Alternative D

The overall direct, indirect and cumulative effects would result in a very small negative habitat trend for three-toed woodpecker. Because the proposed activities effect 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.

AFFECTED ENVIRONMENT - Primary Cavity Excavators (Snag Habitat)

Primary cavity excavators as a group were selected to represent dead/down tree (snag) habitat that a vast array of vertebrate species depend on for reproduction and/or foraging (Table 3-64). Primary cavity excavators create holes for nesting or roosting in live, dead or decaying trees. Secondary cavity users such as owls, bluebirds, and flying squirrels may use these cavities later for denning, roosting, and nesting.

Habitat for primary cavity excavators includes coniferous and hardwood stands in a variety of structural stages and the availability of dead trees in various size and decay classes (Thomas 1979). Primary habitat generally contains snags greater than 15 inches DBH, while smaller sizes provide secondary habitat.

Snag habitat in South George project planning area is variable with most available in areas of light or no management activities, and less in areas of intensive management. Areas with low snag densities are due to past fire suppression, timber salvage, and an inadequate number retained or loss of snags and replacements in previously harvested units. In other areas, insect and disease activity, drought, and overstory mortality due to high stand densities have created new snags and down wood.

Forest wide, snag densities are similar to reference values (Mason and Countryman 2010). This would indicate that overall available snag habitat is contributing to viable populations of primary cavity excavators.

A snag analysis is used to evaluate habitat for primary cavity excavators in the affected watersheds. Snag habitat was assessed using the Current Vegetation Survey (CVS) data collected in the Asotin watershed. CVS inventories (Brown 2003) are permanent plots on a 1.7-mile grid that sample the vegetative condition on Forest Service land. The historical range of variability in South George project planning area (Silviculture Report, pp. 34-37) is also used as a frame of reference.

Snag Analysis

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.

While a wide range of snag densities are present in the project area and the snag analysis area, the average snag densities in the affected watersheds exceed Forest Plan minimum standards (Table 3-69). This would indicate that the snag analysis area contains adequate structural habitat features desired by a number of primary cavity excavating species and other wildlife. Cold upland forest is not represented in the data because it makes up less than one percent of the analysis area.

Table 3-69 Forest Plan Standards and Existing Conditions for Snag Density in Asotin Watershed

Umatilla Forest Plan Standards			Existing Condition, Asotin Watershed		
Working Group	Diameter Class (inches DBH)	Average Snag Density (#/acre)	Potential Vegetation Group	Diameter Class (inches DBH)	Average Snag Density (#/acre)
Ponderosa Pine	≥ 10	2.25	Dry Upland Forest	≥ 10	4.5
	≥ 20	0.14		≥ 20	1.1
Mixed Conifer (South Associated)	≥ 10	2.25	Moist Upland Forest	≥ 10	18.7
	≥ 20	0.14		≥ 20	3
Lodgepole Pine / Subalpine Zone	≥ 10	1.80	Cold Upland Forest	≥ 10	no data
	≥ 20	No standard		≥ 20	no data

The Forest Plan established minimum standards for snag density based on the population requirements of species associated with snags. These biological potential models are now considered to be a flawed technique for determining snag retention needs (Rose et al. 2001). In light of this, the South George project would leave more snags than required in the Forest Plan.

The Forest Plan minimum standard is 0.14 snags > 20 inches DBH per acre, with additional smaller DBH snags to total 2.25 per acre. In this project, at least 3 large snags (> 20 inches DBH) per acre would be retained in dry forest units and at least 2 large snags per acre would be retained in moist forest. In addition, all functioning snag habitat (broken top, signs of excavation, etc) would be retained wherever possible.

CVS plots in the Asotin watershed can also be compared to CVS snag data in DecAID that was collected from unharvested areas over the entire Blue Mountains. Although the data from unharvested areas may not accurately reflect "pre-settlement" or "natural" conditions in eastside forests due to years of fire exclusion (Mellen et al. 2006), it is comparable to other estimates of historical dead wood densities (Harrod et al. 1998, Agee 2002, Ohmann and Waddell 2002).

Dry Upland Forest - In dry upland forest, the amount of forest land in Asotin Watershed with 0 snags per acre is relatively close to reference conditions (Figures 3-8 and 3-9). About 65 percent of reference plots in unharvested areas had 0 snags per acre in the > 10 inch DBH class, and about 80 percent had 0 snags per acre in the > 20 inch DBH class. Plots from Asotin watershed in harvested and unharvested areas showed similar results.

However, the amount of dry forest with more than zero (0) but less than 8 snags per acre is also about 50 percent below what would be expected under natural conditions. There are areas with higher snag densities than reference conditions on a small percentage of the dry forest in the Asotin watershed, which likely reflects patchy past insect and disease infestations that occurred in the 1980s and early 1990s.

Figure 3-8 Distribution of Snags > 10 Inches DBH in Dry Upland Forest

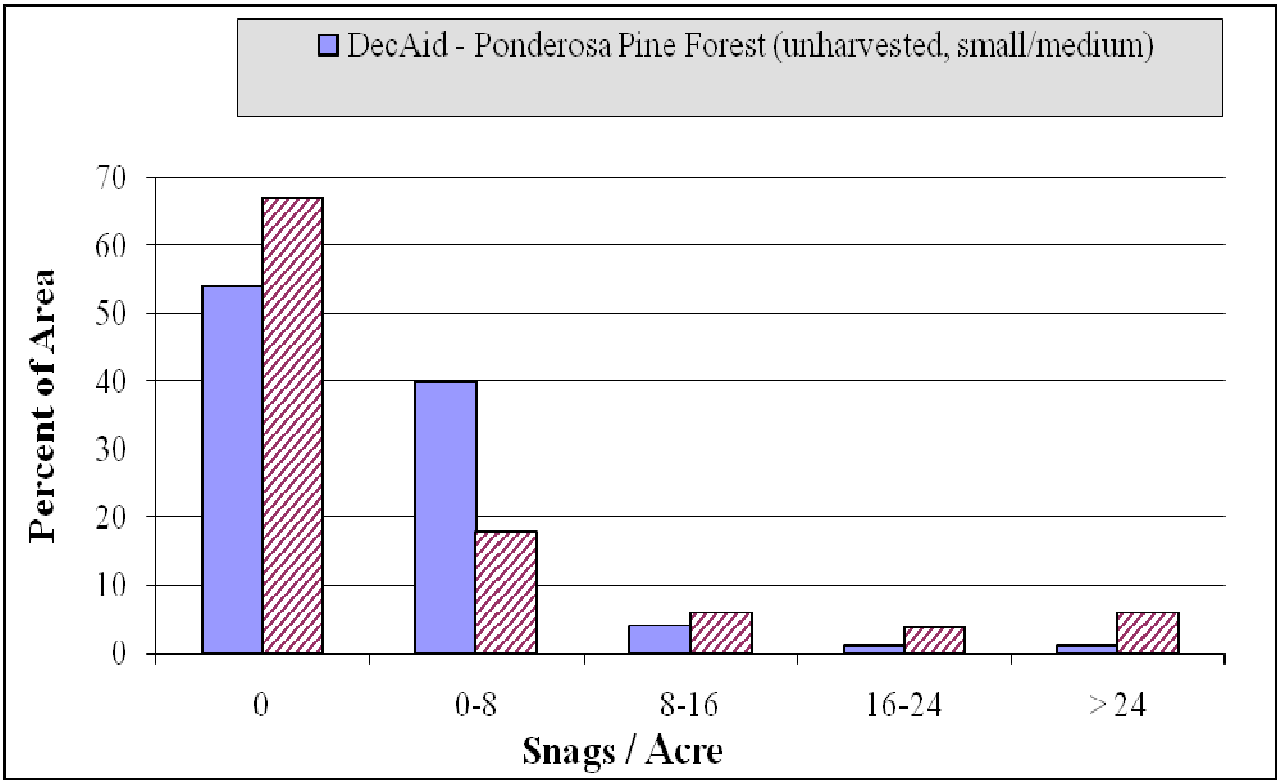
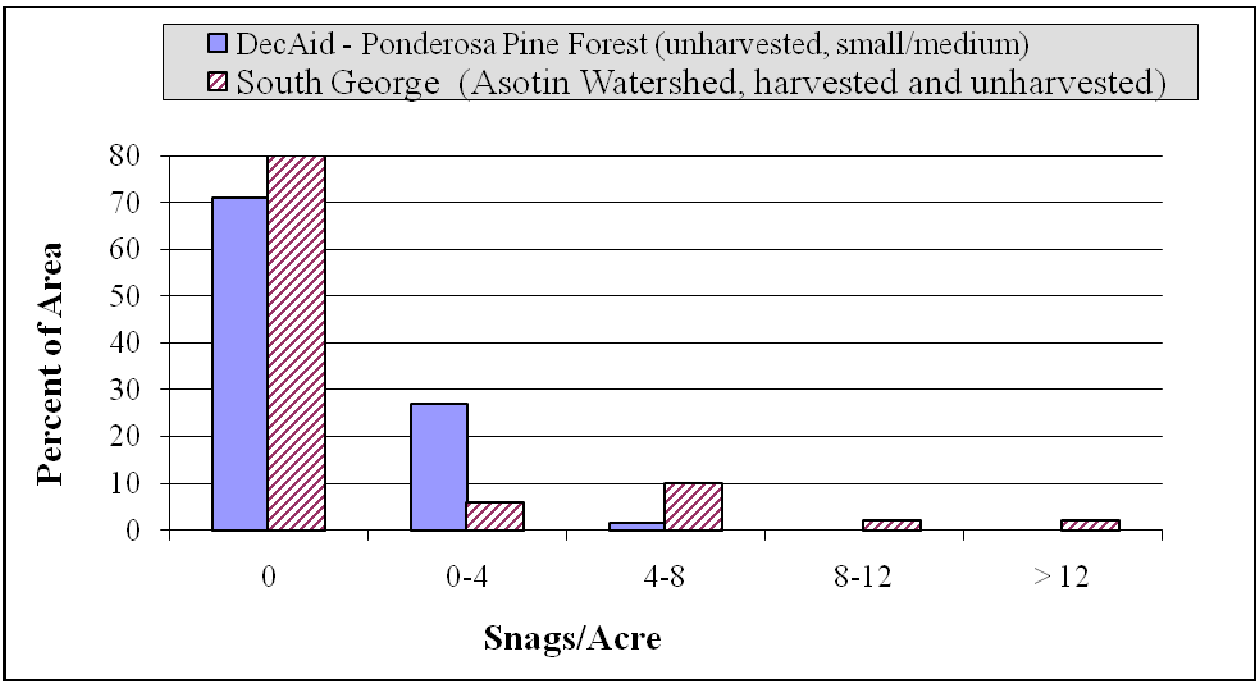


Figure 3-9 Distribution of Snags > 20 Inches DBH in Dry Upland Forest



Moist Upland Forest - For moist upland forest, the data shows a disparity between reference and current conditions. The amount of area with 0 snags per acre is about double that of reference conditions in both size classes (Figures 3-10 and 3-11).

About 15 percent of the moist upland forest appears to have fewer snags over 10 inches DBH than expected under natural (unharvested) conditions, and 40 percent of the moist upland forest appears to have fewer snags over 20 inches DBH than expected under natural (unharvested) conditions.

There are areas with higher snag densities than reference conditions on a small percentage of moist forest in the Asotin watershed, which likely reflects patchy past insect and disease infestations that occurred in the 1980s and early 1990s.

While there are many assumptions and limitations to this data, it provides a general picture of the numbers of snags in the area. Data collection began in the 1990's, and plots are re-read periodically but not consistently. In the years since the snag data was collected, typical activity by bark beetles and defoliating insects has been detected in the area (Silviculture Report, pp. 90- 97). Snag numbers are probably higher than shown by CVS data due to recent tree mortality from insect and drought stress.

Figure 3-10 Distribution of Snags > 10 Inches DBH in Moist Upland Forest

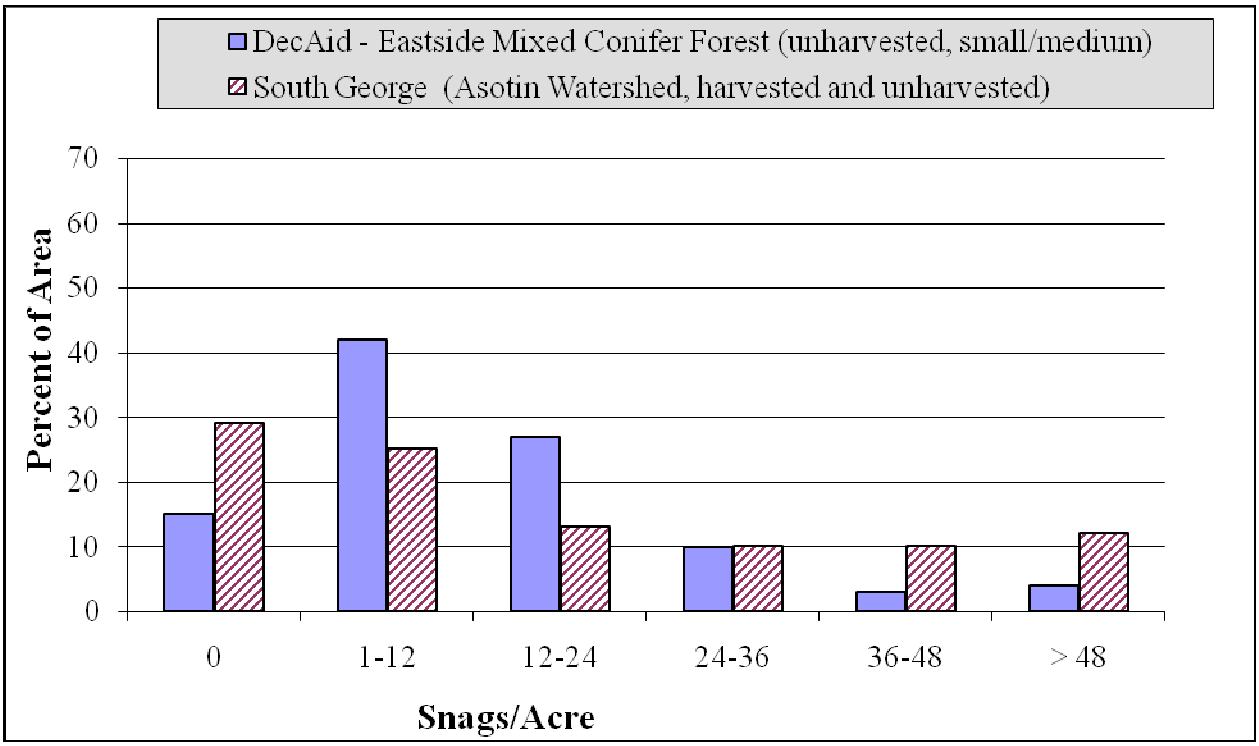
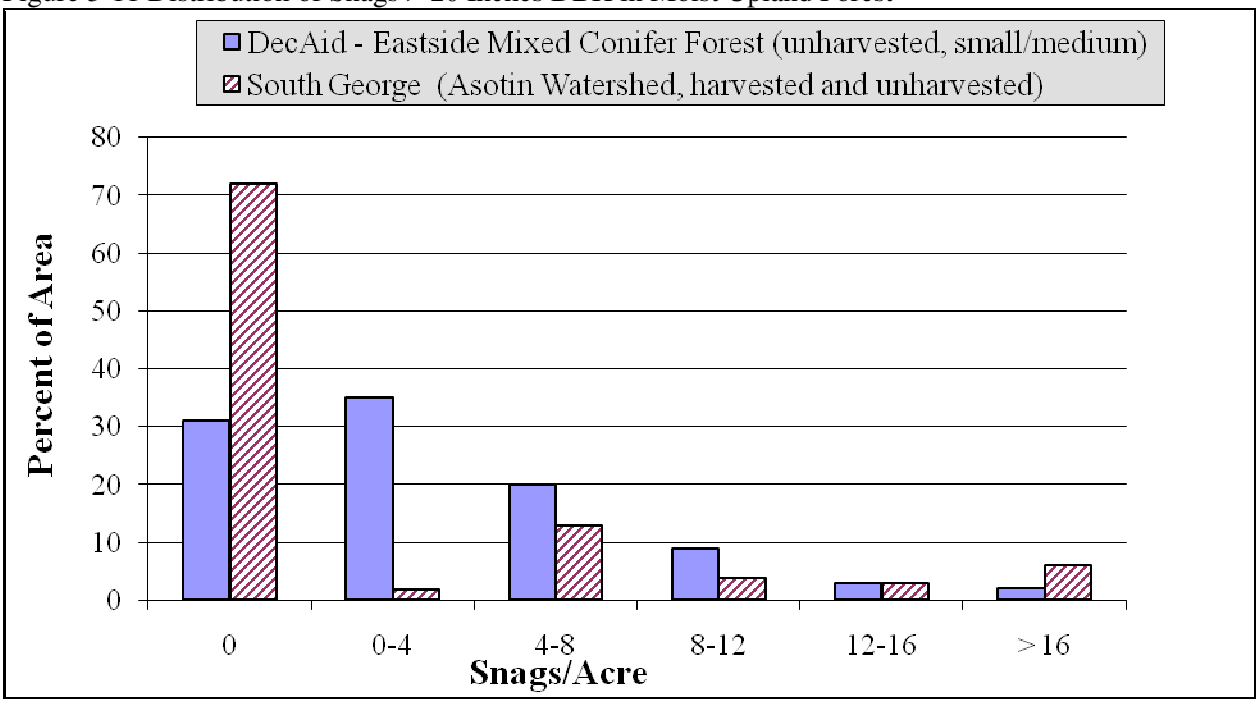


Figure 3-11 Distribution of Snags > 20 Inches DBH in Moist Upland Forest



ENVIRONMENTAL CONSEQUENCES – Cavity Excavator Habitat

Alternative A - No Action

Direct/Indirect Effects – Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground will remain static, they will in fact, continue to change as disclosed below.

The area would continue to provide snags and large down wood for cavity dependent species. Additional snags and large down wood would be created as overstory mortality occurs and dead trees eventually fall, creating new foraging and nesting habitat. Population numbers would likely increase with the additional nesting and foraging habitat. Stands would continue to develop old growth habitat characteristics (large trees, large snags, down wood, multi strata canopy) over the long-term.

Ongoing and potential increases in disease and insect occurrence could improve habitat by creating foraging and nesting habitat (dead wood). There is an increased risk of wildfire that could reduce nesting habitat for some species, but other woodpecker species would respond positively. The black-backed woodpecker and Lewis' woodpecker would benefit in the short and mid-term, due to their preference for burned stands. Most other woodpeckers would respond to fire by shifting their use to adjacent unburned or lightly burned stands. If continuous fuels buildup leads to an uncharacteristically large, severe wildfire, it would take over 100 years to regain mature forest cover with sufficient quantities of snags.

Cumulative Effects – Alternative A

For the No Action alternative, the South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C and D

Tree thinning would reduce the density of green trees that might otherwise become future snags; however these stands would remain fully stocked after treatment and would meet green tree replacement objectives. Fuels treatments would remove some existing dead and down wood habitat in order to reduce the fuel loading in strategic areas. Danger tree removal would also reduce standing dead trees within units and along haul routes. Harvest may also decrease nesting and foraging habitat due to the reduction of dead and down wood habitat. However, most trees and snags $\geq$ 21 inches DBH would be retained, as well as an adequate number of replacement trees for future snag development.

Although snag numbers would decline in harvest units, the amount of area with zero snags per acre would not increase because at least 2 large snags per acre would be retained in grand fir and subalpine fir stands, and 3 per acre in ponderosa pine and mixed conifer stands. If large snags are not available, snags between 10 and 19 inches would be substituted. In addition, all functioning snag habitat (broken top, signs of excavation, etc) would be retained wherever possible.

In general, managing forests within or towards the historical range of variability should provide habitat for a wide range of cavity excavator species. 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 (Figure 3-8).

A minimum of 3-6 down logs per acre (in dry plant association) or 15-20 down logs per acre (in moist plant association) would be retained to meet Forest Plan standards as amended. A minimum of 16 green trees per acre would be left for future snag development. Most thinning units would exceed this number. Some stands slated for regeneration type harvest do not have enough green trees to fulfill this requirement, in which case more snags would be retained than usual.

Prescribed fire can cause high snag losses, especially if there has been a long fire-free period (Bagne et al. 2007). Slash from harvest within units will not be piled against snags to help reduce this effect. Landscape burning could also provide new snags where fire creeps into forested areas.

Effects That Differ by Action Alternative

Direct/Indirect Effects - Alternatives B and C

Cavity excavator habitats would be affected by a reduction in snags and down wood on 4,150 acres, or 27 percent of the forested stands in the planning area. Snags would also be reduced through danger tree removal along about 80 miles of roads. This in turn would reduce habitat for cavity excavator species as well as other species that use the cavities they make.

Most trees and snags ≥ 21 inches DBH would be retained, as well as an adequate number of replacement trees for future snag development. Some trees ≥ 21 inches DBH would be removed in dry forest. Trees ≥ 21 inches DBH in moist forest would only be removed if they pose a danger to workers or are identified as danger trees along roads.

Direct/Indirect Effects - Alternative D

Cavity excavator habitats would be affected by a reduction in snags and down wood on 2,900 acres, or 19 percent of the forested stands in the planning area. Snags would also be reduced through danger tree removal along about 70 miles of roads. This in turn would reduce habitat for cavity excavator species as well as other species that use the cavities they make.

Most trees and snags ≥ 21 inches DBH would be retained, as well as an adequate number of replacement trees for future snag development. Some trees ≥ 21 inches DBH would be removed in dry forest. Trees ≥ 21 inches DBH in moist forest would only be removed if they pose a danger to workers or are danger trees along roads.

Cumulative Effects - Alternatives B, C, and D

Cumulative effects are assessed at the Asotin watershed scale to be consistent with the snag analysis area. Past fire suppression, salvage logging, and harvest in old growth forest has undoubtedly reduced the density of snags in South George project planning area. This is reflected in the existing condition. Recent insect related tree mortality is occurring in the area, creating additional snags.

The Eastside prescribed burn could create some snags where fire creeps into forested areas. Personal firewood collection can contribute to snag reductions, however the overall effects on snag dependent wildlife would be small because removal typically occurs along open roads. Other ongoing and proposed activities such as non-commercial thinning, weed treatments and spring protection would have no cumulative effect to dead wood habitat and woodpeckers.

When the expected effects from proposed activities are combined with residual, present, and foreseeable future actions in the analysis area, they would all add to past reductions in snag densities. Commercial harvest and prescribed burning would result in a minor incremental effect because new snags would also be created by prescribed burning. 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.

FINDINGS OF CONSISTENCY

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.

AFFECTED ENVIRONMENT - Northern Goshawk

The northern goshawk is not a management indicator species in the Forest Plan, and is not federally listed as Threatened, Endangered, or Sensitive. However, the Forest Plan as amended (Regional Forester's Eastside Forest Plan Amendment 2) provides for specific protections for goshawk nesting territories (USFS 1995). Northern goshawk is considered 'sensitive-critical' by the state of Oregon.

Northern goshawk are considered a habitat generalist at large spatial scales, however it typically nests in a narrow range of structural conditions (Squires and Kennedy 2006). Goshawks prefer mature forest with large trees, and relatively closed canopy with an open understory for nesting. Nests are frequently found near the lower portion of moderate slopes and near water.

A study in the Blue Mountains found that structural stage, tree basal area, and low topographic position reliably discriminated between nests and random sites. Positive correlations were found between fledging rate and tree basal area within 1 ha of the nest (McGrath, et al. 2003).

A query of vegetation data for areas with at least 50 percent tree cover and the presence of large diamter trees resulted in approximately 4,700 acres of potential goshawk nesting habitat. These stands are well distributed throughout most of the planning area. Quality nesting habitat would typically be within one-quarter (1/4) mile of water, in the lower portion of the slope, and often on the north facing slope.

Goshawk surveys were conducted in potential nesting habitat that could be affected by proposed project activites. No goshawks were detected. If active nests are found at any time, they would be protected as specified in the project design criteria (see Chapter 2, Table 2-5).

ENVIRONMENTAL CONSEQUENCES – Northern Goshawk

Alternative A - No Action

Direct/Indirect Effects – Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alternative. This does not mean conditions on the ground will remain static, they will in fact, continue to change as disclosed below.

In the mid and-long term, some stands would continue to grow and develop multiple dense canopy layers. In the long-term, young stands would develop large trees and openings created by past harvest would fill in. The availability of nesting habitat would increase in the long-term due to a greater abundance of large trees and dense multi-layered habitat, while foraging areas with open understory would be reduced. The availability and distribution of goshawk nesting and foraging would likely return to a more natural balance. However with continued fire suppression, the susceptibility of stands to high severity wildfires and insect or disease outbreaks would likely increase and could lead to large losses of habitat long-term.

Cumulative Effects – Alternative A

For the No Action alternative, the South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B and C

Timber harvest and fuels treatments follow the Eastside Screens requirements (Forest Plan Amendment # 11) to maintain late old structure stands and connectivity corridors. The intent is to provide short term protections for species dependent on old forest such as northern goshawk. Areas that could not meet these requirements were dropped from consideration during project planning. (See Appendix C-Consistency with Eastside Screens).

Fuels treatments would reduce high down wood and snag densities to reduce fuel loading and make stands more resilient to wildfire. Potential goshawk prey associated with these habitat features may be less abundant following treatment. Untreated areas within units such as riparian habitats would continue to provide well distributed habitat with unaffected prey abundance similar to pre-treatment stands. Treatment units, which would maintain snag densities in excess of Forest Plan standards and down wood densities that meet Forest Plan standards, would also provide some level of structural complexity that would provide for potential prey.

If active nests are found at any time, they would be protected as specified in the project design criteria (Chapter 2, Table 2-5).

Landscape fire, spring protection, non-commercial thinning, and constructing up to approximately 3 miles of temporary road would have very little or no effect to northern goshawk or their habitat.

Effects That Differ by Action Alternative

Direct/Indirect Effects - Alternatives B and C

Proposed activities would affect about 1,700 acres of the potential goshawk habitat in the South George project planning area. Commercial tree thinning and post-harvest fuel treatments would affect about 1,350 acres and regeneration type harvest would affect about 350 acres. Some large blocks of goshawk habitat in the west half of the planning area would be heavily impacted. Approximately 3,000 acres of potential goshawk habitat in the project planning area would not be affected.

About 1,350 acres of treatments would occur in moist forest and about 350 acres in dry forest. In moist forest, all trees $\geq$ 21 inches DBH would be retained except for danger trees. At least 500 acres of moist forest treatments in goshawk habitat would remain classified as moist old forest, which would indicate that these stands may remain suitable for nesting.

In dry forest, trees $\geq$ 21 inches DBH may be removed. Some stands may remain suitable for nesting if clusters of large trees remain.

Cumulative Effects - Alternatives B and C

Cumulative effects are assessed at the South George project planning area scale because it is large enough to potentially support several goshawk nesting territories. The alteration of 1,700 acres of potential nesting habitat would add slightly to past changes in goshawk habitat, which is reflected in the existing condition. However 3,000 acres of nesting habitat would remain. Past, present, and reasonably foreseeable activities in the area such as cattle grazing, non-commercial thinning, and recreational use in combination with proposed projects would not cause cumulative effects to northern goshawk. If active nests are found at any time, they would be protected as specified in the project design criteria (Chapter 2, Table 2-5).

Direct/Indirect Effects - Alternative D

Harvest and fuels reduction would have a much smaller effect to goshawk nesting habitat because there would be no reduction of old forest stands in the moist biophysical environment. Thinning would affect about 230 acres of potential goshawk nesting habitat. In moist forest, all trees > 21 inches DBH would be retained except for danger trees, but in dry forest, trees > 21 inches DBH may be removed. This alternative would therefore retain more large trees for goshawk nesting than Alternatives B or C.

Approximately 4,500 acres of potential goshawk habitat in the project planning area would not be affected.

Cumulative Effects - Alternative D

Past, present, and reasonably foreseeable activities in the area such as cattle grazing, non-commercial thinning, and recreational use in combination with proposed projects would not cause cumulative effects to northern goshawk because there are no known active nests at this time. If active nests are found at any time, they would be protected as specified in the project design criteria (Chapter 2, Table 2-5).

AFFECTED ENVIRONMENT - Landbirds

Neotropical migratory birds are those that breed in the United States and winter south of the border in Central and South America. Continental and local declines in population trends for migratory and resident landbirds have developed into an international concern. Roughly one half of all birds occurring on the Umatilla Forest are Neotropical migrants. Many of these species are associated with old forest, riparian areas, or unique features such as aspen, shrubs, and meadows.

Partners in Flight (PIF) led an effort to complete a series of Bird Conservation Plans for the entire continental United States to address declining population trends in migratory landbirds. These plans are used to address the requirements contained in Executive Order (EO) 13186 (January 10, 2001), *Respon*sibilities of Federal Agencies to Protect Migratory Birds.

The Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000) identifies the following priority habitat types: Dry Forest, Late Successional Mesic Mixed Conifer, Riparian Woodland and Shrub, and several "unique" habitats (Table W-11).

Table 3-70 Priority Habitat Features and Associated Landbird Species for Conservation in the Northern Rocky Mountain Landbird Conservation Region of Oregon and Washington (Altman 2000)

Habitat Type	Habitat Feature/Conservation Focus	Focal Species
Dry Forest	Large patches of old forest with large trees and snags	White-headed woodpecker
	Old forest with large trees & snags interspersed with grassy openings and dense thickets	Flammulated owl
	Open understory with regenerating pines	Chipping sparrow
	Patches of burned old forest	Lewis' woodpecker
Mesic Mixed Conifer	Large snags	Vaux's swift
	Overstory canopy closure	Townsend's warbler
	Structurally diverse; multi-layered	Varied thrush
	Dense shrub layer in the forest understory or forested openings	MacGillivray's warbler
	Edges and openings created by wildfire	Olive-sided flycatcher
Riparian	Large snags in riparian woodland	Lewis' woodpecker
	Riparian woodland canopy foliage and structure	Red-eyed vireo
	Riparian woodland understory foliage and structure	Veery
	Shrub density Willow/alder shrub patches	Willow flycatcher
Unique (special) Habitats	Subalpine Forest	Hermit thrush
	Montane meadow	Upland sandpiper
	Steppe shrubland	Vesper sparrow
	Aspen	Red-naped sapsucker
	Alpine	Gray-crowned rosy finch

Dry Forest Habitat

Dry forest habitat type includes coniferous forest composed exclusively of ponderosa pine, or dry stands co-dominated by ponderosa pine and Douglas-fir or grand fir (Altman 2000). Bird species associated with dry forest have shown the greatest population declines and range retractions in the northern Rocky Mountain province (Altman 2000). In particular, bird species highly associated with snags and old-forest conditions have declined. These species include white-headed woodpecker, flammulated owl, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker.

Old forest, single-story ponderosa pine habitat has declined by 96 percent in the Blue Mountains ERUs of the Interior Columbia Basin, mainly a result of timber harvest and fire suppression (Wisdom et al. 2000). Habitat restoration is the primary strategy for conservation of landbirds associated with this habitat type.

Currently there are about 300 acres of single strata, large diameter ponderosa pine stands in the project planning area. There are about 1,700 acres of the ponderosa pine cover type, so the capacity is there for more. Habitat for white-headed woodpecker, flammulated owl, and Lewis' woodpecker is currently very limited in the planning area.

Mesic Mixed Conifer Habitat

Mesic mixed conifer habitats are primarily cool Douglas-fir, grand fir sites and larch sites. The desired condition is a multi-layered old forest with a diversity of structural elements. Conservation focal species and habitat conditions include: Vaux's swift for large snags; Townsend's warbler for overstory canopy closure, varied thrush for structural diversity and multiple layers; MacGillivray's warbler for a dense shrub layer in forest openings or understory; and olive-sided flycatcher for edges and openings created by fire.

There are about 1,300 acres of mesic mixed conifer habitat with multiple layers and large trees in the project planning area. Dense shrub layers occur in patches but are uncommon. Edges and openings created by fire are lacking.

Riparian Woodland and Shrub Habitat

Riparian vegetation is particularly important to Neotropical migratory songbirds (Sallabanks et al. 2001:217). This habitat type includes riparian communities dominated by shrubs (willow, alder, etc.) that occur along bodies of water or in association with wet meadows and wetlands (Altman 2000). The desired condition is a structurally diverse vegetative community of native species that occur in natural patterns relative to hydrological influences. Focal species and habitat conditions include: Lewis' woodpecker for large snags; red-eyed vireo for canopy foliage and structure; veery for understory foliage and structure; and willow flycatcher for willow/alder shrub patches.

Wet meadow and wetlands are not a component of South George project planning area. Willow, alder, mountain maple, and hawthorn are found sporadically along the streams in the project planning area. The main streams are George Creek, Redhill Gulch, and Asotin Creek. Wet areas such as seeps, bogs, and springs provide small patches of riparian habitat.

Subalpine Forest

This habitat type is the coolest and wettest forest zone, dominated by subalpine fir, Engelmann spruce, lodgepole pine, and huckleberry. Important features of the subalpine forest are a multi-layered structure and dense understory of shrubs (Altman 2000), and the focal species is the hermit thrush.

There are about 1,900 acres dominated by subalpine fir, Engelmann spruce, lodgepole pine in a multi-layered condition, however a dense shrub understory is uncommon in the project planning area.

Montane Meadow

This habitat type includes wet and dry meadows dominated by herbaceous vegetation and grass at moderate and high elevations. These meadows are generally associated with streams and springs. The upland sandpiper is the focal species, but is not known to occur in the planning area. Other species that benefit from conservation of this habitat are sandhill crane, long-billed curlew, Wilson's phalarope, common snipe, and savanna sparrow. This type of habitat is not found within the project planning area.

Steppe-Shrubland

Steppe-shrublands occur in a wide range of habitat types, including grassland, sagebrush, montane meadows, fallow fields, juniper-steppe, and dry open woodlands and openings in forested habitats (Altman 2000). Habitat criteria (objectives) for the steppe-shrubland habitat type include maintaining a mosaic of steppe and shrubland habitats with < 10 percent tree cover. Associated bird species include vesper sparrow, lark sparrow, Brewer's sparrow, and long-billed curlew.

A large amount of grassland habitat is found on the high plateaus and steep hillsides, especially on Smoothing Iron, Cook, Park, Hogback, Smiley, Cabin, and Little Butte Ridges. Smaller openings are found throughout the forested areas. All total just over 5,000 acres in the project planning area.

Aspen

Bird species associated with aspen include the red-naped sapsucker, Williamson sapsucker, tree swallow, northern pygmy owl, western screech owl, and others. Aspen stands have declined throughout the Blue Mountains, due to a combination of factors including fire suppression, competition with invading shade-tolerant species, overgrazing (livestock and wild ungulates), and drought have contributed to their decline.

Several aspen stands are present, but are small in size (less than 1 acre), spatially discontinuous, and have a deteriorating overstory.

ENVIRONMENTAL CONSEQUENCES

Alternative A - No Action

Direct/Indirect Effects – Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. The current condition of habitats for birds in the planning area would not change in the short term. Snags would likely increase in number, benefiting many snag associated species.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C and D

The reduction of crown and ladder fuels would reduce habitat for some birds, but it would also reduce the chances that a large scale uncharacteristic wildfire would eliminate large areas of forest habitat. Timber harvest in the area is expected to improve stand health and resiliency by reducing overstocking, disease, and fuels, and subsequently restore a diversity of tree species.

Some existing snag habitat would decrease within harvest and fuels reduction units, and removal of danger trees also along haul routes. Snags would be left in units at levels identified in the design features and management requirements outlined in Chapter 2, Table 2-5. The retention of trees $\geq$ 21 inches DBH in moist forest would reduce the extent of effects to some birds of concern. Additional trees would likely die as a result of broadcast burning in some areas after harvest and thus bolster the number of snags.

Landscape burning and post-harvest fuels treatments (mastication, underburning, etc) would remove some shrubs, grasses, and seedlings from the understory, temporarily reducing cover and decreasing foraging habitat for some birds. If activities occur during springtime, ground nesting birds could be temporarily disrupted but if so, they generally are able to nest again.

Dry Forest Habitat

Thinning in dry forest is expected to immediately create single story, old forest ponderosa pine on about 240 acres. Another approximately 275 acres of thinning should provide large old trees in the mid to long-term. Landscape burning and non-commerical tree thinning would open up about 50 acres of ponderosa pine.

Mesic Mixed Conifer Habitat

Since no treatments are proposed in moist old forest multi strata (OFMS), there would be very little effect to focal bird species that use multi-layer forest. Habitat would decrease for species that prefer a closed canopy (about 580 acres in Alternatives B and C, none in Alternative D).

About 400 acres dominated by subalpine fir, Engelmann spruce, lodgepole pine in a multi-layered condition would be thinned. This may allow a denser shrub understory to develop and become better suited for hermit thrush.

Riparian

Riparian shrub habitat would not be affected by most activities. Prescribed fire may creep into riparian areas and stimulate shrub growth.

Other Unique Habitats

Aspen, and montane meadow habitat would not be affected. Steppe shrubland would be improved through prescribed burning.

Cumulative Effects – Alternatives B, C, and D

The scale of analysis for cumulative effects to birds is South George project planning area. Past, present, and reasonably foreseeable activities in the area in combination with proposed projects would not cause cumulative effects to bird species. Past activities such as timber harvest is reflected in the existing condition. Additional prescribed burning, livestock grazing, non-commercial thinning, recreational uses, and protection of springs would not have a cumulative effect on birds of concern due to the limited duration, amount, intensity and location of these and proposed activities.

THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE SPECIES

Definitions are as follows:

- An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all, or a significant portion, of its range.
- A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of, its range.
- A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species existing distribution.

The Forest Service Region 6 Sensitive Animal List (USFS 2008) and the Federal endangered species list were reviewed for species that may be present. Based on District records, surveys, and monitoring, as well as published literature about distribution and habitat utilization, species that might occur in or near the planning area include:

- Canada lynx,
- Gray wolf,
- California wolverine,
- Townsend's big-eared bat,
- Preble's shrew,
- Northern bald eagle,
- Peregrine falcon,
- Great gray owl,
- White-headed woodpecker, and
- Mountain quail.

There is no habitat for the gray flycatcher, green-tailed towhee, upland sandpiper, northern leopard frog, and striped whipsnake, and they are not expected to occur in the project planning area. These species and their habitat would not be affected by the proposed activities; therefore, no further discussion is necessary.

AFFECTED ENVIRONMENT - Canada lynx (Threatened)

Umatilla National Forest is currently considered unoccupied by Canada lynx (USFS 2006). Based on the lack of reproduction records, limited verified records of lynx, low frequency of occurrences, and correlations with cyclic highs with populations in Canada, the U.S. Fish and Wildlife Service concluded that lynx may occur on the forest as dispersers that have never maintained resident populations (USFWS 2003). As a Threatened species, effects to lynx as potential transients and effects to lynx habitat are disclosed here, even though there is not a resident population.

Canada lynx habitat is found in the southwest corner of South George project planning area, at elevations between 4,500 and 5,800 feet. Based on potential vegetation data, the project planning area could provide about 3,900 acres of lynx habitat in subalpine fir and adjacent moist grand fir stand types. About half of these acres are currently unsuitable for lynx. South George project planning area is a fringe habitat for lynx, with moist stands intermixed with dry forest, and reduced continuity due to past harvest activities.

ENVIRONMENTAL CONSEQUENCES – Canada Lynx (Threatened)

Alternative A - No Action

Direct/Indirect Effects - Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative. This does not mean conditions on the ground will remain static, they will in fact, continue to change as disclosed below.

There would be no direct effect to individuals if proposed actions were not implemented. The condition of habitat would not change in the short term. Natural processes over the long term would typically mean continued growth in vegetation, with large trees becoming decadent and eventually providing more lynx

denning habitat. The potential for fires may increase, but generally fire creates better habitat for snowshoe hare, the primary prey of Canada lynx.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C and D

No direct effects to Canada lynx are expected to occur because the project does not propose any activities identified as mortality risk factors and lynx are not present.

None of the temporary roads would affect lynx habitat. Fuels reduction proposed in Riparian Habitat Conservation Areas are not within potential lynx habitat. Road maintenance, road and trail decommissioning, and removal of danger trees would have little to no effect to lynx or lynx habitat.

Landscape burning could creep into potential lynx habitat and affect about 175 acres in all action alternatives.

Overall proposed activities would not modify habitats to the point that South George project planning area would no longer provide foraging and denning habitat.

Effects That Differ by Action Alternative

Direct/Indirect Effects - Alternatives B and C

Suitable lynx habitat would be reduced by about 1,000 acres. Mechanical harvest, low intensity burning, and mastication of slash would remove vegetation and change stand structure in 7 harvest units, rendering them unsuitable for lynx and their prey in the short term. Regeneration type harvest (seed tree or clear cut with reserves) would reduce lynx habitat by about 100 acres. Commercial thinning would cause approximately 900 acres to become unsuitable for lynx and their primary prey species in the short-term.

The proposed project activities would reduce suitable lynx habitat by 50 percent in the planning area, but about 1,200 acres would remain suitable for lynx and their primary prey species.

Direct/Indirect Effects - Alternative D

About 675 acres of potential lynx foraging and denning habitat would be affected by timber removal. There would be no regeneration type harvest in lynx habitat. Commercial thinning, low intensity burning, and mastication of slash would remove vegetation and change stand structure, resulting in conditions less suitable for lynx. About 1,500 acres would remain suitable for lynx in the planning area.

Cumulative Effects – Alternativs B, C, and D

The scale of analysis for cumulative effects is the Asotin Lynx Analysis Unit. Ongoing non-commercial thinnning in the project area would affect an additional 50 acres of potential lynx foraging habitat. Cumulatively, about 1,200 acres of lynx habitat within the project planning area would be altered over the next 10 years. Both the School and Columbia Complex Fires temporarily reduced lynx habitat to the west of the project planning area, but nearly 30,000 acres of suitable habitat are still available. No other past, ongoing, or future foreseeable projects would cause cumulative effects to lynx.

Overall, there would be no effect to Canada lynx, because lynx are not known to use the area. The Blue Mountains are considered 'unoccupied' by resident lynx (USFS 2006), and a reduction of suitable habitat on the fringe of lynx range is not expected to have any impact on the lynx population.

AFFECTED ENVIRONMENT - Sensitive Wildlife Species

Gray wolf (Sensitive)

The gray wolf is a habitat generalist inhabiting a variety of plant communities typically containing a mix of forested and open areas with a variety of topographic features. South George project planning area provides abundant deer and elk, as well as other prey species for wolves year-round. No wolf denning or rendezvous sites are known within the project planning area. Wolves dispersing from the Idaho population would likely continue to find their way into the Blue Mountains.

The project planning area is within the Northern Rocky Mountain Distinct Population Segment (DPS) of the gray wolf, which was recently removed from the Endangered Species List (USFWS 2011, USFWS 2009). However, the state of Washington will continue to manage gray wolf as a state endangered species until more packs are established (WDFW 2008).

California wolverine (Sensitive)

Wolverines typically inhabit high elevation conifer forest where sufficient food is available and human activity is low. Denning habitat is usually open rocky talus slopes where snow depths remain over 3 feet into spring. They tend to forage over large areas and travel long distances. The majority of the project planning area is suitable for wolverine foraging, but no potential denning areas are known. There are no indications that wolverine do more than pass through on a rare occasion.

Townsend's big-eared bat (Sensitive)

Big-eared bats have been documented near the town of Asotin, but are not expected to occur within the project planning area. The big-eared bat occurs in a wide variety of habitats including coniferous forests but is strongly associated with spacious cavern-like structures for roosting during all stages of its life cycle (Gruver and Keinath 2006). Typically, they use caves and mines, but have been noted roosting in attics and abandoned buildings, large hollows of redwood trees, in lava tubes and under bridges (Gruver and Keinath 2006). These sites are highly sensitive to disturbance and human interference. Individuals or small groups (3-5 individuals) of bats may day roost in hollow and creviced trees and snags near water for a limited time, but tend to stay within a few miles of colonial roosts (Perkins and Schommer 1992).

Preble's shrew (Sensitive)

Preble's shrews are an uncommonly noted species that has been primarily reported in high desert riparian areas. According to Armstrong (1957), nine specimens of Preble's shrew were captured in pit traps on Pomeroy Ranger District between 5,000 and 6,000 feet in elevation. These are the only records of Preble's shrew in the state of Washington. The sites were described in very general terms as lodgepole pine with small poles, and fir forest, and named several springs (Armstrong 1957). Based on other records throughout their range, it is likely that these captures were in riparian areas within forest openings. Several areas within the project planning area could be considered Preble's shrew habitat, including riparian areas within sagebrush grassland, montane meadows, and springs.

Bald eagle (Sensitive)

In eastern Washington, nesting bald eagles are uncommon, but in winter the reservoirs and major tributaries of the Columbia River provide a food source of carrion, fish, and wintering waterfowl. Bald eagles may occasionally travel through the project planning area, but no roost or nest sites are known.

Waterways in the project planning area are generally too small to attract bald eagles, however the streams do contribute to the quality of habitat downstream.

Peregrine falcon (Sensitive)

Peregrine falcons may occasionally travel through the project planning area, but no known nest sites are known. The nearest peregrine falcon nests are along the Snake River near Clarkston, Washington.

Great gray owl (Sensitive)

Great gray owls inhabit dense coniferous forests with close proximity to meadows, open fields, and clearcuts. This combination allows conifer nesting and roosting along with the abundance of small rodents that occur in forest openings. There have been no reports of great gray owls in or near the project planning area, but they do occur on Pomeroy Ranger District.

White–headed woodpecker (Sensitive)

White-headed woodpecker habitat is typically open ponderosa pine with large trees and snags. Currently there are about 300 acres of single-story, large diameter ponderosa pine stands in the planning area. Pomeroy Ranger District has no records of white-headed woodpecker occurring in the project planning area.

In addition to evaluating white-headed woodpecker habitat in the project planning area, snag habitat is evaluated at the watershed scale in the Management Indicator Species, primary cavity excavator section of this chapter.

Mountain quail (Sensitive)

Mountain quail occurred historically in the Blue Mountains in southeastern Washington (Crawford 2000), but little evidence suggests that they were native to Washington (Vogel and Reese 1995). Birds from multiple sources were translocated into Washington, resulting in mixing of various subspecies. Populations in eastern Washington have been in a severe decline, as reported by Vogel and Reese (2002).

The nearby Chief Joseph Wildlife Area contains a remnant population (WDFW 2006). Washington Department of Fish and Wildlife has attempted additional translocations in recent years with little success (Paul Wik, pers. comm.), but it is possible a few may occur in the project planning area.

In the drier eastern portions of its range, mountain quail are normally found in mountain and riparian shrub communities on steeper slopes, and in early successional-stage shrub vegetation following fire, logging, and other disturbances (USFWS 2003b).

ENVIRONMENTAL CONSEQUENCES – Sensitive Wildlife Species

Alternative A - No Action

Direct/Indirect/Cumulative Effects – Alternative A

Under NEPA, an effect is the result of taking an action. The No Action alternative in this analysis is defined as not taking any of the proposed actions. Therefore, under NEPA, there are no direct or indirect effects of the No Action Alterntative.

The condition of habitats for listed and sensitive wildlife species would not change in the short-term. In the long term habitat would not change other than through natural processes. Growth in vegetation throughout would eventually result in an increase of foraging and security habitat for most species. No negative effects are predicted for any sensitive species.

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably forseeable future actions. Based on the definition provided in the CEQ regulations, there would be no cumulative effects of the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

Proposed activities would not disturb key wolf areas such as den sites, 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.

Wolverines have not been documented in this area, but may pass through undetected and/or stay for short periods. Proposed activities could have short-term effects, but the risk of disturbance to wolverines is considered very low. None of the treatment areas are near wolverine denning habitat. Activities proposed will not alter prey availability or use of the area by wolverine; therefore, this project will not cause a trend toward federal listing and there will be no impact to wolverine.

Proposed activities would not affect caves, buildings, or mine adits that attract big-eared bats. Since there are no historical or recent records of this species in the project planning area, and no nearby roosting sites known, there would be no impact to big-eared bat.

Preble's shrews are not known to occur in the project planning area. The vast majority of riparian areas would be protected from timber harvest, and no pole size lodgepole pine stands are affected. Therefore, there would be no impact to Preble's shrew.

Use of the area by bald eagle is incidental. If this species were in the area during project activities, increased human presence and noise could cause it to move elsewhere. Smoke from prescribed fires may discourage use of the area, but this is limited in duration. Since it is unlikely they would be present during project activities, there would be no impact to bald eagle.

Use of the area by peregrine falcon is incidental. If this species were in the area during project activities, increased human presence and noise could cause it to move elsewhere. Smoke from prescribed fires may discourage use of the area, but this would be limited to a few days. Falcons are highly mobile and there is sufficient habitat for foraging within and outside of the planning area. Since it is unlikely that individuals would be present during activities, there would be no impact to peregrine falcon.

South George project planning area contains many forested areas adjacent to open grassland and old clearcuts. Tree and snag removal in these areas could reduce the suitabililty of habitat for great gray owls. Therefore, proposed activities may impact great gray owl**,** but are not expected to cause a loss of population viability or result in a trend toward federal listing.

No timber harvest would occur in existing white-headed woodpecker habitat, but thinning would create about 240 acres of old forest single story ponderosa pine. Landscape burning and non-commercial tree thinning would affect about 50 acres of large ponderosa pine stands. Since existing habitat would not decrease, and no nesting is currently known, the proposed projects may impact white-headed woodpecker, but are not expected to cause a loss of population viability or result in a trend toward federal listing.

Cumulative Effects - Alternatives B, C, and D

Cumulative effects are evaluated at the project planning scale. Past, present, and reasonably foreseeable activities in the area such as cattle grazing, prescribed burning, non-commercial thinning, and recreational use in combination with proposed projects would not cause little to no cumulative effects to any sensitive wildlife species.

There are no expected impacts to any sensitive species from proposed activities except for white-headed woodpecker and great gray owl. Cattle grazing could alter habitat for great gray owl prey species but typically not to the degree that populations are reduced. Firewood collection should not affect white-headed woodpeckers because cutting of ponderosa pine is not allowed. Non-commercial thinning, and recreational use have no effect to woodpeckers or their habitat, therefore there would be no cumulative effects to white-headed woodpecker.

The following table lists the biological determinations for listed and sensitive species analyzed for this project.

Table 3-71 Summary of Effects for Threatened, Endangered, and Sensitive Wildlife Species (Biological Determinations)

Species	Status	Species Occurrence and Habitat Suitablility	Alternative			
			A	B	C	D
Canada lynx *Lynx canadensis*	Threatened	Potential	NE	NE	NE	NE
Gray wolf *Canis lupus*	Sensitive	Potential	NI	NI	NI	NI
California Wolverine *Gulo gulo*	Sensitive	Potential	NI	NI	NI	NI
Townsend's big-eared bat *Corynorhinus townsendii*	Sensitive	Potential	NI	NI	NI	NI
Preble's shrew *Sorex preblei*	Sensitive	Potential	NI	NI	NI	NI
Bald eagle *Haliaeetus leucocephalus*	Sensitive	Potential	NI	NI	NI	NI
Peregrine falcon *Falco peregrinus*	Sensitive	Potential	NI	NI	NI	NI
Great gray owl *Strix nebulosa*	Sensitive	Potential	NI	MI	MI	MI
Gray flycatcher *Empidonax wrightii*	Sensitive	No Habitat	NI	NI	NI	NI
White-headed woodpecker *Picoides albolarvatus*	Sensitive	Potential	NI	MI	MI	MI
Mountain quail *Oreortyx pictus*	Sensitive	Potential	NI	NI	NI	NI

Species	Status	Species Occurrence and Habitat Suitablility	Alternative			
			A	B	C	D
Upland sandpiper *Bartramia longicauda*	Sensitive	No Habitat	NI	NI	NI	NI
Green-tailed towhee *Pipilo chlorurus*	Sensitive	No Habitat	NI	NI	NI	NI
Striped whipsnake *Masticophis taeniatus*	Sensitive	No Habitat	NI	NI	NI	NI
Northern leopard frog *Rana pipiens*	Sensitive	No Habitat	NI	NI	NI	NI
NE = No effect on a proposed or listed species or critical habitat; NI = No Impact to R6 sensitive species individuals, populations, or their habitat; MI = May Impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.						

FINDINGS OF CONSISTENCY

Forest Plan

All alternatives would be consistent with Forest Plan standards and guidelines, because they would meet design criteria set for the project, meet standards and guidelines for affected land management allocations, and provide for viable populations of wildlife species. All alternatives would provide for diversity of plant and animal communities in South George project planning area, based on the suitability and capability of the project planning area.

Endangered Species Act

A biological evaluation (BE) was completed for federally listed and proposed endangered and threatened species, and for animal species currently listed as sensitive on the Regional Forester's Sensitive Species List (project file). Determinations were made that none of the proposed project activities would adversely affect, contribute to a trend toward federal listing, nor cause a loss of viability to listed animal populations or species.

With regards to threatened and endangered species, a determination has been made that the proposed actions would not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives. Consultation for Canada lynx is not necessary since a determination has been made that the proposed activities would have no effect to this species.

Migratory Bird Treaty Act

All action alternatives are consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Conservation Strategy for Landbirds (Altman 2000) was reviewed for effects disclosures. Design features such as retention of adequate snags and down logs, retention of live trees, and avoidance of riparian areas proposed in this project would minimize take of migratory birds and meet the intent of current management direction.

Bald and Golden Eagle Protection Act

All action alternatives comply with the National Bald Eagle Management Guidelines (USFWS 2007) and the Bald and Golden Eagle Protection Act. Use of the area by eagles is sporadic, and no nesting or

roosting habitat would be affected by the proposed activities.

Action alternatives meet the intent of the Facilitation of Hunting Heritage and Wildlife Conservation Executive Order, specifically by proposing enhancements to elk winter range and bighorn sheep habitat, and by maintaining and restoring aspen habitat.

INVASIVE PLANT SPECIES (Noxious Weeds)

This section incorporates by reference the South George Invasive Plant 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANAYSIS

Invasive plant analysis is based on the South George project planning area (approximately 21,000 acres).

Measurement of the relative effects of activities proposed in South George Vegetation and Fuels Management Project on noxious weeds is based on the number of acres of previously mapped invasive plant sites and Umatilla National Forest Invasive Plants Treatment 2010 ROD and EIS sites within proposed project activity areas, along timber haul routes, and on the amount of ground disturbance anticipated from the proposed activities.

Indicator used to analyze effects of the proposed actions:

- Number of acres of previously mapped invasive plant sites within proposed project area and along timber haul routes.
- Amount of ground disturbance anticipated from proposed activities.

Direction and Policy

The 1999 Executive Order on invasive species (direction found in Forest Service Manual 2080), and the National and Regional strategies for noxious weed management identify prevention as the preferred strategy for managing invasive plant species on National Forest Service lands.

South George Vegetation and Fuels Management Project EIS is tiered to a broader scale analysis (the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 FEIS 2005). The R6 FEIS 2005 culminated in a Record of Decision (10/11/05) which amended the Umatilla National Forest Plan by adding management direction relative to invasive plants. Under the R6 2005 ROD, all National Forests in the Region were released from direction established by the1988 Record of Decision for Managing Competing and Unwanted Vegetation (ROD) and 1989 Mediated Agreement for invasive plant management. Parts of the 1988 ROD and 1989 Mediated Agreement that apply to unwanted native vegetation are not affected by this decision.

This project is intended to comply with the existing management direction, including the Invasive Plants Treatment Project EIS (decision July 2010). The portions applicable to South George Vegetation and Fuel Reduction Project include prevention standards that are incorporated in Chapter 2, Table 2-5 and in prevention standards listed in detail in Appendix A, p. 12 of the Invasive Plant Specialist Report (project file) that apply to activities beginning March 1, 2006.

The terms invasive plant species, noxious weeds, and weeds are used interchangeably in this document to refer to those non-native plant species that are of environmental concern and whose control is addressed as a land management priority at national, regional and local levels (Forest Service Manual 2080, R6 FEIS 2005, and Forest Plan 1990).

Invasive plants are defined as "a non-native plant whose introduction does or is likely to cause economic or environmental harm or harm to human health" [Executive Order 13122].

AFFECTED ENVIRONMENT

Information currently in the forest-wide noxious weed inventory database shows eight (8) invasive species occurring singly or in combination at 35 sites on Forest Service lands within the analysis area, for a total of about 1,270 gross infested acres

Because most of Pomeroy Ranger District is within the boundaries of the State of Washington and all herbicide applicators on the District are licensed through the State of Washington the District noxious weed coordinator has chosen to adopt the Washington State Noxious Weed Control Board priorities listed for weeds which is located on the internet at http://www.nwcb.wa.gov/weed_list/weed_list.htm and is listed below. The Washington State Noxious Weed Control Board adopts a State Noxious Weed List each year. This list categorizes weeds into three major classes (A, B, and C) according to the seriousness of the threat they pose to the state or a region of the state:

Class A weeds are non-native species with a limited distribution in Washington. Preventing new infestations and eradicating existing infestations is the highest priority. Control of these species is required by law. Currently there are no Class A weeds within the boundaries of Pomeroy Ranger District.

Class B weeds are non-native species that are presently limited to portions of the state. Class B species are designated for control in regions where they are not yet widespread. Preventing infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal. Listed below are Class B species known to be located on Pomeroy Ranger District.

- Yellow starthistle (*Centaurea solstitialis*)|annual plant |USFS acronym CESO3
- Spotted knapweed (*Centaurea stoebe*)|biennial or perennial|USFS acronym CEBI2
- Diffuse knapweed (*Centaurea diffusa*)|biennial or perennial|USFS acronym CEDI3
- Rush skeletonweed (*Chondrilla juncea*)|perennial|USFS acronym CHJU
- Meadow hawkweed (*Hieracium caespitosum*)|perennial|USFS acronym HICA10
- Dalmation toadflax (*Linaria dalmatica*)|rhizomatous perennial|USFS acronym LIDA
- Hounds tongue (*Cynoglossum officinale*)|biennial|USFS acronym CYOF
- Sulpher cinquefoil (*Potentilla recta*)|perennial| USFS acronym PORE5
- Tansy ragwort (*Senecio jacobaea*)|bienneal or perennial|USFS acronym SEJA
- Scotch thistle (*Onopordum acanthium*)|bienneal|USFS acronym ONAC

Class C weeds are other non-native weeds found in Washington. Many of these species are widespread in the state. Long-term programs of suppression and control are a local option, depending upon local threats and the feasibility of control in local areas. Listed below are Class C species known to be located on Pomeroy Ranger District.

- St. John's wort (*Hypericum perforatum*)|perennial|USFS acronym HYPE
- Canada thistle (*Cirsium arvense*)|rhizomatous perenneial|USFS acronym CIAR4

- Yellow toadflax-Butter 'n' Eggs (*Linaria vulgaris*)|rhizomatous perennial|USFS acronym LIVU

The following table lists the invasive plants present in South George project planning area and their respective treatment priority.

Table 3-72 Invasive Plant Species in South George Project Planning Area

Noxious Weed Species	Pomeroy RD Treatment Priority (1 –4, Highest to Lowest)	# of Sites	*Gross Acres	Remarks	Treatment as identified in July 2010 EIS
CEBI2 **Spotted knapweed**	1	8	165	Spotted knapweed is a simple perennial that reproduces from seed and forms a new shoot each year from a taproot. The plant can have one or more shoots up to 4 feet tall. Flower color is usually lavender to purple. Spotted knapweed occupies dry meadows, pastures, stony hills, roadsides, and the sandy or gravel flood plains of streams and rivers, where soils are light textured, well-drained, and receive summer precipitation.	Biocontrols available. Herbicides with manual and mechanical Treatment as follow-up. 1- Clopyralid, or Picloram 2- Glyphosate **Timing**: Preferred treatment is spring before bud stage or early summer.
CEDI3 **Diffuse knapweed**	1	17	201	Diffuse knapweed is a biennial or short-lived perennial forb, which reproduces only by seed. The plant usually produces a single main multi-branched stem that is 1 ½ to 2 feet tall. The flower is white or pink with bracts.	Biocontrols available. Herbicides with manual and mechanical treatment as follow-up.1- Clopyralid, or Picloram 2- Glyphosate **Timing**: Preferred treatment is spring before bud stage or early summer.
CESO3 **Yellow starthistle**	1	1	33	Yellow starthistle is characterized by a yellow thistle-like flower with star-like spines at the base of the flower. It is a winter annual that has the ability to germinate and develop in nearly all semiarid and semi-humid areas once temperatures are above sixties.	Biologicals available **Timing**: Herbicides are most effectively applied in rosette to seedling stage before flowering from late winter to May: 1- Clopyralid or Picloram 2- Glyphosate
LIDA **Dalmatian toadflax**	2	6	130	Dalmation toadflax is a short-lived rhizomatous perennial plant that can grow up to 4 feet tall. Flowering occurs in May-Sept.	Mowing/cutting stems in spring or early summer will eliminate plant

Noxious Weed Species	Pomeroy RD Treatment Priority (1 –4, Highest to Lowest)	# of Sites	*Gross Acres	Remarks	Treatment as identified in July 2010 EIS
				when bright yellow, snapdragon-like flowers develop. The plant occurs in fields, pastures, roadsides, and rangelands.	reproduction, but not the infestation. Biocontrols available Herbicides with manual follow up treatment: 1- Picloram 2- Aquatic-labeled Glyphosate **Timing**: Apply during active growth in spring before bloom or in late summer or fall during regrowth.
CYOF **Hounds tongue**	2	10	873	Tap rooted biennial or perennial plant. It reproduces by seed and appears as a leafy rosette in its first year. The plant grows 1 ½ to 3 feet high with reddish-purple flowers. Houndstongue is commonly known as the "Velcro weed" because of its small nutlets that are rapidly spread by people, domestic animals, wildlife and vehicles. Houndstongue grows on ranges, pastures, trails and roadsides and is toxic to horses and cattle, as it contains alkaloids that may cause liver cells to stop reproducing.	Hand pull or dig small populations. Entire root system must be removed. Plants could be left on site if no seed pods are present. Herbicides 1- Metsulfuron methyl 2- Picloram 3- Glyphosate **Timing:** Apply during active growth, preferably basal rosette stage.
ONAC **Scotch thistle**	2	4	60	Scotch thistle is a branched biennial or annual that can grow up to 8 feet tall. Flowers are globed shape and dark pink to lavender. The plant grows in wet meadows and pastures as well as dry pastures and rangelands…also along streams. Each plant is capable of producing 8,000-24,000 seeds annually.	Hand pulling or weed wrenching is most effective in moist soils. Herbicides: 1- Triclopyr 2- Picloram 3- Glyphosate **Timing** Apply during active growth preferably in the spring to young plants

Noxious Weed Species	Pomeroy RD Treatment Priority (1 –4, Highest to Lowest)	# of Sites	*Gross Acres	Remarks	Treatment as identified in July 2010 EIS
CIAR4 **Canada thistle**	3	5	910	Canada thistle is a creeping perennial, which reproduces by seeds and fleshy, horizontal roots. The erect stem is hollow, smooth and slightly hairy, 1 to 5 feet tall, simple, and branched at the top. The flower color is primarily lavender, pink, or purple. Canada thistle emerges in May. Infestations are found in cultivated fields, riparian areas, pastures, rangeland, forests, roadsides, and in waste areas. Because of its seeding habits, vigorous growth, and extensive underground root system, control and eradication are difficult.	Hand cutting of flower heads, which only suppresses seed production. Herbicides: 1- Clopyralid 2- Picloram 3- Glyphosate **Timing** Apply in spring before rosettes and prior to flowering. Or apply in fall to rosettes; season is dependent upon herbicide used.
HYPE **St. Johnswort**	3	11	67	St. John's wort is an erect perennial herb or shrub with a creeping rootstock. The plant readily invades unimproved overgrazed pastures. Flowering in spring to early-summer with bright yellow clusters. Toxins in St. John's wort leaves are harmful to livestock	Hand removal is possible but dug plants must be removed from the area and burned. Herbicides: 1- Metsulfuron methyl (MM) 2- Picloram (PC) 3- Glyphosate **Timing** Apply when plants are fully emerged and in active growth (MM). Apply in early growth stages before blooming (PC).
* Gross acres are not additive, because more than one invasive plant can occur on the same acre.					

ENVIRONMENTAL CONSEQUENCES

Alternatives, B, C, and D, include activities in or near existing weed sites. The potential for spreading weed populations in each alternative is relative to the amount of activity taking place where seeds and plants could be moved through disturbance. The potential for introducing new infestations is relative to the total amount of disturbance and therefore can be compared by the number of acres of activity in each alternative, including transportation activities. All three action alternatives include design features (Chapter 2, Table 2-5) to help minimize ground disturbance, limit introduction and transport of weed seed, avoid selected activities in known areas of infestation, reduce disturbance to existing native vegetation, and restore native ground cover as soon as possible after harvest activities are complete.

Alternative A- No Action

Direct/Indirect Effects – Alternative A

The No Action alternative would not create any further human-caused ground disturbance in the South George Vegetation and Fuels Management project planning area and therefore, no direct or indirect effects. The spread of invasive plants from currently existing populations and off-forest seed sources would continue at the current level. Animal and vehicle vectors would likely be the primary means of seed introduction into the project area.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to Action Alternatives

Direct /Indirect Effects – Alternatives B, C, and D

The activities that are the same with regard to spreading populations in all action alternatives are shown with approximate acres below in Tables 3-72 and Table 3-73. These activities also are the same between action alternatives for the potential for introducing infestations.

Table 3-73a Invasive Species Mapped In Activity Areas

Species priority group	Jackpot Burn Acres	Broadcast Burn Acres	Grapple Pile Units Acres	Hand Thinning Acres	Mechanical Thinning Acres	Landscape Prescribed Fire Acres
1	75	0	7	0	150	1
2	870	0.5	870	870	1,015	870
3	880	0.25	870	870	875	870

Table 3-73b Invasive Species Mapped Along Temporary and Decommissioned Roads

Species priority group	Alternative B Temp. Roads Acres	Alternative C Decommissioned Roads Acres	Alternative D Temp. Roads Acres
1	0	75	0
2	0	925	0
3	0	885	0

Design features (Chapter 2, Table 2-5), 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 soil seedbank in the vicinity of pre-existing populations. It is not possible to calculate exact acreage reductions resulting from these weed treatments. However, the reductions in areas at risk would be proportional for each action alternative.

The following table shows the number of approximate acres of invasive species, by priority group, previously mapped within harvest units and along haul routes. The acres listed indicate the relative potential for spreading populations.

Table 3-74 Invasive Species Mapped In Harvest Units and Along Haul Routes

	Alternative B and C		Alternative D	
Species priority group	Acres within harvest units	*Miles along haul routes	Acres within harvest units	*Miles along haul routes
1	366	27	110	16
2	1,055	36	960	34
3	940	34	915	30
*Danger tree removal will occur on 300 feet on each side of haul routes and have the same area affected as the haul routes.				

The potential for introducing new infestations is relative to the total amount of disturbance and therefore can be compared by the number of acres of activity in each alternative, including transportation activities.

Table 3-75 Proposed Harvest Acres and Road Miles Used in Action Alternatives

Unit of Measure	Alternative A	Alternatives B and C	Alternative D
Harvest Acres	0	3,900	2,600
Haul Route Miles	0	79	71

Cumulative Effects - Alternatives B, C, and D

Ongoing human and animal activities in the project planning area that could create bare soil and spread plant propagules include vehicle traffic, cattle grazing, recreation activities, woodcutting, and wild animal movement. All of these activities could affect areas outside the project planning area. It is not possible at this time to calculate how many acres may be affected.

Future foreseeable non-commercial thinning activities within the project planning area, occurring 18-20-years from harvest activities, would not likely create bare soil, but would involve vehicle traffic that would go outside of the project planning area. Future foreseeable invasive plant treatments, over the next 10-years, would continue to manage weed populations in the project planning area and outside the area Monitoring, mapping, and assessment of new populations would increase tracking capacity in preparation for treatment. These foreseeable future actions would further reduce the number of acres at high risk of weed spread. It is not possible at this time to calculate exact acreage reductions resulting from these weed treatments.

FINDING OF CONSISTENCY

The proposed South George Vegetation and Fuels Management Project is consistent with the Forest Plan, as amended, with respect to noxious weeds. Compliance includes the above discussions of existing condition, the mechanisms of invasive species spread, prevention measures (standards and guidelines) listed as design features, and risks.

THREATENED, ENDANGERED, AND SENSITIVE PLANTS

This section incorporates by reference the South George Threatened, Endangered, and Sensitive Plant Report and Biological Evaluation 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

Threatened, endangered, and sensitive (TES) plant species analysis is based on the South George project planning area (approximately 21,000 acres) and adjacent subwatersheds.

Indicator used to analyze effects of the proposed actions:

- Effects to TES species

AFFECTED ENVIRONMENT

Silene spaldingii, Spalding's catchfly, is Federally listed as threatened and known to occur on Umatilla and Wallowa-Whitman National Forests. This plant occurs primarily in open grasslands with deep Palousian soils and is located approximately 2 to 3 miles north of South George project planning area. There are no documented occurrences of this plant in the project planning area and there is no habitat for this plant species in South George project planning area.

Complete species inventory botanical surveys have been conducted in South George project planning area and adjacent subwatersheds and are listed in Table 3-76.

Table 3-76 Botanical Surveys Completed in South George Project Planning Area

Survey #	Survey Name	Year
321	East Firewood	1992
344	George	1992
625	Wickiup	1992
366	Hogback	1993
593	Two George	1993
100	01C (Dark Canyon)	1995
101	01D (Upper South Fork Asotin)	1995
644	Arnold Spring	1999
1057	Coombs Rx Burn	2004

These vascular plant surveys are recorded in the Natural Resources Inventory System (NRIS) Threatened, Endangered and Sensitive/Invasive Species (TESP/IP) database. Examination of these surveys with regard to changes to the Regional Foresters Sensitive Species List (RFSSL) over time (January, 2008) resulted in no documented TES plant species in and or adjacent to South George project planning area. Given the previous survey efforts and records, it was determined that no additional botanical surveys were needed in South George project planning area in June of 2009 when the BE was originally prepared for this project.

In 2009 and 2010, a thorough review of Umatilla National Forest survey records found that a number of RFSSL listed species had been documented in survey lists over time but had not been tracked as sensitive

species. One of these species, *Antennaria corymbosa*, flat-top pussytoes, is documented on two surveys included on Table 3-76 above, Survey #366 Hogback completed in 1993 and Survey #101 Upper South Fork Asotin in 1995. In addition, flat-top pussytoes is also documented on another proximal survey polygon just north of the project area, #519 Smoothing Iron completed in 1993. In August 2011, the Forest TES Botanist and biological technician explored the area looking for habitat for flat-top pussytoes. No habitat was found and no flat-top pussytoes populations were located.

There is no known habitat in the South George project planning area for any special status nonvascular plant species (lichens and bryophytes) on Region 6 RFSSL updated in January 2008. Surveys for special status lichens and bryophytes were conducted under contract in 'potential habitat' areas across the Umatilla National Forest in 2006, 2007, and 2008. The final report from these surveys is on file in the Botanical Resources Department of the Umatilla National Forest and special status lichens and bryophytes documented can be found in the NRIS (TESP/IP) database.

ENVIRONMENTAL CONSEQUENCES

Alternative A – No Action

Direct/Indirect Effects – Alternative A

There are no ground-disturbing activities proposed in the no action alternative. Alternative A would have no effect, direct, or indirect, on any currently listed Region 6 sensitive vascular and/or nonvascular plant species.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects - Alternatives B, C, and D

There are no sensitive plants documented in South George project planning area and therefore, there are no direct or indirect effects to any currently listed Region 6 sensitive plants from proposed activities in the project planning area.

Cumulative Effects – Alternatives B, C, and D

The spatial scale of analysis for cumulative effects to RFSSL listed sensitive plants is South George project planning area and adjacent subwatersheds. The temporal scale begins with the first European settlers in the area and in this case begins with the history of grazing beginning in the mid 1800's. The other end of the temporal scale is approximately 10 years into the future or 2021, based on the knowledge of proposed projects. See Chapter 3, pp. 3-1 to 3-4 for a listing of past, present, and reasonably foreseeable future actions.

There are no sensitive plants documented in the project planning area and therefore, there are no cumulative effects to sensitive plants from proposed activities.

BIOLOGICAL DETERMINATION OF EFFECTS TO TES PLANT SPECIES

Federally listed plant, Silene spaldingii
As stated previously in the Affected Environment section above, there are no occurrences of *Silene spaldingii* nor is there habitat for *Silene spaldingii* in South George project planning area. Therefore, the proposed South George Vegetation and Fuels Management Project will have "N*o Effect*" on *Silene spaldingii*.

Region 6 and listed Washington State sensitive
There are no effects to RFSSL listed plants from proposed activities in South George project planning area. A determination of *"No Impact*" was given for sensitive plant species.

FINDINGS OF CONSISTENCY
This project complies with present Federal regulations (ESA) pertaining to the management of Threatened, Endangered, and Sensitive plant species. This project is consistent with Forest Plan goals (p. 4-7) and Forest-wide standards and guidelines (pp. 4-89 to 4-90).

As required, a Biological Evaluation for plant species is available and located in the project analysis file.

RANGE

This section incorporates by reference the South George Range 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The South George Vegetation and Fuels Management project planning area is located within portions of the Asotin Cattle and Horse (C&H) Allotment. For the purpose of discussing domestic livestock grazing, those portions of the Asotin Allotment that are within the project planning area will be analyzed and the portions of the allotment that are outside the analysis area will not be discussed in detail.

Indicator for comparison purposes between alternatives are:

- Environmental consequences of this project on livestock grazing will be discussed in relation to how each alternative affects management of livestock distributions in uplands and riparian community types.

AFFECTED ENVIRONMENT

Asotin allotment is located in the eastern portion of Pomeroy Ranger District, mainly in the Asotin Watershed, about twelve miles west of Anatone, Washington. The entire area of the allotment encompasses approximately 39,400 total acres consisting of four grazing pastures of National Forest Lands. Pastures are identified as Park/Cook, Hogback, George, and Wenatchee. Park/Cook and Hogback pastures are used simultaneously and are alternated between early use and later use with the George pasture. Wenatchee pasture is not within the project planning area. Asotin allotment currently provides

summer pasture for 413 cow/calf pairs, from June 13 to October 13 at a stocking rate of 18 acres/animal unit month (AUM). A deferred rotation grazing system is used to minimize impacts on upland and riparian vegetation rotating season of use in pastures. Deferred rotation is defined in the Forest Plan as withholding livestock from a range to allow forage to reach a certain stage of growth, stocking, and vigor for those species that govern utilization. This helps improve plant vigor and maintains or improves vegetation composition of desired plant association (AOI, 1995 EA and 1996 AMP). There is one term grazing permit currently issued for this allotment.

Asotin allotment is currently operating under a 1995 Environmental Assessment, a 1996 Allotment Management Plan, and Annual Operating Instructions (AOI). Existing management is also outlined in the current Term Grazing Permit.

All of South George project planning area (approximately 21,000 acres) is within the Asotin C&H Allotment. The following table lists pasture names, acres, and usage dates.

Table 3-77 Pasture Acreages in the South George Project Planning Area

Allotment	Pasture	Regeneration Acres Within Project Planning Area	Total Pasture Acreage within Project Planning Area	**Approximate Use Dates
Asotin	Park/Cook	86	4,430	6/13-8/12
	Hogback	343	7,575	6/13-8/12
	George	363	8,600	8/13-10/35
**This date is the time of year that this area could be used throughout the grazing season. Livestock will be in each pasture for a specified number of days each grazing season.				

The Allotment Management Plan for Asotin Allotment lists terms and conditions stipulated in the Biological Opinion for Tucannon Watershed consultation for on-going activities Biological Assessment which is the baseline for the Asotin Watershed grazing program. These terms are as follows:

- Permittee will provide riders to check pastures twice weekly.
- Cattle in the riparian will be removed and placed back in the upland portion of the pastures. Cows that repeatedly return to riparian areas will be removed from the pasture.
- Permittee to keep a written record of their inspections and give a copy to the Forest Service at the end of each month.

Historically all four pastures have met monitoring requirements; including Forest Plan standards and guidelines, Interagency Implementation Team (IIT) standards, PACFISH requirements, and terms and conditions in National Marine Fisheries Service (NMFS) Biological Opinion for the Asotin Watershed Assessment of on-going activities (Range Report, project file).

Upland Conditions

In general, range vegetation within South George Vegetation and Fuels Management project planning area supports about 25 percent of nonforest vegetation, much of which consists of dry meadows and bunchgrass communities (dominated by Idaho fescue and bluebunch wheatgrass). The predominant forest cover type is grand fir (49%) followed by spruce-fir (17%), Douglas-fir (15%) and ponderosa pine (14%) (page 3-49).

Many areas of transitory rangeland were created by past timber harvest and seeding to non-native species such as orchard grass and fescues. These areas improved the amount of forage available for livestock grazing and helped improve livestock distribution. Transitory rangeland has been decreasing in available forage and accessibility as tree canopy has increased.

A total of 25 ponds, 26 spring developments and 3 corrals have been constructed on Asotin Allotment and are within the project planning area. These ponds and troughs were constructed and or used to help improve livestock distribution within pastures reducing the concentration of livestock. Division fences, rotational, and deferred grazing strategies have also been used to improve range condition within this allotment.

A total of seven Condition and Trend monitoring transects (established in 1954) are located in Asotin C&H Allotment, six are within the project planning area. These plots are located in areas that were representative of the range vegetation plant communities where changes in livestock management would be reflected. Monitoring data since 1954 has displayed static to upward trends on both soil and range vegetation conditions. This indicates that current livestock management is effective in meeting the goals and objectives of the Forest Plan.

Riparian Conditions

There are three main fish bearing streams within Asotin C&H Allotment; George Creek, Coombs Creek and South Fork Asotin Creek. George Creek runs approximately 4.5 miles within the allotment and has confirmed ESA-listed fish species (steelhead) present, located below the forest boundary. Documented spawning occurs within ¼ mile of the forest boundary. Therefore, George Creek has potential rearing habitat and flows into the main stem of Asotin Creek at river mile (RM) 4. George Creek also has several incidental sightings (unconfirmed) of Bull Trout. George Creek was listed for critical habitat. Coombs Creek runs approximately 3 miles within the allotment and is classified as a Category 2 stream which does not contain ESA-listed fish species; however, it does contain resident Redband trout, which are currently listed as sensitive on the Regional Forester and Washington States lists. Coombs Creek drains into George Creek below the forest boundary.

South Fork Asotin Creek contains approximately 4.5 miles of stream channel within allotment. Steelhead are known to spawn below the forest boundary. Bull trout were documented in 2008 by an independent stream survey crew electro-fishing. South Fork Asotin Creek joins with the Asotin Creek at RM 20; it was listed as critical Bull Trout habitat in 2010.

Hillsides leading to the creeks have natural barriers such as steep slopes, downed material, etc. that inhibit domestic livestock from accessing a good percentage of the riparian.

ENVIRONMENTAL CONSEQUENCES

Alternative A – No Action

Direct/Indirect Effects – Alternative A

Livestock grazing distribution on uplands would stay the same or continue to slowly decrease as stocking in timber stands grows denser and wood continues to accumulate on the ground. Livestock access would stay the same or continue to slowly decrease due to down wood, continuous regeneration of trees, and the resulting reduction in visibility. Forage would also stay the same or continue to slowly decrease due to the gradual reduction of sunlight on the forest floor reducing forest floor vegetation.

However, since in the context of NEPA, direct and indirect effects are, by definition (40CFR 1508.8), the result of taking actions, and in this alternative the Forest Service would be taking no action; there are no direct or indirect effects of this alternative.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects – Alternatives B, C, and D

All action alternatives would increase livestock distribution on Asotin C&H Allotment by increasing access and or increasing available forage for livestock. This would spread utilization of vegetation more evenly through the allotment and reduce soil and vegetation disturbance in areas of concentrated use.

Proposed burning would reduce the amount of forage in a one to two-year period, however, after that time period forage would be expected to be higher than the existing condition due to the reduction in competition from small trees and or shrubs. Proposed non-commercial thinning, commercial thinning, removal of danger trees, fuels reduction projects, and harvest would increase the amount of sunlight on the forest floor, stimulating grass growth and increasing the amount of available forage (transitory range[18]) for domestic livestock. These treatments would also remove down wood and decrease stand densities, which currently limit access and visibility for both livestock and livestock managers in portions of the project planning area.

Management of livestock would improve with all action alternatives due to increased visibility and access for livestock herding, and due to short term increases in forage. An increase in distribution of livestock on the uplands could decrease the amount of use on riparian areas. The effects of the approximately 25 acres of proposed riparian fuels treatment in the RHCA may result in cattle drawn into the new established forage near water, however existing Terms and Conditions listed above would monitor and prevent negative effects from this activity.

Proposed harvest, commercial thinning, removal of danger trees, fuels treatments, and landscape burning could reduce the effectiveness of fences (which are used as a tool to manage livestock in portions of the allotment at specific times). However, the identified designed features (Chapter 2, Table 2-5) under all the action alternatives would protect fences in their existing condition to prevent livestock movement between pastures.

Cumulative Effects – Alternatives B, C, and D

Analysis area for cumulative effects is the project planning area and the time period is approximately 5 years which is when the existing Term Grazing Permit expires.

Proposed treatments in all action alternatives, in addition to implementing the Eastside Prescribed Burn project of approximately 4,500 acres, the approximately remaining 156 acres of the Red Hill Prescribed Burn project and approximately 247 acres remaining in the Park Ridge Prescribed Burn project, maintenance of spring developments, new cattle access sites and proposed non-commercial thinning

[18] Transitory Range – Land that is suitable for grazing use of a non-enduring nature over a period of time; often found in the openings created by timber harvesting activities.

could permit more frequent and widespread use of prescribed fire in the future. This could result in long-term improvements in forage and increased accessibility for livestock.

FINDINGS OF CONSISTENCY
All action alternatives would be consistent with Forest Plan objectives to manage grazing resources to maintain and improve vegetative conditions compatible with protecting and maintaining use of the Asotin C&H Allotment.

RECREATION

This section incorporates by reference the South George Recreation 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. A summary of the current conditions of the affected environment and the predicted effects of the proposed action and its alternatives are discussed in this section.

Recreation opportunities available on National Forest lands broadly benefit users. For many Americans, public lands provide the only means of experiencing outdoor recreation. Settings and experiences of these lands are important to an overall healthy lifestyle of the American public. Managing recreation resources includes the analysis of projects with regard to how proposed activities would affect developed and undeveloped recreation sites, uses, and activities, as well as recreation settings in which the user experience is presented.

SCALE OF ANALYSIS
The recreation analysis considered the area within the project planning area boundary (approximately 21,000 acres) for direct, indirect, or cumulative effects, unless otherwise noted.

Indicator for comparison purposes between alternatives are:

- Developed and dispersed camping – recreation experience and availability
- Access and dispersed recreation activities – travel access, safety, and desired use

Regulatory framework:
Umatilla Forest Plan establishes goals related to specific resources by management area allocation.

The Forest Service uses a nationally recognized classification system called the Recreation Opportunity Spectrum (ROS) to describe different recreation settings, opportunities, and experiences to help guide recreation management activities (USDA Forest Service 1986). Umatilla Forest Plan has recognized the importance of recreation settings and each management area (MA) is assigned a desired ROS.

AFFECTED ENVIRONMENT

The existing condition for recreation resources is considered in terms of facilities, travel and access, ROS, and sense of place.

Developed and Dispersed Camping
Wickiup Campground is the only developed campground within the project area. It is located in the southwestern corner of the project planning area at the junction of forest roads (FRs) 43 and 44. Facilities

include 6 picnic sites and 5 overnight camping sites, and a vault toilet. There is no water or garbage service. The campground is most heavily utilized during the late summer and fall hunting seasons. Roads and trails open to ATV can be accessed from the campground. Non-motorized and semi-primitive non-motorized opportunities are within close proximity of the campground as well.

Wenatchee Guard Station, located along FR 43 just a few miles east of the Wickiup campground is a recreation rental cabin. The rustic one bedroom rental cabin is without electricity or running water. The cabin is a popular rental with commanding views of the Wenatchee watershed to the south and the Grande Ronde River valley to the southeast. The cabin is consistently rented throughout the summer and fall months. Motorized and non-motorized opportunities exist from the cabin.

Cloverland Sno-Park is a developed winter recreation trailhead located within the project area at the forest boundary on FR 44. The site is designed to accommodate vehicles with snowmobile trailers. Facilities include a vault toilet. This site is occasionally used for dispersed camping, especially in the spring for mushroom gathering and during the fall hunting season.

Dispersed campsites **-** There is no inventory of dispersed campsites in the project area; however there are a number of traditional dispersed campsites scattered throughout. A generic description of a dispersed campsite consists of a user-made area that is generally adjacent to a developed road. The site often has a meat pole in the trees, a rock fire ring, and a hardened parking/camping surface for one to three families. Dispersed camping has traditionally been a popular activity in the area, particularly during big game hunting season. People currently disperse camp in or near past harvest treatment areas where vegetation treatments are more noticeable.

There are a number of popular recreation activities in the area besides camping that occur year around including:

- hiking
- horseback riding
- all terrain vehicle (ATV) riding
- mushroom and berry picking
- hunting
- sight seeing
- snowmobiling

Travel Access

There are currently about 50 miles of roads that provide access for hiking, ATV riding, hunting, berry picking, and sightseeing. There are also a number of miles of unauthorized ATV trails within the project area.

Travel routes in the project planning area are closed at different times of the year to certain types of vehicles for various reasons including for wildlife protection, improving big game hunting, facilitating winter recreation and erosion control. Currently, there are no roads that remain open throughout the entire year in this project planning area. There are about 17 miles of road that are open from June 1 through November.

Portions of FRs 4300 and 4400 and FR 4304 are closed to motor vehicle travel (about 8 miles) except for snowmobiles travel from December 1 to April 1. These routes and FR 4302 (Hogback road) are popular for ATV riding during the summer and during the fall hunting season. They also constitute a significant portion of the groomed snowmobile trail system during winter months.

Snowmobiling is a popular winter activity across Pomeroy Ranger District. Approximately 47 miles of designated snowmobile trail are groomed on the district each year. There are about 19 miles of groomed routes within the project planning area. Cloverland Sno-Park is located at the eastern edge of the project planning area at the forest boundary on FR 4400. This sno-park is the primary staging facility on the east side of Pomeroy Ranger District.

Approximately 5.5 miles of non-motorized system trails (Trails 3144 and 3132) are located on the east side of the project planning area. They provide access to South Fork of Asotin Creek, Park Ridge, Red Hill Gulch, and Sheriff Gulch areas. These are stock trails used primarily during fall hunting season.

ENVIRONMENTAL CONSEQUENCES

Alternative A – No Action

Direct/Indirect Effects – Alternative A

The no action alternative would continue with existing management of the setting, facilities, and access. Developed and dispersed site campers and cabin renters would remain undisturbed by noise, smoke, or traffic. Dispersed campsite use patterns would remain the same. There would be no effects to travel and access. The recreation opportunity spectrum would not be affected with implementation of this alternative and Sense of Place would not be affected by any proposed activities.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to Action Alternatives

Action alternatives (B, C, and D) are designed to alter the characteristics of timber stands in the project planning area. The alternatives do not directly address recreation facilities. Effects to recreation resources are primarily related to timber harvest and prescribed fire activities and the disturbance that these activities create. There are some effects and changes related to the recreation setting. Timber harvest activities would create short-term effects to the timbered portion of the landscape. For further description of these effects, see the following scenery resource section in this chapter.

Direct/Indirect Effects – Alternatives B, C, and D

Developed and Dispersed Camping

Wickiup Campground, Wenatchee Guard Station rental cabin, and some dispersed campsites would experience an increase in dust and noise during harvest and thinning activities, and from an increase of related traffic on haul routes. Some recreationists could be displaced from their desired dispersed campsite, but the effects would be short-term and limited to a small number of sites at one time and would cease as soon as treatment of an adjacent activity unit is complete (generally 1-2 weeks as work is occurring). Hunters may be displaced from their favorite dispersed camping site for one season during the prescribed burning window. Numerous alternative dispersed campsites would continue to be available. Dispersed campsites located along open system roads that would be decommissioned as proposed in Alternative C would no longer be available. Wickiup Campground and Wenatchee Guard Station recreation rental cabin would remain available during and after harvest activities.

The campgrounds, rental cabins, and dispersed campsites could also be affected by smoke from prescribed burning. This could coincide with some of the more popular camping periods (fall hunting season) because conditions during late fall are generally the best times for conducting prescribed burning. Late fall campers (primarily hunters) would be most likely affected.

Cumulative Effects – Alternatives B, C, and D

The spatial boundary for cumulative effects analysis is the project planning area. It is expected that recreational opportunities outside of the project planning area would not be affected by project alternatives.

The temporal boundary coincides with the project timeline for harvest activities. For future foreseeable burning projects listed on page 3-3 (Red Hill, Park Ridge, Non Commercial Thinning and Fuels Reduction, and Eastside Prescribed Burn). The temporal boundary coincides with the project timeline, ending with completion of the project. There are no expected effects that would continue beyond project completion.

Following decommissioning of open system roads in Alternative C, there may be a small reduction of some dispersed campsites, but there are numerous other dispersed sites or other suitable sites available within the project planning area.

Direct/Indirect Effects – Alternatives B, C, and D

Travel and access

For Alternatives B, C, and D activities associated with commercial thinning, mechanical fuels reduction, and prescribed burning could present safety issues for the public. Increased vehicle traffic during harvest and thinning activities may deter localized recreational user activities. Some open roads or portions of open roads may temporarily be closed during project activities and would be re-opened as soon as possible after work is completed, especially during hunting season. During project activity alternative snowmobile routes would be designated in order to avoid conflict between winter logging operations and snowmobile activity. By restoring and maintaining a more sustainable species composition, the risk of uncharacteristic high intensity fires would be less of a threat to the recreational use of the area and a safer atmosphere would exist for the recreational user.

Alternatives B and D

No roads open to ATV or non-motorized trails would be affected for Alternatives B and D. Opportunities for dispersed recreation activities would also remain unchanged. Unauthorized ATV routes would not be decommissioned. There would be no changes to existing travel system after treatment. Existing roads and trails that are open to the public would continue to be available.

Alternative C

With implementation of Alternative C approximately 4.3 miles of system roads open to all motorized travel would be decommissioned. This represents about a 10 percent reduction in the number of miles of roads open to all motorized travel in the project area. Approximately 15 miles of unauthorized ATV roads and trails would also be decommissioned. The approximately 4.3 miles of system open roads to be decommissioned provides only limited quality riding opportunities. None of the proposed decommissioned roads are part of any loop travel opportunity. These roads are mostly short, dead end, spur roads or the tail ends of longer spur roads. Segments of these roads range in length from 0.1 miles to 1 mile. However, they may provide access to someone's favorite dispersed camping site or hunting area.

Alternative C proposes a seasonal closure on Hogback road (FR 4302) to be extended longer than currently exists from August 1-November 30 in order to provide increased protection for wildlife. The

road system would be reduced from a maintenance level 3 to a maintenance level 2. It would still be available for grooming during the winter as part of the groomed snowmobile system.

ATV traffic on open system roads would be expected to increase as a result of the decommissioning of 4.3 miles of open system roads and about 15 miles of unauthorized trails in the project area. Some ATV riders may choose to ride in different areas on the forest.

Cumulative Effects – Alternatives B, C, and D

The spatial boundary for cumulative effects for travel and access is the Pomeroy Ranger District. As noted below the project would affect access in this area of the district. The temporal boundary for travel and access would be from the time of road closure to the foreseeable future.

Currently there are 354 miles of forest roads and 25 miles of trails open to ATV's and motorcycles on Pomeroy Ranger District. With the anticipated completion of the Steven's Ridge ATV complex in the near future approximately 24 miles of ATV trails will be added to the system. The Steven's Ridge complex is located on the north end of the district starting at the Boundary Campground.

In May, 2009 a decision was signed for the North-South ATV trail project that, when implemented it will redirect ATV and motorcycle users from about 13 miles off of FR 40 onto about 12 miles of new designated ATV trails. With implementation of these two projects (about 2 to 5 years) there would be about 400 miles of roads and trails open to ATV travel on Pomeroy Ranger District (341 miles of roads and 58 miles of ATV trail).

With implementation of Alternative C, there would be a 4.3 mile reduction of roads open to all motorized vehicles. This represents a 10 percent reduction within the project area and a little more than 1 percent of the roads and trails that would be open to ATV's and motorcycles on Pomeroy Ranger District when Steven's Ridge complex is opened.

No long-term cumulative effects of harvest and fuels activities to travel and access are anticipated.

FINDINGS OF CONSISTENCY

All action alternatives would be in compliance with the Forest Plan, forest wide standards and guidelines for recreation (Forest Plan (FP) p. 4-47), and for standards and guidelines for management areas located within the project planning area, A6 (FP p. 4-118); C1 (FP p. 4-144); C3 (FP p. 4-152); C3A (FP p. 4-155); C4 (FP p. 4-158); and C5 (FP p. 4-163).

VISUAL RESOURCE (SCENERY)

This section incorporates by reference the South George Scenery Resource 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. A summary of the current conditions of the affected environment and the predicted effects of the proposed action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The South George project planning area is located on Pomeroy Ranger District and is approximately 21,000 acres in size. It is primarily situated in Asotin County with a small portion in Garfield County, Washington.

Indicators for comparison purposes between alternatives are:

- **Scenic Integrity** - The degree to which the scenery is free from visible disturbances that detract from the natural and socially valued appearance, including disturbances due to human activities or extreme natural events inconsistent with the historical range of variability.

- **Scenic Stability** -The degree to which the desired scenic character can be sustained through time and ecological progression

Regulatory Framework:
Integration of this scenery analysis assures the South George Project is consistent with scenery-related Forest Plan direction, Forest Service policies, and applicable elements of Forest Service Visual Management and Scenery Management systems. The following table shows Forest Plan visual quality objectives by management area (FP pp. 4-117 – 4-163)

Table 3-78 Visual Quality Objectives for Specific Management Areas

Management Area	VQO
A6-Developed Recreation	Retention-Partial Retention
C1-Dedicated old Growth	Retention
C3-Big Game Winter Range	Retention –Maximum Modification
C3A-Sensitive Big Game Winter Range	Retention –Modification
C4-Wildlife Habitat	Retention –Modification
C5-Riparian Habitat	Retention –Modification

AFFECTED ENVIRONMENT

Scenic Integrity

Scenic Character **-** The project planning area lies at the head of the drainage system flowing east which includes several streams; and at the breaks of Wenatchee Creek and the Grande Ronde River drainage that flows south. The topography drops dramatically away to the west along forest road (FR) 4300 giving way to an expansive vista that stretches into Oregon and Idaho where the Wallowa Mountains and the Seven Devils can be seen on the horizon. To the east, and within the project area the topography is made up of a series of steep canyons that start at the headwaters as heavily timbered draws of mixed conifer and transition to ponderosa pine stands and grassland slopes. The views of these landscapes are a mix of

foreground views into the timber stands and vistas down and across the canyons. The vegetative mosaic of timber and grasslands laid across the dissected topography creates diverse views.

Visual Quality - The existing visual quality is evaluated by looking at the scenery from the routes and sites that were utilized in assigning the visual quality objectives for the Forest Plan. An evaluation of the existing condition considers the degree of visual disturbances of past activities to the natural appearing scenery that is derived by the contextual landscape and the historical range of variability.

Transportation Routes - There are currently 50 miles of roads open to motorized vehicle travel in the project planning area (33 miles of maintenance level 3[19] and 17 miles of maintenance level 2[20] roads). Approximately 43 of those miles are open to ATV's and motorcycles (all are open roads except FR 4300 which is approximately 7 miles in length). These routes provide access for hiking, ATV riding, hunting, berry picking, and sight-seeing.

Portions of FR 4300 and 4400 and FR 4304 are open to motor vehicle travel, except from December 1st to April 1st when they are used for snowmobile activity. These routes and FR 4302 (Hogback Road) are popular for ATV riding during summer and fall hunting season. They also constitute a significant portion of the groomed snowmobile trail system during the winter months.

Forest road 4300 runs along the breaks of the Grande Ronde River drainage. Immediate views to the south are of the vast expanse of steep drainages and flat ridges. The Wallowa Mountains and Seven Devils in Idaho are visible on the horizon. Views to the north looking into the project area are varied. The timbered foreground in areas that have not been previously harvested are dense with very little understory growth. The thick canopy closure makes these areas dark. The viewing distance into these areas is very limited. There are many areas that have been harvested and these plantations area more than 20 feet in height. A recent thinning has taken place which has reduced the thick regrowth allowing views through the trees. The patchwork appearance of young plantations and unharvested timber is very unnatural appearing. The edges of the plantations are very prominent in the middle ground views from Hogback Road. Where these patches are most visible the visual quality is modification. This patchwork is not evident from FR 4300 road; therefore the existing visual quality is partial retention. See Figures 3-12 and 3-13.

[19] Maintenance level 3 – suitable for passenger vehicles, surface not smooth.
[20] Maintenance level 2 – suitable for high clearance vehicles.

Figure 3-12 View looking south east from the Hogback Road

Figure 3-13 View looking west from the Hogback Road

Forest road 4400 runs east west up Smoothing Iron ridge. To the west views are directly into the Asotin Creek drainage which has very steep slopes. This drainage is not within the project planning area but is a key visual attraction of this route. To the east views are of Cook Ridge, Dark Canyon, and Park Ridge which are rolling ridges running northeast. From this road, past clearcuts are visible in rectangular shapes across the north facing slopes. The remaining timber is visibly unhealthy. Much of the grand fir is dead or dying. The stands are very densely stocked with large amounts of down and dead material. The clearcut patches are coming in with small trees, but the view is very patchy and unnatural appearing. It then meets FR 4300 at the breaks of Wenatchee Creek. The views into North Fork Asotin Creek are similar to that of Wenatchee Creek. This route runs through previous harvest units as it traverses the landscape north south. The current visual quality varies from modification to maximum modification (Low to Very Low Scenic Integrity). See Figures 3-14 and 3-15

Figure 1-14 View looking east from FR 4400 -This view is representative of the contextual landscape in which the project area lies. The timbered canyons are often flanked by rolling open ridges. The draws are heavily timbered and contrast strongly with the grass slopes.

Figure 3-15 View looking east from FR 4400 - This view shows the patchwork of harvested and unharvested areas visible from FR 44. Harvested areas are regenerating with 15-foot to 20-foot tall timber, but patches are still very evident due to the stark edges of the openings. In unharvested areas there are many dead trees visible.

Viewpoints - From Big Butte Lookout and Wenatchee Cabin the patchwork is not evident. The project planning area is a mix of forest and open grassy knolls and steep slopes. These views meet partial retention.

Approximately 5.5 miles of non-motorized system trails (Trails 3144 and 3132) are located on the east side of the project area. They provide access to the South Fork of Asotin Creek, Park Ridge, Red Hill Gulch, and Sheriff Gulch. These are stock trails used primarily during the fall hunting season. These trails are within a maximum modification visual quality objective (very low scenic integrity level).

Figure 3-16 View into Redhill Gulch

Wickiup Campground is the only developed campground within the project area. It is located in the southwestern corner of the project area at the junction of FRs 4300 and 4400. This campground lies on both sides of FR 4300, is a development level 2 campground. Currently the visual quality of scenery visible from the campground is partial retention (moderate scenic integrity).

Wenatchee Guard Station is located within the project area along FR 4300 just a few miles east of the Wickiup campground, is a recreation rental cabin. The cabin is a popular rental with commanding views

of the Wenatchee watershed to the south and the Grande Ronde River valley to the south east. The cabin is consistently rented throughout the summer and fall months. Currently the visual quality of scenery visible from the rental cabin is partial retention (moderate scenic integrity).

Cloverland Sno-Park is a developed winter recreation trail head located within the project planning area at the forest boundary on FR 43. This sno-park is the primary staging facility on the east side of Pomeroy Ranger District. The site is designed to accommodate vehicles with snowmobile trailers. Trailheads are in a sense the portal to recreation experiences on the forest. Therefore, scenery at this point establishes the initial setting for the experience. Snowmobiling is a popular winter activity across Pomeroy District. Approximately 47 miles of designated snowmobile trail are groomed on Pomeroy District each year. There are about 19 miles of groomed routes within the project planning area. The views from these routes are varied with canyon views, and timbered rolling ridges intermixed with grassy slopes. The timbered areas show visual signs of past timber harvest which often dominate the foreground and middleground views. The existing condition is modification along this route.

There is no inventory of dispersed campsites in the project planning area; however, there are a number of traditional dispersed campsites scattered throughout. Dispersed camping has traditionally been a popular activity in the area, particularly during big game hunting season. The scenery is an essential aspect of the recreation setting. The existing condition is modification to partial retention from dispersed campsites.

The table below lists the visual quality objectives (VQOs), scenic integrity as perceived by the public, and scenery integrity objectives.

Table 3-79 Visual Quality Objectives and Perceived Alteration

Visual Quality Objectives	Scenic Integrity as people perceive it	Scenic Integrity Objectives
Preservation	Unaltered (visually complete or intact)	Very High
Retention	Unnoticeably altered	High
Partial Retention	Slightly altered	Moderate
Modification	Moderately altered	Low
Maximum Modification	Heavily altered	Very Low
Unacceptable Modification	Unacceptably altered	Unacceptable

Scenic Stability

Scenic stability is the degree to which the desired scenic character can be sustained through time and ecological progression. The existing scenic stability analysis for South George project planning area focuses on the single major scenery attribute of vegetation, addressing its ecosystem conditions identified by field observation and Fire Regime Condition Class (FRCC) 7 coarse-scale data on vegetation and fire history data. Ecosystem changes to other minor scenery attributes such as landform, rock outcrops, and winter snowfall are not as critical to the project area's scenic character as its vegetation, since these changes are relatively stable over time regardless of fire behavior and human activities.

Evaluating scenic stability is done by considering conditions necessary to sustain desired scenic character of stands within the natural and historical range of the landscape. Appropriate stand density, species composition, and fuel loads are necessary for stands to maintain the inherent characteristics through their lifecycle. When trends such as increasing stand density, encroachment of less resilient species, increasing fuel loads, and high levels of mortality exist, the expected consequences are changes in the scenic character that are beyond the historical range. Examples of these consequences are large canopy openings

from intense wildfires, large stands of dead and dying timber, and loss of distinctive characteristic such as open, large tree character pine stands, lodgepole stand mosaics and multi-layered mixed species stands.

Gradual trends over time have altered species composition, stand structure, and age classes of the forest vegetation. Stands of large mature ponderosa pine that provide an open forest are diminished due to encroaching mixed conifer species, and past harvest practices that removed pine to release shade tolerant species. (See Vegetation and Fuels sections of this chapter).

Scenic stability levels provide a measuring tool that addresses the resiliency of the scenic attributes and the scenic composition of the desired scenic character. Scenic stability levels are defined as follows:

Scenic Stability Level Definitions:

Very High Stability—All dominant and minor scenery attributes of the valued scenic character are present and are likely to be sustained.

High Stability—All dominant scenery attributes of the valued scenic character are present and are likely to be sustained. However, there may be scenery attribute conditions and ecosystem stressors that present a low risk to the sustainability of the dominant scenery attributes.

Moderate Stability—Most dominant scenery attributes of the valued scenic character are present and are likely to be sustained. A few may have been lost or are in serious decline.

Low Stability—Some dominant scenery attributes of the valued scenic character are present and are likely to be sustained. Known scenery attribute conditions and ecosystem stressors may seriously threaten or have already eliminated the others.

Very Low Stability—Most dominant scenery attributes of the valued scenic character are seriously threatened or absent due to their conditions and ecosystem stressors and are not likely to be sustained. The few that remain may be moderately threatened but are likely to be sustained.

No Stability—All dominant scenery attributes of the valued scenic character are absent or seriously threatened by their conditions and ecosystem stressors. None are likely to be sustained, except relatively permanent attributes such as landforms.

The greatest hazard to scenery resources in the South George project planning area are large stand replacement fires that would burn much more intensely than what has historically occurred. Fire is a natural disturbance in this area but due to the stocking levels, species compositions, ladder fuels, and canopy closure that have developed over time, it is expected that a fire event would be much larger and more severe.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – No Action

Direct/Indirect Effects – Alternative A

Visual Quality/Scenic Integrity – Implementing the no action alternative would cause no direct or indirect effects to the existing conditions. The existing visual quality would remain at *modification to partial retention*.

Scenic Stability – Implementing the no action alternative would cause no direct effects to the existing condition. Indirect effects are related to increasing stand density, encroachment of less resilient species,

increasing fuel loads, and high levels of mortality. This trend decreases the resiliency of the timber stands causing the scenic stability to be continually reduced as conditions degrade.

Cumulative Effects – Alternative A

There would be no cumulative effects to visual quality/scenic integrity with implementing Alternative A because no direct or indirect effects would occur. Scenic stability would continue downward in future years as conditions degrade due to the lack of resiliency of timber stands.

Effects Common to All Action Alternatives (B, C, and D)

Direct/Indirect Effects -Alternatives B, C, and D

Effects vary as to the number of acres treated in each action alternative.

Commercial harvest

The project units are designed to address the dense, overstocked stands throughout the project area. Proposed thinning prescriptions are to soften the hard edges of the past harvest units, which would decrease the unnatural appearance over time.

The silviculture prescription of improvement cutting (free thinning) would be used to select trees to harvest. This prescription selects trees based on species and size, leaving the preferred species (fire-resistant species - Ponderosa pine and western larch). Large trees of non-resistant species would remain. This practice leaves an uneven aged structure of the desired composition and densities. Commercial harvest leaves stumps which are visible from an immediate foreground distance (300 feet). Commercial harvest would open up the stands and allow more sunlight into the forest floor, and provides a longer viewing distance into the forest stands.

Commercial harvest activities that would occur include tractor logging and skidding, skyline logging, and helicopter logging. Tractor logging and skidding creates some soil disturbance along skid trails, tearing the topsoil and exposing the soils. The understory vegetation is torn up along these skid trails which are visible from an immediate foreground distance. These visual effects are usually an immediate impact that dissipates within a short period of time. As vegetation returns the impacts are usually not visible after a growing season to the casual viewer. Skyline logging creates similar effects as tractor logging. The skid trails associated with skyline logging are usually longer than those associated with tractor logging. These trails can often times be visible from middleground viewing distances. However, these visual effects are also short-term. Helicopter logging creates very minimal effects to scenery. The stumps remaining are the only visible evidence that is created, when slash is treated.

Danger Tree Removal

Danger tree removal would cause some stumps to be created along haul routes in the immediate foreground. Stumps would be visible from the road and would cause a visible effect. The degree of effect is dependent on the amount of stumps and the location of the stump related to the road, as well as the viewing angle and the amount of grasses and forbs that may screen the stump.

Fuel Treatments

Fuel treatments that would occur congruently with harvest treatments include mechanical thinning, prescribed burning of activity fuels, grapple piling, and yarding with tops attached. These treatments would clean up the majority of the slash created by the harvest activities. The effects are primarily beneficial to the visual quality, reducing the visual impacts of human activities with a natural appearing landscape. Removal or burning of residual material (tree stumps, snags, limbs and brush piles), removes the clutter that detracts from the remaining trees other scenic attributes. Most visual preference surveys indicate dislike for messy landscapes (Bradley, Forest Aesthetics, 1996, pg. 6). Non-commercial thinning

removes trees less than 10 inches DBH, where these trees are in excess. This activity is usually a benefit to the visual quality. Viewers are known to prefer views of large trees with open spacing.

Landscape prescribed fire would create scorching across the acres of the prescription. This activity would create visual effects that are within the natural scenic character that is dynamic, changing with natural disturbance and cycles of growth and renewal. There would be some torching of individual trees, and groups of trees.

Wickiup campground is located approximately one-half mile from the nearest harvest unit under all action alternatives. Visitors at Wickiup campground are not likely to experience direct or indirect scenic effects from harvest or fuels treatments with implementation of any action alternative.

Under Alternatives B and C the Wenatchee Cabin Rental is between two tractor harvest units (Units 58 and 59). Visitors would experience a more open stand in areas several hundred feet to either side of the cabin. Under Alternative D the nearest harvest unit (unit 71) is located about one-quarter mile to the east and would likely be unnoticeable from the cabin. The scenic vistas to the south that many people come to the cabin to enjoy would remain unaffected with implementation of any action alternative.

Views from dispersed camp sites that are near or within treatment areas would initially be impacted by the harvest activities because of stumps and skid trail disturbance. The foreground views from these dispersed camps would be more open, allowing the more visual distance into the forest.

There are no harvest or fuels treatment units proposed near Cloverland Sno-Park under any of the action alternatives. Visitors to the sno-park are not likely to experience visual direct or indirect effects from harvest treatments. However, those utilizing the trails would travel through a setting where harvest activity would be very evident. Stumps, skid trails, and blackened grasses and scorched trees would be visibly dominant in the short-term for the first 1 to 2 years. Treated stands would be more open visually. In the long-term stands would appear healthier after 1 to 2 years.

There are a small number of acres that are within the partial retention visual quality objective (VQO). These acres are located along FR 4300. Alternative B proposes 158 acres of intermediate harvest, Alternative C proposes 158 acres of intermediate harvest, and Alternative D proposes 58 acres of intermediate harvest. The harvest treatments are expected to meet partial retention. Proposed harvest visible from FR 4400 would treat timber stands that remain between past clearcuts, thinning from below and opening up the canopy to allow more light into the forest floor, and cleaning up the dead and down material. This proposed harvest would soften the patchiness of the timbered landscape by blending the previous cuts that are now regenerating with less dense harvested pieces of this project. The result would remain at a visual quality level of modification, but could soften the stark visual patchwork. Eventually the patches would completely blend to a contiguous natural appearing forest. The images below (Figures 3-17 and 3-18) depict a representation of the expected results of the treatments and a few years of regrowth. As past harvested areas continue to grow, the blending of the two harvest efforts would improve the scenic integrity. It is expected that the trend toward low scenic integrity would be slowed by all the action alternatives. Alternative D would not slow that trend as much.

Figure 3-17 Existing view looking southeast from the Hogback Rd

Figure 3-18 Rendition of Expected results after 5-10 years

The scenic stability of the area is dependent on the conditions that favor resiliency to fire and insects and disease. Currently much of the area is outside of the historical range of variability in ways that put the forest at greater risk of large, severe fire. Proposed action Alternatives B and C would harvest 3,900 acres in a selective manner leaving fire resilient species and densities, as well as utilizing fuels treatments on approximately 7,100 acres. Alternative D treats 2,600 acres with harvest techniques, and approximately 6,100 acres of fuel treatments. It is expected that the additional regeneration harvests proposed in Alternatives B and C could potentially help control fires, whereas Alternative D would not. Therefore Alternative B and C would be more beneficial to the improvement of scenic stability. However it is not expected that the difference would be measurable by the scenic stability scale.

Alternatives B and C are expected to maintain a moderate scenic stability while Alternative D is expected only to slow the trend toward low scenic stability.

Cumulative Effects – Alternatives B, C, and D

Past, present, and foreseeable activities (pp. 3-1 to 3-4) that contribute to the cumulative effects to scenery resources range from regeneration harvests, thinning, prescribed fire, and grazing practices that overlap in time and space. The timeframe for which these effects overlap ranges from the time of the activity through the life of the effect. Created openings that are unnatural appearing last until the seed trees gain enough height to make the opening disappear as a visual form. This usually occurs when the trees reach 20 feet in height. This usually takes 20 to 25 years. The project planning area is not highly visible from outside the project boundary due to the slope and orientation of the landscape, therefore the project

boundary is the spatial boundary for cumulative effects. Past, present and reasonable and foreseeable activities are briefly described and the cumulative effects disclosed below.

The harvest activities that created long term visual effects in the area that would overlap in time would be the regeneration harvests that occurred after 1990 (p. 3-2). Approximately 1,830 acres have been harvested in this manner creating openings of varying sizes. These opening do remain and create an existing visual condition that is really blocky with squarish openings arranged horizontally across the slopes with timbered blocks between the openings. Harvest units in this project treat timbered blocks in a manner that would soften this blocky appearance by thinning out dense timbered areas. The cumulative effect would result in maintaining the existing visual quality in some areas and improving it slightly in others.

There have been minimal effects due to past wildfires; approximately 40 acres have been burned in the project area, which does not create cumulative significant effects to visual quality. The visual evidence of past fires is in keeping with what is naturally expected in a fire dependent ecosystem.

The Red Hill prescribed fire project would add the remaining 156 acres to the amount of acres proposed for prescribed fire in this project. These additional acres would not change the visual quality objective expected to be met by any of the three action alternatives. The scenic stability would remain the same as well.

The Park Ridge project of non-commercial thinning, pullback and prescribed fire would add the remaining 247 acres to the amount of acres proposed for this project. These additional acres would not change the visual quality objective expected to be met by any of the three action alternatives. These activities would open up stands and improve the appearance of the forested stands by making large healthy trees more visible. Short-term effects such as the red needles of the cut whips would be visible for one to one and one half years. The scenic stability would remain the same as well even though this project contributes to improving the health and viability of the stands it is not enough additional acres to make significant changes to merit an improved rating.

The ongoing recreation activities are not expected to decrease the visual quality objective that is associated with this project. The effects of ongoing recreation activities are accounted for in the existing visual quality objective.

The ongoing grazing activities are not expected to decrease the visual quality objective that is associated with this project. The effects of ongoing grazing activities are accounted for in the existing visual quality objective.

The invasive plant treatments are not expected to add substantial effects to this project to effect the visual quality objective achievement. Reduction in invasive plants is an effort that maintains the scenic stability of the herbaceous scenic attributes.

Non-commercial thinning and fuels reduction that would occur over the 5 year period would open up the forest and clear small understory trees to express large tree character. Short-term effects such as the red needles of the cut trees would be visible in foreground views remaining for 1 to 1 ½ years. These activities in addition to the proposed activities in all action alternatives would meet visual quality objectives and maintain or improve scenic stability.

Invasive plant treatments planned through 2013 is expected to improve the grassland composition, restoring areas, and cumulatively maintain visual quality and scenic stability.

The Eastside prescribe burning would create visual effects that are in keeping with natural fire effects such as smoke, scorched boles, red needles and blackened forest floor. Most of these effects would be localized, and limited to foreground views. Many of the effects would be reduced significantly by new spring growth of grasses and forbs, making them short-term effects. The remaining effects in addition to the South George project activities would not reduce the visual quality objective. The cumulative effect to scenic stability would be positive, but would not increase the rating.

Three areas along the Hogback Road (FR 4302) and two other areas near problem culverts have been identified as sites where cattle watering at road crossings cause localized bank disturbance (map in project file). Hardening of these sites with rock is proposed to reduce disturbance and improve bank conditions and localized water quality.

The spring development restoration and access sites would not contribute significantly to the achievement or degradation of visual quality. Where visible from FR 4302, the restoration would improve the appearance of the sites that have been degraded.

This landscape would continue to express the activities that occur as management, and other uses. Reasonably foreseeable activities that are planned to occur would perpetuate a modified scenic expression of the landscape. It is expected that this expression would improve as present and foreseeable actions are of a lighter or more sensitive approach to management than those of the past. The resiliency of the scenic attributes is expected to be improved as management activities are carried out to maintain the vegetation within the natural range of variation. These practices should improve scenic stability.

FINDINGS OF CONSISTENCY

The proposed action alternatives (B, C, and D) have very little differences between them that relate to scenery resources overall. The impacts would not exceed the limits of visual impacts defined by maximum modification, modification, and partial retention. All proposed action alternatives would meet the visual quality objectives established in the Forest Plan (see Table 3-78).

ECONOMIC ANALYSIS

This section incorporates by reference the South George Economic Analysis 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. A summary of the current conditions of the affected environment and the predicted effects of the proposed action and its alternatives are discussed in this section.

INTRODUCTION

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 communities and counties and generate revenues that are returned to the federal treasury. This section presents the economic effects of the project, including the project feasibility, financial efficiency, and impacts to jobs and income. Refer to the Umatilla National Forest, Land and Resource Management Plan, FEIS, Appendix B, for further detailed description of the main social and economic characteristics of the area (USDA 1990).

The Purpose and Need for this project, as stated in Chapter 1, include a social economic secondary objective to provide sawlogs and wood fiber for utilization by local and regional economies.

This analysis assesses both the effectiveness of meeting the objective of the purpose and need as well as assessing potential economic and social justice impacts from proposed activities. Similar methods of analysis are used for both and these methods are described in this section.

SCALE OF ANALYSIS

The geographic scope of the economic analysis includes Asotin and Garfield Counties, Washington. These counties are encompassed within the Spokane Bureau of Economic Analysis Region. This is an appropriate scope of analysis because the project would occur entirely in Asotin County, and wood products would most likely be transported and processed in Clarkston, Washington. The temporal scope of the analysis is five years, the duration of the proposed activities.

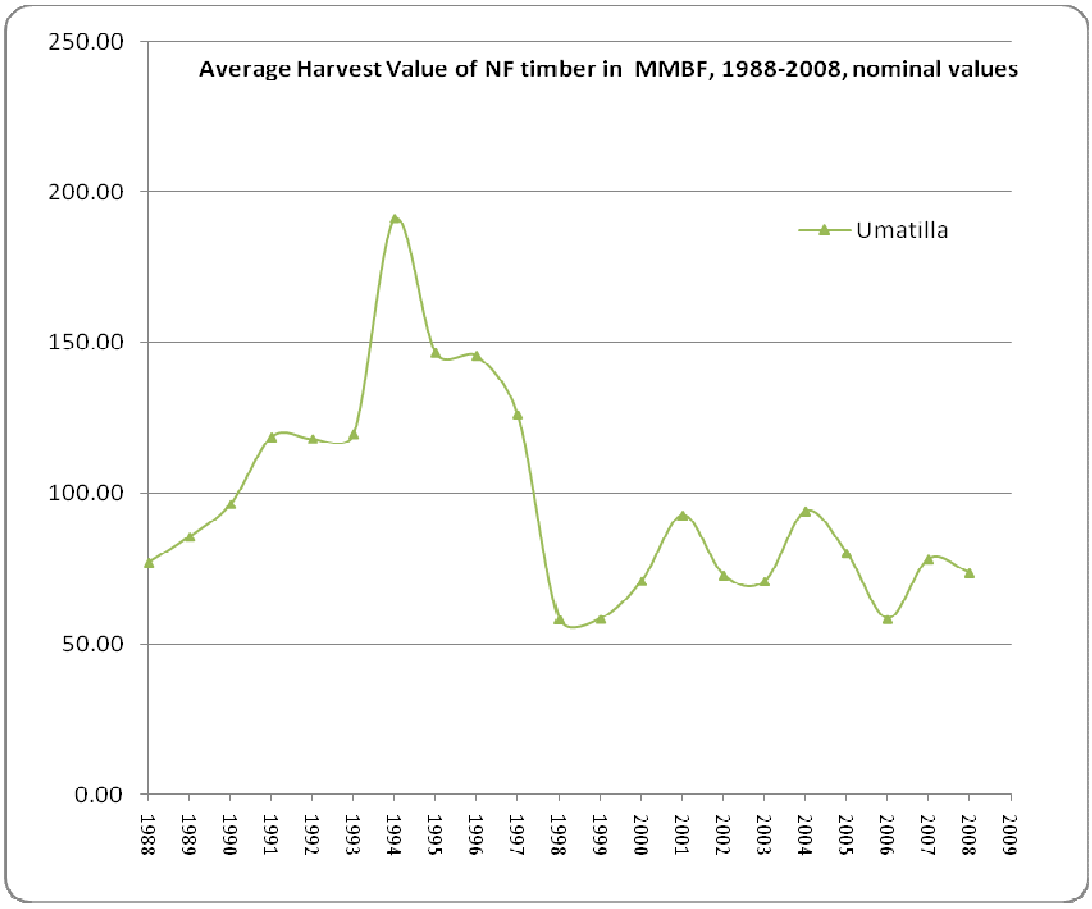
Indicators for comparison purposes between alternatives are:

- Alternative efficiency – present net value (PNV)
- Sale viability – value of above base rates
- Benefits to regional economy – number of jobs

AFFECTED ENVIRONMENT

Although Umatilla National Forest occupies less than 25 percent of the land base in Asotin and Garfield Counties, forest products have been an economic mainstay for over a century in this area. However, over the last 10 to 15 years, the dependence on forest products has been greatly reduced. The following graph (Figure 3-19) displays information regarding Umatilla National Forest's timber program from 1998 to 2008. This display offers a time series perspective for the last ten years. Even at the current harvest levels, volume produced by Umatilla National Forests plays a role in the wood products and home heating economy of five economic impact counties.

Figure 3-19 Trend in Timber Revenue on Umatilla National Forest (1998-2009).



Community Demographics

During 2009, approximately 23,502 people lived in the bi-county economic impact area (BEA, WA REAP, 2009). Between 1969 and 2009, Asotin County's population rose from 13,285 in 1969 to 21,385 in 2008, for a net gain of 8,100, or (61.0 percent). Garfield County's population decreased from 2,755 in 1969 to 2,117 in 2008, for a net loss of 638, or (-23.2 percent).

Employment

Agriculture, manufacturing, retail, and service sectors are important sources of employment and income in this area. There were 10,026 part and full time jobs in the bi-county area economy during 2008, with over two thirds of these jobs created since 1970. Asotin County's employment rose from 3,179 in 1969 to 8,738 in 2008, for a net gain of 5,559, or (174.9 percent). Garfield County's employment dropped from 1,579 in 1969 to 1,288 in 2008, for a net loss of 291, or (-18.4 percent). Asotin County employment growth was slightly higher than the state aggregate (161 percent) and significantly higher than the national average (100 percent).

In 2009, the average annual unemployment rate for Asotin County area was 7.8 percent, and 10.2 percent for Garfield County (WA OFM 2009). There is a clear trend of the lowest unemployment during the late summer months and increased unemployment during the winter months due to the cyclic pattern common in agricultural based economies. Annual timber harvest related employment from Umatilla National Forest between the years 1995 to 1997 averaged 394 jobs.

ENVIRONMENTAL CONSEQUENCES

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).

Project Feasibility

The estimation of project feasibility was based on the Region 6 transaction evidence appraisal (TEA) model, which took into account logging system, timber species, and quality, volume removed per acre, lumber market trends, costs for slash treatment, and the cost of specified roads, temporary roads, and road maintenance. The estimated high bid and base rates for each action alternative is displayed in Table 3-80. The estimated high bid for each alternative indicates that the action alternatives are feasible (likely to sell). The predicted high bid from the feasibility analysis is used in the financial efficiency analysis discussed below. The higher the anticipated value above base rates a potential sale has the more likely the timber sale would sell.

Financial Efficiency

The financial efficiency analysis is specific to the timber harvest and restoration activities associated with the alternatives (as directed in Forest Service Manual 2400-Timber Management and guidance found in the Forest Service Handbook 2409.18). Costs for sale administration, regeneration, and restoration activities are included. All costs, timing, and amounts were developed by the specialists on the project's interdisciplinary team. If exact costs were not known, the maximum of the cost range was used to produce the most conservative present net value (PNV) result. The expected revenue for each alternative is the corresponding predicted high bid. The PNV was calculated using R6 sale evaluation residual value model, a program for economic analysis of long-term, on-the-ground resource management projects. A 4 percent real discount rate was used over the seven-year project lifespan (2011-2017).

This analysis is not intended to be a comprehensive cost-benefit or PNV analysis that incorporates a monetary expression of all known market and non-market benefits and costs. Many of the values associated with natural resource management are best handled apart from, but in conjunction with, a more limited benefit-cost framework. These values are discussed throughout this chapter, for each respective resource area.

Table 3-80 summarizes the project feasibility and financial efficiency, including the base rates, predicted high bid (i.e., estimated stumpage value), total revenue, and PNV for each alternative. The PNV value indicates the financial efficiency of the timber sale, including all costs and revenues associated with the timber harvest and required design criteria. Table 3-80 indicates financial inefficiency for all action alternatives, due primarily to the current economic recession and poor demand for wood products. The No Action Alternative has no costs or revenues associated with it.

A reduction of financial PNV in any alternative as compared to the most efficient solution is a component of the economic trade-off, or opportunity cost, of achieving that alternative. The no action alternative would not harvest or take other restorative actions and, therefore, incur no costs. As indicated earlier, many of the values associated with natural resource management are non-market benefits.

Economic Impacts

This analysis calculated the jobs and labor income associated with the processing of the timber products harvested and conducting mandatory and other land management activities, such as non-commercial fuel reduction, and road decommissioning. Timber products harvested from the proposed project and the non-timber activities would have direct and indirect effects on local jobs and labor income. Table 3-80 displays total estimates for employment (part and full-time) and labor income that may be attributed to

each alternative. Since the expenditures occur over a seven-year period, the estimated impacts of jobs and labor income would be spread out over the life of the project. Most of the timber harvest and wood processing jobs would occur over the first five years of the project and most of the economic impacts related to the land management activities would occur during the later stages of the project. It is important to note that these are not new jobs or income, but rather jobs and income that can be attributed to this project.

Estimates in Table 3-80 indicate that each action alternative would maintain approximately between 75-140 jobs and $3.4 -$6.3 million of labor income are attributable to the processing of the timber products and mandatory and land management activities. Alternative A maintains no jobs or income because there are no activities associated with this alternative.

Table 3-80 Economic Comparison by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D
Commercial Unit Area (acres)	0	3,900	3,900	2,600
Volume Harvested (CCF)	0	47,250	47,250	25,350
Value/CCF (Above Base Rates)	$0	$49.00	$36.00	$41.00
Total Timber Value at Predicted High Bid Rate (Revenue)	$0	$2,315,250	$1,701,000	$1,039,350
Discounted Revenue	$0	$2,130,000	$1,564,920	$956,202
Discounted cost	$0	(-$3,449,250)	(-$3,449,250)	(-$1,850,550)
Financial Present net value (PNV)	$0	(-$1,319,250)	(-$1,884,330)	(-$894,348)
Cost/Acre	$0	(-$338)	(-$483)	(-$344)
Financial Benefit/cost ratio (B/C)	N/A	(-1.62)	(-2.20)	(-1.94)
Local Employment*- jobs	0	140	140	75
Total Potential Labor Income**	0	$6,329,260	$6,329,260	$3,390,675

* Definitions: Employment is the total full-and part-time wage, salaried, and self-employed jobs in region.
**Labor income includes the wages and salaries as well of benefits of workers who are paid by employers, and income to proprietors.

Alternative A – No Action

Direct /Indirect Effects – Alternative A

This alternative proposes no action. No costs or benefits are derived from this alternative and no detailed analysis was calculated for it. However, selection of this alternative could lead to costs in the future. These costs would be associated with increased fire suppression costs, loss of private property, and other costs associated with failure to treat the vegetation in this area.

Alternative B (Proposed and Preferred Alternative)

Direct/Indirect Effects – Alternative B

The PNV for this alternative is negative. This alternative has the least cost per acre of the three action alternatives and the least cost per acre of the three action alternatives. Alternative B proposes more commercial harvest than Alternative D and has a lower cost per acre. Alternative B has the highest predicted bid rate as compared to Alternatives C and D. The number of job (140) would be the same as Alternative C but higher than Alternative D. The anticipated value above base rates is positive and higher than Alternatives C or D, so the sale of commercial products is assumed to be viable. Trust funds can be expected to adequately fund vegetative treatments with implementation of this alternative.

Alternative C

Direct/ Indirect Effects – Alternative C

The PNV for this alternative is negative and the highest of the three action alternatives. Alternative C has the highest cost per acre of the three action alternatives. Alternative C proposes the same amount of harvest as Alternative B, but has more harvest units with a helicopter logging system. The anticipated value above base rates is positive, so the sale of commercial products is assumed to be viable. Trust funds can be expected to adequately fund vegetative treatments with implementation of this alternative.

Alternative D

Direct/Indirect Effects – Alternative D

The PNV for this alternative is negative but of a lesser amount than Alternatives B and C. This alternative proposes fewer acres of commercial harvest. The cost per acre for treatment is slightly higher than Alternative B. Since this alternative has the least amount of commercial harvest it has the least amount of benefit to the regional economy and jobs. Alternative D also has a positive anticipated value above base rates (less than Alternative B and more than Alternative C), so the sale of commercial products is assumed to be viable. Trust funds can be expected to fund less work for vegetative treatments with additional reliance on appropriated monies; this alternative has the highest risk of not being funded.

Effects Common to all Action Alternatives

Cumulative Effects – Alternatives B, C, and D

Many factors influence and affect local economies, including changes to industry technologies, economic growth, international trade, and the economic diversity and dependency of the counties. This project is not expected to add to any existing cumulative effects. However, jobs and income associated with implementing the action alternatives may bring the local economy some increased relative stability during the life of the project. None of the alternatives restrict or alter opportunities for subsistence hunting and fishing by Native American tribes.

FINDINGS OF CONSISTENCY

Implementation of any alternative would be consistent with Forest Plan standards and guidelines. 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.

The Forest Plan includes a forest-wide management goal (USDA Forest Service, 1990) to:
Provide for production and sustained yield of wood fiber insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency (Forest Plan p. 4-2).

It also includes forest-wide management objectives to*:* Provide an even flow of timber products to help support local industry, maintain a healthy diverse timber resource, improve or maintain wildlife habitat, salvage dead timber, control insects, and disease, and reduce natural fuel loading. Utilize small diameter material and sawlog by-products. Commercial harvest for firewood and other small products would be used to accomplish timber stand improvement where appropriate. Provide direct and indirect employment opportunities through personnel programs and through jobs created by user groups as they utilize National Forest resources (Forest Plan pages 4-67 to 4-76).

INVENTORIED ROADLESS AREAS (IRAs) POTENTIAL WILDERNESS AREAS (PWAs) AND OTHER UNDEVELOPED LANDS

This section incorporates by reference the South George IRA. PWA, and Other Undeveloped Lands 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. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

INTRODUCTION

This section of the EIS discloses the affected environment and environmental consequences for, inventoried roadless areas (IRAs), potential wilderness areas (PWAs), and other remaining undeveloped lands. These three resource topics (IRA, PWA, other undeveloped lands) are grouped and discussed together because they share a complicated set of terminology and interrelated history. Appendix H and Appendix I of this EIS discloses additional narrative and maps in support of this topic.

During public involvement for this project, and in past similar projects, a wide range of terms have been used by respondents, the courts, and the Forest Service when referring to these topics such as roadless, inventoried roadless area, unroaded, uninventoried roadless, potential wilderness area, undeveloped lands, and roadless expanse.

From the mid-1970s through 2001 the Forest Service maintained a roadless area inventory of undeveloped lands that we used and updated for RARE, RARE II, and in support of Land and Resource Management Planning completed in 1990. All during that time we called these polygons “roadless areas” or “inventoried roadless areas” (IRA). With completion of the Roadless Area Conservation Rule (RACR) in 2001 these lands ceased being just an inventory, and IRAs became more of a designation, with fixed boundaries and prohibitions set by Forest Service regulation (36 CFR 294). Confusion ensued because two Forest Service maps used the same name; IRA. One map had fixed boundaries set by the RACR and another map had changeable boundaries based on inventory criteria.

To address this situation, the Forest Service created a new term for their inventory of undeveloped lands called “potential wilderness areas” (PWA) to make a clear distinction between the IRA term used by the 2001 RACR. This terminology addition was made policy by changing the 2006 handbook for wilderness evaluation (FSH 1909.12 Chapter 70) and is also reflected in the 2008 Forest Service NEPA regulations (36 CFR 220). In the regulations, potential effects to ‘inventoried roadless areas’ and ‘potential wilderness areas’ are factors in determining whether a CE, EA, or EIS is the appropriate NEPA document for a particular project. The term ‘other undeveloped lands’ is presented and used in this document to provide a consideration for the balance of those remaining lands that did not meet the inventory criteria for a PWA, were not designated an IRA under the RACR, and do not contain roads and evidence of timber harvest (see definitions below).

To resolve this confusion the Forest Service uses its discretion to rely on agency policy, agency definitions of terms, and agency procedures for the inventory of resources and facilities. Inventory criteria and procedures for potential wilderness areas are found in Forest Service Handbook 1909.12, Chapter 71.

The terms and definitions as stated below will be used in this site-specific analysis. The following four resource topics are based on current law, regulation, agency policy, and the Umatilla Land and Resource Management Plan (Forest Plan), as amended.

1. **Wilderness**: A wilderness area is designated by congressional action under the Wilderness Act of 1964 and other wilderness acts. Wilderness is undeveloped Federal land retaining primeval character and influence without permanent improvements or human habitation (Umatilla Forest Plan, page GL-45).

2. **Inventoried Roadless Area (IRA**): These areas were identified in the 2001 Roadless Area Conservation Rule in a set of inventoried roadless area maps, contained in Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps (36 CFR 294.11). These areas were set aside through administrative rulemaking and have provisions, within the context of multiple use management, for the protection of inventoried roadless areas. Most IRA boundaries are substantially identical to those identified as 'Roadless Areas', referred to in the 1982 planning rule (36 CFR 219.17) and identified by the Forest Plan, FEIS, Appendix C; however some localized, minor differences in boundaries may exist.

   All roadless area acres were allocated to various management area strategies as disclosed in the Umatilla Forest Plan FEIS, Appendix C and described in the Record of Decision (page 6-9) for the FEIS. Some management area strategies were intended to retain the undeveloped roadless character of the roadless area and some management area strategies were intended to develop the lands with timber harvest and road building activities; thus forgoing roadless character.

3. **Potential Wilderness Area (PWA)**: Areas of potential wilderness identified using inventory procedures found in Forest Service Handbook (FSH) 1909.12, Chapter 71 are called potential wilderness areas (PWAs). The inventory is conducted by the Forest Service with the purpose of identifying potential wilderness areas in the National Forest System. The National Forest System Land and Resource Management Planning Rule (currently the 1982 Rule, 36 CFR §219.17) directs that roadless areas be evaluated and considered for wilderness recommendation during the forest planning process.

   PWAs are not a land designation decision, they do not imply or impart any particular level of management direction or protection, they are not an evaluation of potential wilderness (Chapter 72), and lastly they are not preliminary administrative recommendations for wilderness designation (Chapter 73). The inventory of PWAs does not change the administrative boundary of any inventoried roadless area (IRA).

   Typically, PWAs substantially overlap, and/or are contiguous with IRAs, and can be considered as an IRA/PWA. PWAs may also be contiguous with designated wilderness areas. Some newly inventoried PWAs may be stand alone areas that were not identified as 'roadless areas' in Appendix C of the 1990 Umatilla Forest Plan and 'inventoried roadless areas' as identified in a set of maps in the 2001 Roadless Area Conservation Rule (RACR). PWAs overlap inventoried roadless areas only where those acres of land are consistent with the inventory criteria (FSH 1909.12 Chapter 71) and may extend beyond IRA and wilderness boundaries consistent with inventory criteria.

4. **Other undeveloped lands**: These acres of land have no history of harvest activity, do not contain forest roads[21], and are not designated as a wilderness area or inventoried as a potential wilderness area.

The USDA Forest Service, Pacific Northwest Region (Region 6) covers approximately 27.2 million acres within the states of Oregon and Washington. This represents approximately 27 percent of the total acreage of both states combined. These 27.2 million acres are allocated and managed based on the land allocations designated within the respective National Forest Land and Resource Management Plan. However, two types of land designations are overriding and common among all units within the region (indeed the nation), these are the management of congressionally designated Wilderness areas and the management of Inventoried Roadless Area. In Region 6, there are approximately 4 million acres of Inventoried Roadless Areas (15%) and approximately 5 million acres of Wilderness (18%).

Umatilla National Forest is one of 16 administrative units that manage National Forest System lands within the Pacific Northwest Region. Umatilla National Forest covers approximately 1.4 million acres and is situated in the northeastern corner of Oregon and southeastern corner of Washington State. Umatilla National Forest contains approximately 303,000 acres of wilderness (21%) and about 282,000 acres of Inventoried Roadless Areas (20%). Umatilla National Forest consists of four Ranger Districts one of which is the Pomeroy Ranger District.

Pomeroy Ranger District is about 366,000 acres in size and contains approximately 177,500 acres of designated Wilderness (48%) and about 69,000 acres of Inventoried Roadless Areas (19%). South George project planning area occurs along the eastern portion of Pomeroy District and is not adjacent to the Wenaha-Tucannon Wilderness. South George project planning is separated from the Asotin Creek and Wenatchee Creek IRAs by existing main access system roads. The site specific analysis for South George project identified approximately 8,785 acres of lands that had no history of development and were subsequently classified using the criteria discussed later in this section and Appendix H.

[21] **Forest road** - A road wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. Road – A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR§212.1).

Table 3-81 displays a contextual display of these areas discussed above.

Table 3-81 Contextual Display of Wilderness and Roadless Areas in PNW Region, Umatilla NF, Pomeroy RD, and South George Project Planning Area

Unit	Acres	Percentage
Pacific Northwest Region	27.2 million	27%[22]
• Wilderness	5 million	18%
• Inventoried Roadless Area	4 million	15%
Umatilla National Forest	1.4 million	5%[23]
• Wilderness	303,000	21%
• Inventoried Roadless Area	282,000	20%
Pomeroy Ranger District	366,000	26%[24]
• Wilderness	177,500	48%
• Inventoried Roadless Area	69,000	19%
South George Project Planning Area	21,000	6%[25]
• Wilderness	0[26]	0%
• Inventoried Roadless Area	0	0%
• PWAs	0	0%
• Other lands that have undeveloped character	8,785[27]	42%

[22] Percentage represents the portion (acres) of both Oregon and Washington that are National Forest System lands.
[23] Percentage represents the portion (acres) of US Forest Service Pacific Northwest Region that is managed by Umatilla National Forest.
[24] Represents the portion (acres) of Umatilla National Forest that is managed by Pomeroy Ranger District
[25] Represents the portion (acres) of Pomeroy Ranger District that occurs within the boundary of South George project planning area.
[26] Wenaha Tucannon Wilderness does not occur within South George project planning area.
[27] This number reflects the acreages of other undeveloped lands.

BACKGROUND

Oregon Wild submitted written comments (April 1, 2009) about what they called "roadless areas" and "uninventoried roadless areas" during the scoping period for South George Vegetation and Fuels Management Project EIS. Their letter included a map with a polygon they identified as "South Fork Asotin Creek roadless area." In their letter they requested that the NEPA analysis clearly state what activities are planned within any portion of the roadless area they had identified. Oregon Wild did not provide information on the inventory criteria they used to develop their map.

Confusion surrounds this issue because there are conflicts between Forest Service maps and the map presented by Oregon Wild. Their map of a roadless area has its own history of genesis. Confusion continues when Oregon Wild in their letter of April 1, 2009 asked the Forest Service to fully analyze any effects to roadless areas and roadless values on lands the Forest Service determined do not meet agency inventory criteria.

In a related example, this EIS discloses impacts to a number of resources sensitive to the construction of temporary roads. A road is defined and criteria and methods for inventorying a road conform to agency policy. Definitions and inventory criteria do not change project to project, Forest to Forest; they are common agency-wide. It would not be reasonable for a single individual or group to assert their own definition of a road or how to inventory a road system and then ask the Forest Service to disclose the impacts of 'their road system' on resources present such as elk habitat, fish habitat, or potential wilderness areas. Further, it is unreasonable to consider one version of inventoried forest roads to analyze impacts to elk and fish habitat and then apply a second version of roads in another analysis (PWA, undeveloped lands) within the same EIS. Inventories of resources and facilities in support of the South George project have been predicated on agency policy and procedures. The situations described above confound our ability to conduct a clear and meaningful effects analysis for the "roadless" issue in the South George project planning area.

To resolve this confusion the Forest Service uses its discretion to rely on agency policy, agency definitions of terms, and agency procedures for the inventory of resources and facilities. Inventory criteria and procedures for potential wilderness areas are found in Forest Service Handbook 1909.12, Ch 71. The application of these procedures used for analysis of the South George project is found in Appendix H of this EIS.

There are no designated wilderness areas within or contiguous to South George project planning area. Asotin Creek and Wenatchee Creek IRAs (for this document they are referred to as IRAs/PWAs) are separated from the project planning area by existing main access forest system roads (FRs 4400, 4300, and 4304).

ASOTIN CREEK AND WENATCHEE CREEK IRAs/PWAs

On Umatilla National Forest most inventoried roadless areas (IRAs) are potential wilderness areas (PWAs), but not all acres in an IRA[28] may meet PWA inventory criteria (FSH 1901.12, Chapter 71). This situation may have occurred because the lands within the IRA were allocated to a Forest Plan management area that provided for timber harvest and road construction (FP ROD p. 8 and FP p. 3-5). Therefore, past management activities on some acres within IRAs may now have stumps and skid trails or roads that are substantially recognizable, or have acres where clear-cuts have not regenerated to the

[28] Not meeting PWA inventory criteria does not change the status of an area as an IRA, nor does it change the boundary of an IRA as identified in maps in the 2001 RACR.

degree that canopy closure is similar to surrounding areas. Maps in Appendix H depict Asotin Creek and Wenatchee Creek as IRAs/PWAs.

Wenatchee Creek (about 15,315 acres) and Asotin Creek (about 16,432 acres) roadless areas are identified and mapped in Appendix C of the Umatilla Forest Plan and are also identified in the set of maps for inventoried roadless areas (IRAs) in the Forest Service Roadless Area Conservation FEIS, Volume 2, and dated November 2000. There are no meaningful differences between the boundaries of the Wenatchee Creek and Asotin Creek roadless areas identified in Appendix C of the Forest Plan and the 2001 Wenatchee Creek and Asotin Creek inventoried roadless area boundaries. Overall resource management addressed by the Umatilla Forest Plan (FP) is comprised of management goals, objectives, Forest-wide standards and guidelines (FP p. 4-1 to 4-93), and management area allocations (FP p. 4-94 to 4-195). The roadless area issue is primarily addressed in the Forest Plan is through management area allocations (FP ROD p. 8 and FP p. 3-5).

Asotin Creek and Wenatchee Creek IRAs/PWAs are not part of the environmental effects analysis for this project because both IRAs/PWAs are separated from the project planning area by existing main access forest system roads (FRs 4400, 4300, and 4304) and no management activities would occur in these IRAs/PWAs. There would be no direct effects from any project activity to either IRA/PWA. Ongoing activities of general road maintenance including removal of danger trees, and existing sights and sounds would continue with usage of these main access roads. Any smoke produced from prescribed fire treatments in the area would comply with Washington State Department of Natural Resources (DNR) Smoke Management Plan (see Air Quality section above).

POTENTIAL WILDERNESS AREA INVENTORY
Appendix H and Appendix I

Appendix H of this document 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.

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 criteria found at Forest Service Handbook (FSH) 1909.12, Chapter 71.

These polygons of other undeveloped lands 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. These polygons identified as other undeveloped lands are displayed in Map H-5 and Table H-1B located in Appendix H.

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). The descriptions of

environmental effects to the intrinsic physical and social values disclosed in this chapter for other undeveloped lands applies to the acres of Oregon Wild's polygon that overlap with Forest Service inventoried other undeveloped lands as displayed in maps located in Appendix I. There are also maps in Appendix I that show the relationship of Oregon Wild's polygon to activities proposed in action Alternatives (B, C, and D).

OTHER UNDEVELOPED LANDS

BACKGROUND

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). 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.

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).

The descriptions of environmental effects to the 'intrinsic physical and social values' disclosed in the section below for other undeveloped lands also applies to the acres in Oregon Wild's map with their identified polygon in relation to other undeveloped lands.

Temporary road construction, timber harvest, natural fuels treatments, and prescribed fire are proposed within these other undeveloped lands.

SCALE OF ANALYSIS

The scale of analysis is represented by the South George project planning area, approximately 21,000 acres.

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.

Indicators of comparison between alternatives are:

- Intrinsic physical and biological resources (soils, water, wildlife, recreation, fisheries, etc.)
- Intrinsic social values (apparent naturalness, solitude, remoteness)
- Change in acres of other undeveloped lands

AFFECTED ENVIRONMENT

Table 3-82 below displays the acres of remaining other undeveloped lands within South George project planning area along with references to maps in Appendix H for a visual representation. In South George project planning area (approximately 21,000 acres) there are approximately 8,785 acres (about 43% of the project planning area) that have been identified as isolated polygons of other undeveloped lands. The remaining approximately 11,815 acres (about 57% of the project planning area are developed and managed lands (contain evidence of past harvest and forest roads). Individual polygons of other undeveloped lands less than an acre were eliminated from further study because no special or unique resource values were identified and the description of effects to individual pieces of land less than one acre are better disclosed as part of the other resource effects section in this EIS.

Following is a summary table of the potential wilderness inventory for this project as displayed in Appendix H.

Table 3-82 Potential Wilderness Area Inventory Summary

	Approximate Acres
Total Acres Inventoried Map H-1	21,000
Acres Removed from inventory (past harvest) Map H-2	*6,890
Acres removed from inventory (roads) Map H-3	*4,925
Acres identified as Other Undeveloped Lands Map H-4	**8,785
Acres of Potential Wilderness Areas identified within the project planning area Map H-5	None (0)
*Acres that overlapped were not considered in this figure. ** This number does not include polygons less than one acre in size.	

Table 3-83 below displays the number, size class, and approximate acres represented in polygons of other undeveloped lands. Approximately 90 percent of the polygons are in the 1 to 99-acre size class. For perspective, one square mile is about 640 acres, Wenatchee Creek IRA/PWA is about 15,315 acres, Asotin Creek IRA/PWA is 16,432, and the closest designated wilderness area (Wenaha-Tucannon) is over 176,754 acres. The residual shape of each undeveloped polygon is the result of boundaries created by past harvest and road building. 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.

Table 3-83 Size Class and Acres of Other Undeveloped Lands in the Project Planning Area

Number of Polygons	Size Class	Approximate Acres
64	1 to 99 acres	787
3	100 to 499 acres	399
1	500 to 999 acres	993
3	1,000 to 4,999 acres	6,606
None	>5,000 acres	None

The majority of the approximately 8,785 acres of other undeveloped lands are allocated to Forest Plan management areas C1- Dedicated Old Growth, C3-Big Game Winter Range, and C3A-Sensitive Big

Game Habitat, C4-Wildlife Habitat, and C5-Riparian and Wildlife. The following table shows a summary of management area allocations in the four largest polygons of undeveloped lands.

Table 3-84 Summary of Forest Plan Management Area Allocations in Polygons 1, 2, 3 and 4

Management Area (MA)	Polygon 1 (4,440 acres)	Polygon 2 (995 acres)	Polygon 3 (1,115 acres)	Polygon4 (1,055 acres)
C1-Old Growth	520 acres	0 acres	305 acres	0 acres
C3-Big Game Winter Range	98 acres	74 acres	0 acres	0 acres
C3A- Sensitive Big Game Winter Range	670 acres	921 acres	0 acres	0 acres
C4- Wildlife Habitat	2,685 acres	0 acres	730 acres	850 acres
C5-Riparian	467 acres	0 acres	80 acres	205 acres

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.

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.

Human influences have had limited impact to long-term ecological processes within other undeveloped lands. Disturbance by insects and fire has been and most likely would continue to be the factors with the most potential to impact the area. Opportunities for primitive recreation are limited to hiking, mostly cross-country, and hunting. Ongoing firewood gathering and removal of danger trees along forest roads that border each polygon changes the vegetation, leaves stumps, and presents a managed appearance within a developed transportation corridor.

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 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, non-conforming 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.

Affected environment for other undeveloped lands as described above is the same for the 3,485 acres polygon submitted by Oregon Wild that overlaps with Forest Service identified other undeveloped lands polygons displayed in Appendix I.

The existing condition of approximately 11,815 acres of developed lands within South George project planning area and affected by proposed activities presents a landscape that has been managed and is generally developed in nature; these lands contain evidence of past harvest and forest roads. Past management actions and current conditions within these acres reflect the multiple-use intent and decisions made in the Forest Plan (1990 as amended), and reflects consistency with Forest Plan management area allocations.

Descriptions of the affected environment for the approximately 11,815 developed acres also applies to the approximately 485 acres of Oregon Wild's polygon that do not overlap with Forest Service polygons of other undeveloped lands displayed in Appendix H; map H-5 and Appendix I.

ENVIRONMENTAL CONSEQUENCES

Alternative A - No Action

Direct/Indirect Effects – Alternative A

There would be no direct effects to undeveloped lands because no activities would occur in these areas. The affected environment would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would continue. The landscape would likely continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within upland forest stands which would result in larger acreages of blackened landscapes compared to prescribed fires. Some forest visitors may avoid blackened landscapes until green vegetation returns after 3 to 5 years. Fire is a natural occurrence and expected disturbance process in this landscape. All polygons of other undeveloped lands (8,785 acres) 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.

Cumulative Effects – Alternative A

For the No Action alternative, South George project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action Alternative.

Effects Common to All Action Alternatives

Direct/Indirect Effects (Alternatives B, C, and D)

Timber harvest would occur on approximately 1,405 acres of other undeveloped lands. Associated activities (mechanical, RHCA mechanical, and hand thinning) in Alternatives B and C would occur on approximately 225 acres and landscape prescribed fire would occur on about 1,805 acres of other undeveloped lands. If Alternative B were implemented approximately 1.7 miles of temporary road would be constructed in other undeveloped lands to facilitate haul. There would be no temporary road constructed in other undeveloped lands if Alternative C were implemented.

If Alternative D were implemented there would be approximately 955 acres harvested in other undeveloped lands and approximately 1.16 mile of temporary road constructed to facilitate access and haul. Associated activities (mechanical, RHCA mechanical, and hand thinning) in Alternative D would occur on approximately 225 acres and landscape prescribed fire on about 1,805 acres of other undeveloped lands.

Maps H-6, H-7, and H-8 in Appendix H display the location of activity units and other undeveloped lands. Appendix B of this document displays a listing of harvest activity units, logging methods and additional information. Table 3-85 below is a summary of acres of activities and miles of temporary road construction proposed under each action alternative that occurs within other undeveloped lands.

Table 3-85 Proposed Activities in Other Undeveloped Lands by Action Alternative

Activities within Other Undeveloped Lands	Alternative B	Alternative C	Alternative D
Commercial Harvest and associated activity fuels treatments	1,405 acres	1,405 acres	955 acres
Natural Fuels Treatments (mechanical, manual, RHCA)	225 acres	225 acres	225 acres
Landscape Prescribed Fire	1,805 acres	1,805 acres	1,805 acres
Temporary Road Construction	1.7 miles	None	1.16 miles
Danger tree removal	Yes – as needed	Yes – as needed	Yes – as needed

The descriptions of environmental consequences to the 'intrinsic physical and social values' of other undeveloped lands also applies to the 3,485 acres of Oregon Wild's submitted polygon that overlap with the polygon of other undeveloped lands displayed in Appendix I; maps I-OW-AltB, I-OW-AltC, I-OW-AltD.

The environmental consequences to the approximate 11,815 remaining acres of developed land within South George project planning area that are not IRAs/PWAs and not other undeveloped lands are disclosed throughout all other resource sections of this chapter. The descriptions of environmental consequences to the remaining developed acres also applies to the 485 acres of Oregon Wild's polygon that do not overlap with other undeveloped lands polygons displayed in Map H-5 in Appendix H, and maps in Appendix I.

Environmental effects to the acres listed above in Table 3-85 and the physical, biological, and social values within them are described below.

Intrinsic physical and biological resources (soils, water, wildlife, recreation, fisheries, etc.)

For other undeveloped lands within South George project planning area where proposed timber harvest, mechanical fuel treatments, temporary road construction, and prescribed fire activity would occur, the impacts to soil, water quality, air quality, forage; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources, etc. are essentially the same as disclosed for areas of proposed project activity in previous sections of this chapter and are not reiterated here.

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 (see previous sections of this chapter for Findings of Consistency for each resource).

Intrinsic social values (apparent naturalness, degree of solitude, sense of remoteness

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 short-term (about 5 to 10 years). Effects such as closed roads, skid trails, and tree stumps would be evident much longer.

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.

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. Table 3-86 is a summary showing the changes in acres for other undeveloped lands by alternative.

Table 3-86 Changes in Undeveloped Lands in South George Project Planning Area by Alternative

Alternative	Undeveloped Acres After Implementation	Acres changed (harvest and mechanical fuels treatments	Percent of Area* After Implementation	Percent Change	Developed** Acres After Implementation
A (No Action)	8,785	No change	42%	No change	11,815
B	7,155	(-1,630)	34%	(-8%)	13,445
C	7,155	(-1,630)	34%	(-8%)	13,445
D	7,605	(-1,180)	36%	(-6%)	12,995

*approximately 21,000 acres within the project planning area is 100 percent
**Developed defined here as managed acres that contain evidence of past harvest and forest roads
Currently there are approximately 8,785 acres of other remaining undeveloped land within planning area (Table 3-82).
Currently there are approximately 11,815 acres of developed lands within planning area (Table 3-82)

Cumulative Effects (Alternatives B, C, and D)

For other undeveloped lands in which project activities would occur the cumulative effects to soil, water quality, air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources are disclosed in previous sections of this chapter and are not reiterated here.

In the project planning area the increased numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. In the long-term (about 50 plus years), the project would result in the development of historical open, park-like conditions, characterized by larger diameter trees, though more stumps would be present than currently exist.

Prescribed burning (including ongoing and reasonably foreseeable) and future wildfires would cumulatively change composition and structure of vegetation which could affect some forest visitor's sense of naturalness and remoteness. For a few years burned areas would display a blackened color. Outside the burned areas, the conditions described in the affected environment would remain unchanged except by natural processes and ongoing management activities such as grazing and hunting.

Apparent naturalness and solitude and remoteness would be cumulatively impacted by grazing, dispersed camping, and motorized ATV and vehicle use on roads. Effects associated with recreational use, including noxious weed spread, hunting, fishing, erosion, litter, and evidence of fire rings, are expected to remain cumulatively minor. Ongoing removal of danger trees along forest roads changes the vegetation but does not change the overall sense of naturalness or sense of solitude along an existing developed transportation corridor. Overall, cumulative impacts from these activities on apparent naturalness, solitude and remoteness is very small (not measurable/indistinguishable) in proportion to the changes anticipated from the direct and indirect impacts of the alternatives disclosed above.

FINDINGS OF CONSISTENCY

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.

SPECIFICALLY REQUIRED DISCLOSURES

This section describes how the action alternatives comply with applicable state and Federal laws, and Forest Service policies and regulations.

National Historic Preservation Act –Heritage surveys have been completed. State Historic Preservation Office consultation was conducted under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and Washington State Historic Preservation Officer regarding Cultural Resource Management on National Forests dated April 1997. Identified sites and any newly recorded sites are protected from all project activities associated with South George Vegetation and Fuels Management Project (Chapter 2, Table 2-5). Because heritage resources would not be affected by proposed activities under any action alternative, there would be no effect to any historic property listed in or eligible to the National Register of Historic Places.

Endangered Species Act and Regional Forester's Sensitive Species - The Endangered Species Act requires protection of all species listed as "Threatened" or "Endangered" by Federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). The Forest Service also maintains through the Federal Register a list of species which are proposed for classification and official listing under the Endangered Species Act, species which appear on an official State lists, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists. Biological Evaluations have been completed for all TE&S plant, aquatic and terrestrial wildlife. Details are found in the Fisheries, Plants, and Wildlife sections of this chapter, and Appendix F.

Wild and Scenic River Act – There are no Wild and Scenic Rivers within the project area. No designated or potential wild and scenic river sections would be affected by implementation of any alternative.

Prime Farmland, Range Land, and Forest Land - No adverse effects on any prime farmland, range land and forest land not already identified in the Final FEIS for the Forest Plan would be expected to result from implementation of any alternative.

Civil Rights, Women, and Minorities - No adverse effects on civil rights, women, and minorities not already identified in the FEIS for the Forest Plan would be expected to result from implementation of any alternative. Alternatives B, C, and D would be governed by Forest Service contracts, which are awarded to qualified contractors and/or purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements.

National Forest Management Act Compliance – The National Forest Management Act of 1976 (P.L. 94-588), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378), states that when trees are cut to achieve timber production objectives, the cuttings shall be made in such a way that "there is assurance that such lands can be adequately restocked within 5 years after harvest" (P.L. 93-378, Sec. 6, (g), (3), (E), (ii)). See Appendix C, pp. C-9 to C-10.

This reforestation policy is based specifically on language from the National Forest Management Act of 1976 (P.L. 94-588), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378): "Sec. 3 (d) (1) It is the policy of the Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans."

Treaty Trust Responsibilities - In this analysis, the primary focus of the federal government Trust Responsibility is the protection of the treaty rights and interests that tribes reserve on land included in this project. The Nez Perce Tribe has treaty rights and interests in the South George area.

For this project, a government to government scoping letter was sent to tribal staff members of the Nez Perce Tribe on March 2, 2009, informing them of the South George proposed project and requesting any comments or concerns regarding this proposed project. Pomeroy's District Ranger presented the District's Program of Work to Nez Perce tribal staff members on May 23, 2011, and November 7, 2011. At these meetings, projects are presented and an offer is made by the District Ranger to respond to any questions or present any additional information requested on a project. No specific comments or concerns for South George project were presented by tribal staff members after the government to government consultation scoping letter or Program of Work meetings. Tribal staff members have identified for similar past projects the rights they believed most at risk. Of major concern are potential effects on Treaty rights, fish habitat and populations, water quality, and protection of archaeological sites, traditional cultural properties, and first foods resources.

Cultural Resource surveys were conducted to locate cultural sites and gather the information necessary to evaluate historic properties. Identified sites and any newly recorded sites would be protected from all project activities associated with the South George Vegetation and Fuels Management Project (Chapter 2, Table 2-5). A Project Review for Heritage Resources under the terms of the 1997 Programmatic Agreement between ACHP, SHPO, and USFS R6, has been completed (3/24/11). A No Effect determination was made.

Timber harvest has the potential to negatively affect water quality and thus indirectly aquatic habitat. The effects of harvest and associated activities on water quality are discussed in the Hydrology section in this

chapter. It was found that effects of the action alternatives would not adversely or measurably affect water quality. The action alternatives were designed to prevent damage to RHCAs. Riparian and channel components that protect water quality would be maintained. Other design criteria and BMPs would control disturbance that could lead to erosion and sedimentation.

The effects of harvest and associated activities on aquatic species and habitats are found in the Fisheries section. It was determined that action alternatives may effect – not likely to adversely affect threatened species and may impact some sensitive species (see Table 3-15).

Based on the information summarized above, it is reasonable to assume that treaty rights would be protected during implementation of the proposal.

Roads Analysis - A Forest-wide Roads Analysis was completed in March 2004 on the Umatilla National Forest. The forest scale analysis addressed only those National Forest System Roads maintained for passenger car traffic, arterial, and collector roads. South George project planning area has arterial, collector, and local roads. These roads are seasonally opened or are closed system roads. A site-specific project Roads Analysis containing a road risk value for each road was completed for this project and is located in the project file. This project analysis also includes maps showing the risk value for each road and the operational maintenance level of each road in the project planning area (also see Appendix G). A summary list of miles of roads used as haul routes for each alternative and other proposed road activity such as temporary road construction, and proposed decommissioning of roads in Alternative C is found in Table 2-11 and Appendix G. No new road construction is proposed for this project.

Floodplains, Executive Order 11988 – Executive Order (EO) 11988 requires the Forest Service to avoid "to the extent possible the long and short term adverse impacts associated with the occupation or modification of floodplains…" The proposed alternatives would avoid all floodplains and affects to floodplains and is consistent with this EO.

Wetlands, Executive Order 11990 - Executive Order (EO) 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands." The proposed alternatives would avoid all wetlands and affects to wetlands and is consistent with this EO.

Municipal Watersheds - There is no de-facto or designated municipal watershed in South George project planning area.

Energy Requirements - No adverse effects on energy requirements would be expected to result from implementation of any alternative.

Public Health and Safety - Public health and safety would be improved with Alternatives B, C, and D removing danger trees along open forest routes, haul routes, developed recreation sites, and administrative sites within South George project planning area.

Environmental Justice – No local minority or low income populations were identified during scoping or environmental effects assessment. No minority or low-income populations are expected to be affected by implementation of any of the alternatives, in accordance with Executive Order 12898.

OTHER RESOURCE CONCERNS AND OPPORTUNITIES

Probable Adverse Environmental Effects that Cannot be Avoided - There are no unavoidable adverse effects associated with implementing any of the alternatives that are not already identified in the FEIS for the Forest Plan (Chapter 4 pages IV 1- 15).

Congressionally Designated Areas - There are no Congressionally Designated Areas within the project area.

Research Natural Areas – There are no Research Natural Research Areas (RNA) within the project area.

Relationship Between Short-Term Use and Long-Term Productivity - Maintenance of healthy soils in terms of organic matter and structure is a key prerequisite to maintaining healthy ecosystems (Forest Health Report). Long-term productivity depends on maintaining the basic ecosystem resources and their function. For this project, implementation of standards and guidelines as outlined in the FEIS for the Forest Plan are designed to provide for continued long-term site productivity. However, there would be some short-term effects related to the implementation of any of the action alternatives (pages 3-8 to 3-14).

Irreversible and Irretrievable Commitment of Resources – Irreversible commitment of resources refers to a loss of future options with nonrenewable resources. Irretrievable commitment of resources refers to a loss of production of renewable resources.

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.

Potential Conflicts with Plans and Policies of Other Jurisdictions - There are no known conflicts with plans and policies of other jurisdictions associated with implementing the alternatives. The FEIS for the Forest Plan (Chapter 4, pages IV 226 - 227) discusses this in further detail.