FINAL ENVIRONMENTAL
IMPACT STATEMENT

Eastside Township Fuels and Vegetation Project

Volume I

April 2007

USFS

BLM

Cottonwood Field Office

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

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5000(420)

April 02, 2007

Dear Reader:

Enclosed for your review is the Final Environmental Impact Statement (EIS) for the Eastside Township Fuels and Vegetation Project located near Elk City, Idaho. The Final EIS has been prepared following a 60-day public review period in which public comments were received and modifications made to the EIS. Comments received on the Draft EIS and the responses to these comments are included in Chapter 4, section 4.5 of the Final EIS.

This document is being sent to those who either requested to be included in the project mailing list or submitted written comments. The EIS is also available on the Bureau of Land Management (BLM) website at: www.id.blm.gov/offices/cottonwood/index.htm.

The Final EIS discloses potential effects of the proposed action and the alternatives for fuel and vegetation treatments and restoration activities on approximately 1,200 acres of federal land in north central Idaho, administered by the BLM's Cottonwood Field Office. The Nez Perce National Forest (NPNF) is a Cooperating Agency on this project because BLM proposes to use and construct roads on the National Forest to implement the project.

Based on the analysis in the Final EIS, BLM and the NPNF expect to make decisions on this project in the spring of 2007. A Record of Decision will be published in a single Legal Notice in a newspaper(s) of local distribution. If the decision is to proceed with the project, implementation of portions of the project could begin as early as summer 2007.

This Final EIS is available for public review for a 30-day period following publication of the Notice of Availability by the Environmental Protection Agency in the *Federal Register*. Comments on the Final EIS can be sent to the address at the top of this letter, Attention: Eastside Project or send an email to robbin_boyce@blm.gov. Comments will be reviewed to determine if they have merit and if new information should be considered prior to issuing the Record of Decision. Comments will be most useful if they are specific, mention page numbers where appropriate, and cite sources when applicable. Comment letters and emails must include your complete name, address and phone number or they will not be considered. Anonymous comments will also not be considered.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

I would like to thank the individuals and organizations who participated in the development and review of this project. For additional information or clarification regarding this document, please contact Robbin Boyce, Project Lead, at (208) 962-3594.

Sincerely,

Acting Field Manager

Eastside Township Fuels and Vegetation Project

Final Environmental Impact Statement

1. Responsible Agency: United States Department of the Interior
   Bureau of Land Management
2. Type of Action: Administrative (X) Legislative ( )
3. Document Status: Draft ( ) Final (X)
4. Abstract: This Final Environmental Impact Statement describes and analyzes four alternatives for managing the public lands and resources, within the project area administered by the Bureau of Land Management's Cottonwood Field Office and the Nez Perce National Forest's Red River Ranger District, located in northern central Idaho, in Idaho County. BLM is the Lead Federal Agency and the NPNF is a Cooperating Agency on this project. BLM proposes to use and construct roads on the NF and, as a result of the analysis in this EIS, the NPNF may authorize the use and construction of identified roads.

   The Eastside Township Fuels and Vegetation Project (Eastside Project) was developed to address the forest health, fuels, safety, and watershed issues in the Elk City area. The four alternatives include Alternative A (the "no action" alternative), Alternative B (proposed action-preferred alternative), and Alternatives C and D, which are variations of Alternative B developed to respond to issues raised by the public. The project alternatives are designed to address declining forest health issues, accumulation of fuels due to fire suppression, and effects of historic activities such as road construction and mining. Restoration activities are being proposed to address watershed, water quality, and fisheries conditions, and a plan for improved public access. The alternatives address the need for an upward trend in fish habitat condition, as well as the economic and social well being of area users and local residents.
5. The Final EIS for the Eastside Project will be available for public review for 30 calendar days following publication of the Notice of Availability in the *Federal Register* by the Environmental Protection Agency.
6. For further information contact:

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Summary

The Bureau of Land Management, (BLM) Cottonwood Field Office of the Coeur d'Alene District, is the lead federal agency in preparing this Environmental Impact Statement (EIS). The Nez Perce National Forest (NPNF) is a Cooperating Agency for this project because access across NPNF lands may be needed to implement the BLM actions proposed in this area.

This EIS was prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EIS discloses the direct, indirect, and cumulative environmental impacts that would result from the three action alternatives and the no action alternative.

The project area is located in north central Idaho, near the southern part of the Idaho Panhandle in Idaho County, near the small, isolated town of Elk City, Idaho. The Eastside Township Fuels and Vegetation Project (Eastside Project) is located in the American River watershed, within the larger upper South Fork Clearwater River watershed (Appendix A, Map 1). The majority of the Elk City township occurs in the American River watershed and is completely surrounded by NPNF lands. The project area, which encompasses approximately 3,300 acres, borders the town of Elk City and surrounding wildland urban interface (WUI) areas. Actual BLM-administered acres to be treated total approximately 1,300.

Purpose & Need for Action

The BLM initiated the project to deal with the increasing fuel load resulting from the combined effects of long-term fire suppression and an ongoing mountain pine beetle epidemic in the Elk City area. Also, aquatic and riparian conditions in the area, particularly fish habitat, have been degraded, primarily by historic mining activities. The Chief Joseph Management Framework Plan (MFP) requires concurrent watershed restoration actions when implementing timber management activities of this scale, to improve the fish habitat conditions and to continue an upward trend. The purpose of this project is to:

- Reduce the risk of high-intensity wildland fire to life, property, and natural resources in the Elk City and surrounding WUI area;
- Manage forest stands to create conditions that will contribute to sustaining long-lived fire tolerant tree species;
- Design a public transportation system that provides safe travel routes for the public, while meeting watershed and fisheries management goals, in a cost effective manner;
- Create an upward trend in fish habitat condition;
- Contribute to the economic and social well being of area users and local residents; and
- Implement intensive forest management decisions from the MFP.

Proposed Action

The Eastside Township Fuels and Vegetation Project would reduce existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments. The proposed action is the preferred alternative. Vegetation manipulation includes removing mainly dead and dying trees and selectively harvesting live trees in both lodgepole pine and mixed conifer stands. Fuels treatments include biomass utilization, piling and burning, and prescribed burning. The project would treat approximately 1,293 acres requiring approximately 15.1 miles of temporary road construction. Upon completion of the project, including road decommissioning, there would be no net change of road density per square mile in the American River watershed and a decrease of 2.12 miles of permanent road in the project area.

The project implements watershed improvement activities that would provide for an upward trend in aquatic habitat and water quality. These include riparian planting, road decommissioning, relocation of road segments along the American River, stream crossing improvements (ford closures, ford hardening, and ATV bridge replacement), reconnection of Queen Creek to the American River, road to ATV trail

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Winter Rearing Habitat	Well below objective for all streams	Measurable short-term degradation (i.e., greater than 10%) predicted in Whitaker and Queen Creek	No measurable change predicted to existing condition in all subwatersheds	Measurable short-term degradation (i.e., greater than 10%) predicted in Whitaker Creek
Issue 8: The American River has been heavily affected by historic instream mining activities that have reduced fish habitat complexity, e.g., meanders, pools, large woody debris, and pool riffle ratios. Also roads are encroaching on the river channel and are impacting riparian/aquatic habitat.				
Pool riffle ratios & number of pools	Chronic sources of erosion/sediment such as stream fords, roads, and historic dredge mined areas would continue to contribute sediment to stream channels and subsequent pool filling. Existing non-point sediment sources would slowly recover over time and pool habitat would slowly improve.	Would reduce chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels. Less change than alternative C, but greater than alternative D.	Would reduce chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels. Greatest beneficial change of alternatives.	Would reduce chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels. Less change than alternative C, and B.
Issue 9: Proposed stream reconnect and ATV bridge construction activities may affect stream channels and processes. ATV bridge construction has the potential to cause increased sediment delivery to streams in the analysis area and a take of some fish species.				
Fords eliminated	No Change, 2 fords remain on American River, 1 ford remains on Kirks Fork	Middle American River Ford hardened, Lower American River and Kirks Fork fords eliminated.	Middle American River, Lower American River and Kirks Fork fords eliminated.	Same as Alternative C.

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Fisheries – Issue 6: Proposed riparian planting and streambank re-contour activities affect fish and fish habitat by increasing streamside shading and the number of trees that may fall into the stream channels, and affect 303(d) listed streams.				
Large woody debris & Stream Temperature	Expect increased LWD with increased dead and dying lodgepole pine or other trees falling into streams. Lack of vegetation/fuels treatments may contribute to continued accumulation of fuels, potentially resulting in more severe wildfires, which, depending on size, severity, and location, could affect water temperature.	Restoration activities should decrease stream temperature in the long-term with growth of streamside trees and shrubs, and subsequent increased shading. No timber harvest occurs within any RHCAs. Negligible risk of causing adverse impacts from harvest/fuels activities.	Same as Alternative B	Same as Alternative B
Fisheries – Issue 7: Proposed streambank re-contour, harvest, road construction, road reconstruction, and road decommissioning activities have the potential to cause increased sediment delivery to streams in the analysis area, decreasing quantity and quality of spawning, rearing, and over-wintering fish habitat for Federally listed and BLM sensitive species.				
Cobble embeddedness	Amount currently above BO standard all streams	Measurable short-term degradation (i.e., greater than 10%) predicted in Lower Am. River and Queen Creek	No measurable change predicted (i.e., less than 10%) to existing condition in all subwatersheds	Same as Alternative C
Summer Rearing Habitat	Above or near objective for all streams	No measurable change predicted (i.e., less than 10%) to existing condition in all subwatersheds	Same as Alternative B	Same as Alternative B

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Watershed – Issue 5: Proposed activities may increase erosion and sediment yield, which could impair fish habitat, and affect 303(d) listed streams.				
Percent over base sediment yield by subwatershed	No change to slight decrease in some subwatersheds	East Fork Am. River, Little Elk Creek – No increase. Middle Am. River, Kirks Fork, Lower Elk Creek <5 % increase. Lower Am. River 7% increase. Whitaker Creek, Box Sing Creeks 26% increase. Queen Creek 22% increase. Whitaker and Queen approaching thresholds set in MFP All increases short term returning to pre-project levels within 5 years except Mid. Am. And Lower Am. River subwatersheds that decrease to below pre-project levels due to reduction in chronic sources through restoration	East Fork Am. River, Little Elk Creek – No increase. Middle Am. River, Kirks Fork, Whitaker Creek, Queen Creek, Lower Elk Creek, Lower Am. River <5 % increase. Box Sing Creek 26% increase. All increases short term returning to pre-project levels within 5 years except Mid. Am. And Lower Am. River subwatersheds that decrease to below pre-project levels due to reduction in chronic sources through restoration	East Fork Am. River, Little Elk Creek – No increase. Middle Am. River, Kirks Fork, Queen Creek, Lower Elk Creek, Lower Am. River <3 % increase. Whitaker Creek, Box Sing Creeks 26% increase. Whitaker approaching thresholds set in MFP All increases short term returning to pre-project levels within 5 years except Mid. Am. And Lower Am. River subwatersheds that decrease to below pre-project levels due to reduction in chronic sources through restoration

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Watershed – Issue 4: Proposed vegetation treatment activities may increase water yield and change timing and duration of peak runoff, thereby decreasing stream channel stability.				
Equivalent Clearcut Area % by subwatershed	All nine subwatersheds below 15% ECA	All below 15% except Whitaker at 17%, and Queen at 18%. Risks considered negligible in all subwatersheds because of existing good channel stability	All below 15% except Whitaker at 16%, and Queen at 18%. Risks considered negligible in all subwatersheds because of existing good channel stability	All below 15% except Whitaker at 16%, and Queen at 18%. Risks considered negligible in all subwatersheds because of existing good channel stability

Table 0.2 Comparison of the Effects of the Eastside Project Alternatives on the Major Issues and Their Indicators

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Hazardous Fuels – Issue 1: Proposed fuel/vegetation activities are not needed and are ineffective in protecting communities, structures, and reducing the effect of wildfire across the landscape. The dead and dying lodgepole pine in the project area are a natural and periodic occurrence. **Hazardous Fuels – Issue 2**: Proposed fuel/vegetation activities are needed to protect the community of Elk City, the American River Subdivision, other subdivisions in the project area, and the natural resources in the area. The large amount of dead and dying lodgepole pine is creating an unacceptable hazard. Doing nothing is irresponsible.				
Area of future fuel model 8 and 8/10	355 acres 17%	1,036 acres 48%	1,036 acres 48%	957 acres 45%
Future area with low flame length potential, <4′	112 acres 5%	472 acres 21%	472 acres 21%	472 acres 21%
Future area with surface fire potential	227 acres 10%	768 acres 35%	768 acres 35%	725 acres 33%
Future area with potential tree mortality <50%	237 acres 11%	644 acres 29%	644 acres 29%	573 acres 26%
Area dominated by lodgepole pine	1,670 acres 53%	879 acres 28%	879 acres 28%	942 acres 30%
Watershed – Issue 3: Proposed road construction, road reconstruction, road decommissioning, and conversion of roads to ATV trails affect water quality in the short and/or long term.				
Total post project road density American River	2.3	2.3	2.3	2.3
Decreased Road miles in RHCAs	0	2.55	3.70	3.57
New miles permanent construction	0	.57	1.13	.56
Miles temporary road construction	0	15.1	10.5	10.7

[4] This is the replacement of two ATV fords with bridges (one on American River, one on Kirks Fork) with rocking of approaches, +ATV trail crossing Alt D.
[5] Stream crossing improvements include upgrading or improving culverts and bridges to improve fish passage and peak water flows and are listed as the number of sites, or ford hardening to remove chronic sediment sources.
[6] This is an access change that closes the current ford on the American River in Section 2.
[7] This is the miles of anadromous fish habitat that will be reconnected to the American River.
[8] This is an access change, which reduces the running surface width and restricts use to two wheeled vehicles or snowmobiles over snow or, all terrain vehicle use (ATV) from previous automobile use. Some roads would be replaced by new permanent road.

Comparison of Alternatives

Table 0.1 compares activities and outputs of the alternatives. Table 0.2 compares the alternatives in terms of environmental effects on the major issues. See Chapter 3 for a complete description of effects and for the scientific basis for the results in the comparison tables.

Table 0.1 Comparison of Activities and Outputs by alternative

Proposed Activity–Vegetation/Fuels		Alt B (Proposed)	Alt C	Alt D
Acres of Treatment	Tractor Yard/Excavator Pile or Biomass Utilization	770	761	728
	Tractor Yard/Burn	31	31	27
	Cable Yard/Burn	298	194	135
	Helicopter Yard/Burn		244	238
	Helicopter Yard/Hand Pile	54	54	43
	Slash/Burn Fuels Treatment Only	140		
	Total Acres Treated	**1293**	**1284**	**1171**
	Percent Regeneration	82	83	84
	Percent Partial Cut/Thin	18	17	16
Temporary road construction (miles)[1]		15.1	10.5	10.7
Road improvement (for timber harvest) (miles)[2]		2.4	2.4	2.4
Estimated Green Volume Harvested (MMBF)		9.7	11.1	10.4
Estimated Dead Volume Harvested (MMBF)		4.1	4.1	3.6
Proposed Activity–Restoration		**Alt B**	**Alt C**	**Alt D**
Miles of decommissioned roads[3]		1.9	3	1.5
Miles of American River Stream Bank Re-contour		1.2	1.2	1.2
Miles of New Permanent Road		0.6	1.1	0.6
New Automobile River Crossing (Bridge)			1	1
Number of sites of Watershed Trail Improvements[4]		2	2	3
Stream crossing improvements[5]		3	2	2
Stream crossing closures[6]			1	1
Miles of riparian vegetation planting		4.8	4.8	4.8
Miles of Recreation and Trail improvements			0.2	0.2
Miles Queen Creek re-connect to American River and increased fish habitat access[7]		1.35	1.35	1.35
Access change for vehicle use–Automobile use to ATV restricted use (miles)[8]		1.6	1.6	2.4
Acres of Mine Site Reclamation		0.5	0.5	0.5

[1] Temporary roads will be decommissioned within one to three years of construction.
[2] Road improvement covers a range of activities, such as surface blading, drainage repair, and roadway brushing with occasional culvert installations, slump repairs, and stabilization work. Road widening could occur with major reconstruction. Road improvements stated in this table are not to be considered or confused with routine road maintenance that may include but not limited to road prism brushing, clearing, or hazard reduction activities.
[3] Road decommissioning for this project covers a range of activities, from re-contouring to abandonment due to grown-in conditions. Some decommissioned roads would be replaced by new permanent road.

would be irregular shelterwood; 252 acres would be shelterwood; 266 acres would be seed tree; 93 acres would be commercially thinned; and 100 acres would be salvaged. Compared to Alternative B this alternative utilizes the same vegetation/fuels treatments with the exception that 120 acres of slashing and burning would be logged with helicopter. These treatments would also involve fuels treatment, using a combination of biomass utilization, piling and burning or prescribed burning.

Actions planned for improvement of riparian and/or aquatic condition include those noted for Alternative B with the following differences. New construction of 0.56 miles of permanent road, including a bridge of the American River (0.01 miles less than Alt. B, replacing 1.1 mile existing road), construction of 0.5 miles of ATV trail (to circumvent and close an automobile ford of the American River), 1.5 miles of road decommissioning (0.4 miles less than Alt. B) and 2.6 miles of road converted to ATV trail (0.77 miles more than Alt. B).

Design Features

The action alternatives include the required design features listed in Chapter 2, Table 2.3.1.

Monitoring and Evaluation

Appendix E contains the detailed monitoring and evaluation plans.

sensitive plants, soils, wildlife, visual resources, cultural resources, tribal trust and treaty rights, grazing, socio-economics, and recreation.

Alternatives Considered in Detail

Alternative A (No Action): Both BLM and CEQ regulations require the development of the No Action alternative. This alternative serves as the baseline for comparison of the effects of all action alternatives.

Under this alternative, there would be no change in current management direction or in the level of ongoing management activities within the project area. No fuel reduction/vegetation treatments associated with this project would be implemented. Also, because of watershed entry criteria and the timing of the FS American and Crooked River Project, the opportunity to treat much of the area, except on a limited basis, would be lost for another 10 years. Future implementation of watershed improvement activities associated with this project would require obtaining funding that is currently not part of the BLM budget and initiation of the NEPA process. Work previously planned within and/or adjacent to the project area would still occur under this alternative.

Alternative B (Proposed Action-Preferred Alternative): This alternative reduces existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments on approximately 1,293 acres requiring approximately 15.1 miles of temporary road construction. Actions planned for improvement of vegetative/fuel condition include regeneration treatments that would reserve groups and single trees including: approximately 351 acres would be irregular shelterwood; 284 acres would be shelterwood; 286 acres would be seed tree; 123 acres would be commercially thinned; 140 acres would be slashed and broadcast burned; and 109 acres would be salvaged. These treatments would also involve fuels treatment, using a combination of biomass utilization, piling and burning, or prescribed burning.

Actions planned for improvement of riparian and/or aquatic condition include: 4.8 miles of riparian tree and shrub planting; 1.2 miles of streambank re-contour, planting, and sediment mitigation; reconnect Queen Creek (a 1.35 mile fish-bearing stream) with American River; closing two river/stream fords and replacing with ATV bridges; new construction of 0.57 miles of permanent roads (to replace existing roads); 1.6 miles of road to be converted to ATV trails; and 1.9 miles of road decommissioning.

See Table 0.1 below for a comparison of action alternative activities and outputs.

Alternative C: This alternative reduces existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments on approximately 1,284 acres. Compared to Alternative B, there are more acres of helicopter logging (fewer acres of tractor and cable) and less temporary road construction (10.5 miles). Actions planned for improvement of vegetative/fuel conditions include regeneration treatments that would reserve groups and single trees including: approximately 491 acres would be irregular shelterwood; 284 acres would be shelterwood; 286 acres would be seed tree; 123 acres would be commercially thinned; and 100 acres would be salvaged. Compared to alternative B this alternative utilizes the same vegetation/fuels treatments with the exception that 140 acres of slashing and burning would be logged with helicopter. These treatments would also involve fuels treatment, using a combination of biomass utilization, piling and burning, or prescribed burning.

Actions planned for improvement of riparian and/or aquatic condition include those noted for Alternative B with the following differences: new construction of 1.1 miles of permanent road, including a bridge of the American River (0.56 miles more than Alt. B, replacing a 1.1 mile existing road and an automobile ford of the American River); and 3.0 miles of road decommissioning (1.1 miles more than Alt. B).

Alternative D: This alternative reduces existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments on approximately 1,171 acres. Compared to Alternative B there are more acres of helicopter logging (fewer acres of tractor and cable) and less temporary road construction (10.7 miles). Actions planned for improvement of vegetative/fuel conditions include regeneration treatments that would reserve groups and single trees including: approximately 460 acres

The Nez Perce Forest Supervisor will make the following decisions and document them in a Record of Decision accompanying or following the Final Environmental Impact Statement (EIS):

> Should some roads be improved, constructed, or maintained across NPNF lands to provide access for treatment activities on BLM land? If so, which, and what road standards or restrictions should be applied?

Scoping Summary

In February of 2004, the BLM mailed letters to approximately 200 interested individuals, agencies, the Nez Perce Tribe, organizations, and adjacent landowners. Based on the comments received and further field review, it was determined that analysis using an EIS was appropriate.

The BLM participated in meetings held in the community of Elk City in March and April of 2005 to discuss the project.

In July 2005, a Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register*. Over 250 letters were sent to interested individuals, agencies, the Nez Perce Tribe, and organizations requesting comments on the proposal. A public meeting and two field tours were held.

Based on the public comments and resource specialist concerns, the following concerns or controversies were identified as the major issues to be carried forward for analysis in the EIS.

Major Issues

The Interdisciplinary (ID) Team identified Hazardous Fuels, Watershed, Fisheries, and Road/Trail Access-Transportation System as major issues.

Hazardous Fuels: Two differing viewpoints were expressed during scoping about the extent of the project. Issue 1 reflects the view that the current fuels and vegetation conditions are part of a natural cycle, and the proposal would be ineffective. Issue 2 reflects the view that management is needed to protect the community of Elk City, the American River Subdivisions, and the natural resources in the area.

Watershed: Three issues are that proposed activities: may affect overall watershed condition in the short and/or long term; may increase water yield and change timing and duration of peak runoff, thereby decreasing stream channel stability; and may increase erosion and sediment yield, which could impair fish habitat, and affect 303(d) listed streams.

Fisheries: There are four issues regarding the proposed activities. First is streamside shading and the number of trees that may fall into the stream channels and affect 303(d) listed streams. Second is the potential to cause increased sediment delivery to streams in the analysis area, decreasing quantity and quality of spawning, rearing, and over-wintering fish habitat for Federally listed and BLM sensitive species. Third is the current reduced fish habitat complexity. Fourth is that bridge construction activities may affect stream channels, processes, and has the potential to cause increased sediment delivery to streams in the analysis area and a take of some fish species.

Road/Trail Access-Transportation System: Issues include that proposed activities may restrict administrative/public access to Bureau of Land Management lands and affect access routes to homes and private property; and there is a large amount of temporary road construction to access vegetation/fuels treatment areas.

Other Issues

Besides the major issues identified above, the ID Team analyzed the effects of the alternatives on other issues and resources, including air quality, vegetation, noxious weeds, threatened, endangered and

conversion, and re-contouring streambank along the American River. Table 0.1 is a summary of the proposed activities associated with the project by alternative.

Conformance with Applicable Land Use Plans

Chief Joseph Management Framework Plan–North Idaho Timber Management FEIS
The Chief Joseph MFP and the North Idaho Timber Management FEIS allocate resource management emphasis to areas based on the land's capabilities. The forested areas are divided into three levels of forest management: intensive, extensive, and custodial. The proposed treatment units lie in the Intensive Timber Management land class.

The Fisheries/Water Quality Refinement of the Chief Joseph MFP (USDI-BLM, 1989a) identifies fisheries/water quality objectives by prescription watershed. The project includes portions of eight prescription watersheds, six of which are below the percent habitat potential objective. For those streams, the guideline states that timber management can occur concurrently with habitat improvement efforts that show a positive upward trend.

Nez Perce National Forest Land and Resource Management Plan
While there are no proposed treatments on Forest Service (FS) land, BLM may need authorization from the NPNF to use existing roads and to construct new temporary roads on the forest. The road use and construction, if determined necessary to implement the Eastside Project, would be in conformance with the NPNF land use plan, and the NPNF would apply their road standards to any authorization.

Decisions to be Made

The BLM Cottonwood Field Manager will make the following decisions and document them in a Record of Decision following the Final Environmental Impact Statement (EIS):

Should the BLM do fuels/vegetation treatments to create a fuel reduction area on BLM lands in the project area to protect adjacent subdivisions, private property, and natural resources from the risks associated with wildland fire? If so:

- What vegetation treatment methods should be used?
- How many acres should be treated?
- Should management activities occur in RHCAs? If so, how?
- If timber is harvested, how should harvest unit slash be treated?
- Should some roads be improved, constructed, or maintained to provide access for treatment activities? If so, which?
- Should some roads be obliterated/decommissioned/seasonally closed in order to meet the MFP requirements for a concurrent upward trend of aquatic/riparian areas? If so, which?
- Should some roads be converted to ATV trails with restricted running surface widths in order to meet the MFP requirements for a concurrent upward trend of aquatic/riparian areas? If so, which?
- Should some roads be improved, constructed, or maintained to provide access and escape routes for residential areas? If so, which?
- What design features and mitigation measures should be required to meet MFP standards and guidelines for all resources?
- What monitoring requirements are appropriate to evaluate implementation and effectiveness of this project?

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Additional anadromous fish habitat accessible	No Change	Queen Creek re-connected to American River, 1.35 miles of increased habitat.	Same as Alternative B.	Same as Alternative B.
Issue 10: Proposed activities (road to trail conversions, road relocation and obliteration, and new road construction) may restrict administrative/public access to Bureau of Land Management lands, and affect access routes to homes and private property.				
Miles new permanent Road	None	0.57 in Lower American River	0.57 in Lower American River, 0.56 in Middle American River	0.56 in Middle American River
Decreased Highway Vehicle Miles	None	2.12	2.62	2.48
Miles of road to ATV trail conversion	None	1.62	1.62	2.39
Number of public bridges (highway vehicle)	No change, 1 bridge on road 1809, 1 bridge on road 443	No change, one bridge on road 1809, 1 bridge on road 443	New bridge in Middle American River, bridge on road 1809, bridge on road 443 total 3	Same as Alternative C
Issue 11: Access to complete management activities requires a transportation network. Proposed activities include a large amount of temporary road construction. Designing a transportation system that balances implementing projects cost effectively versus the environmental impacts from the transportation system is an important project consideration.				
Miles of temporary road on BLM	None	12.97	8.43	10.28
Miles of temporary road on Private	None	0.19	0.19	0.19
Miles of temporary road on Forest Service	None	2.15*	1.89*	0.26
Areas with roadless characteristics (applies to Forest Service lands only)	None	One affected area, American-2, impact to unroaded character	Same as Alternative B.	None

* Includes 1.89 miles that was included in the FEIS for the American and Crooked River Project

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Chapter 1. Purpose and Need for Action

1.1 Introduction

The Bureau of Land Management (BLM), Cottonwood Field Office of the Coeur d'Alene District, is the lead federal agency in preparing this Environmental Impact Statement (EIS). The Nez Perce National Forest (NPNF) is a Cooperating Agency for this project because temporary road construction across NPNF lands will be needed to implement the BLM actions proposed in portions of the project area.

This EIS was prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EIS discloses the direct, indirect, and cumulative environmental impacts that would result from the three action alternatives and the no action alternative.

The document is organized into four chapters:

Chapter 1: Purpose and Need for Action: This chapter includes an introduction of the proposed project, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the BLM scoped the project, including obtaining public input.

Chapter 2: Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's Proposed Action, as well as alternative methods for achieving the stated purpose. These alternatives were developed based on major issues raised by the public and other agencies. This discussion also includes design features. Finally, this section provides a summary table of the environmental effects associated with each alternative.

Chapter 3: Affected Environment–Environmental Effects: This chapter combines two major parts of a NEPA analysis: the Affected Environment and the Environmental Effects associated with the proposed action and the alternatives. The physical, biological, and human resources of the environment that may be affected by the proposed action and the alternatives are examined. Affected Environment and Environmental Effects have been combined to give the reader a more thorough explanation of the resources and how they may be affected by the proposed action and the alternatives. Chapter 3 analyzes the issues used to generate the alternatives, as well as potential effects to other resources.

Chapter 4: Consultation and Coordination: This chapter provides a list of preparers, individuals and agencies consulted, and a synopsis of the public comments received during scoping which were used in the development of the Environmental Impact Statement. A list of recipients of this Final EIS is provided.

Appendices: The appendices provide maps and more detailed information to support the analyses presented in the EIS.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning records located at the BLM Cottonwood Field Office (CotFO), Cottonwood, Idaho.

1.1.1 Changes in the Document Between Draft and Final EIS

As the result of internal review and comments received on the Draft EIS, changes have been made to both Volumes I and II of Final EIS. Substantial changes are detailed below. Most of the changes were minor and involve corrections of typographical errors, formatting, grammar, and sentence structure. The changes in the document are not physically highlighted or noted (such as strike-through and underlined text to show deletions and additions).

The reader should take note of the following substantial changes:

Chapter 1 – Section 1.1.1, was added to highlight the changes between the Draft and the Final EIS.

Chapter 2 – Some design Criteria were modified to provide more concise information. New design criteria were added (3, 27 and 32) that were inadvertently left out of the Draft.

Chapter 3 – Additional information has been included in the discussion regarding the Clean Water Act and the Idaho State Water Quality Standards.

Appendix A – Four Maps were updated, three had corrections to symbols, and one has additional information.

- Map 5 – Corrected road shown as decommissioning to proposed ATV.
- Map 6 – Corrected road shown as decommissioning to proposed ATV.
- Map 7 – Corrected road shown as decommissioning to proposed ATV.
- Map 15 – NPNF areas with unroaded characteristics were added as shown the American and Crooked River Project FEIS (USDA-FS, 2005a).

Appendix B – Term definitions were refined to provide more concise information.

Appendix C – Literature used in analysis or responding to comments to the DEIS was added.

Appendix H – Additional information has been added to the following sections.

- **Fisheries/Water Quality Objectives**
- **Upward Trend**
- **Aquatic Model Disclosures**
  - **Equivalent Clearcut Area (ECA)**
  - **NEZSED**
- **Aquatic Trend Analysis**
  - Updated information in **Table H.3**
  - Updated information in **Table H.4**
  - Inserted new section **Effectiveness Monitoring and Trend.** This provides additional information regarding current and ongoing monitoring and trend.

Appendix I – Additional information has been added to the following sections.

- **Description of Restoration Projects**
  - Updated information in **Table I.3**
  - Updated information in **Table I.4**
  - Added new information about Queen Creek channel reconnect in **Improved Fish Passage** section.

1.2 General Location

The project area is located in north central Idaho, near the southern part of the Idaho Panhandle. The project is located in Idaho County, near the small, isolated town of Elk City, Idaho. The Eastside Township Fuels and Vegetation Project (Eastside Project) occurs in the American River watershed, within the larger upper South Fork Clearwater River watershed (Appendix A, Map 1). The Elk City township is completely surrounded by NPNF lands. Ownership within the township includes 12,859 acres BLM (53%), 10,100 acres private (42%), and 80 acres Forest Service (3%). The Eastside Project is located in the American River watershed that is approximately 58,500 acres in size, and extends from the confluence with the South Fork Clearwater River near Elk City to an area near Beargrass Mountain. NPNF lands comprise 72% of the watershed, followed by 15% private lands, and 13% BLM lands. BLM lands are adjacent to NPNF lands and intermingled with private lands within the immediate project area. The Eastside Project area encompasses approximately 3,273 acres, of which 3,121 acres are managed by the BLM, and 152 acres are privately owned.

1.3 Purpose & Need for Action

The purpose of this project is to:

- Reduce the risk of high-intensity wildland fire to life, property, and natural resources in the Elk City and surrounding WUI area;
- Manage forest stands to create conditions that will contribute to sustaining long-lived fire tolerant tree species;
- Design a public transportation system that provides safe travel routes for the public, while meeting watershed and fisheries management goals, in a cost effective manner;
- Create an upward trend in fish habitat condition;
- Contribute to the economic and social well being of area users and local residents; and
- Implement intensive forest management decisions from the MFP.

The forest vegetation in the Elk City area is dominated by lodgepole pine that established following wildfires occurring in the late 1800s and early 1900s. These stands have reached maturity (80–130 years old) and are well into the cycle where mountain pine beetles attack and kill individuals and groups of trees. Aerial surveys supporting the 2003 Zone Entomologist report for the Nez Perce National Forest (NPNF) indicate that the mountain pine beetle activity is currently intense and expanding (USDA-FS, 2005a). The bark beetle activity continues to kill trees that will accumulate as standing and down fuels over the next 10–20 years. The potential for high-intensity stand replacing fire to occur in the project area, and potentially impact the WUI (Appendix A, Map 17) is high and increasing. The associated risk to firefighter and public safety is also increasing. The fuels reduction activities proposed are needed to reduce this potential.

Fire suppression has limited the extent of wildfire in the area in the past 70 years. The resultant stands have an excessively dense, small tree component of shade tolerant trees (i.e., grand fir, subalpine fir) with multi-storied conditions creating a fuel ladder situation. The dead and dying lodgepole pine, combined with the dense small trees, creates conditions conducive for intense fires. In order to reduce the likelihood of high-intensity wildland fires, these stands need to be changed to increase the presence of long-lived, fire tolerant species. This would result in reduced fire behavior and create a forest stand that is more resilient to insects, disease, and other forest disturbances.

The primary ingress and egress to subdivisions in the project area is a portion of the American River road that crosses private and BLM land. This is the primary route that would be used in the event of an evacuation of these residential areas. Another portion of this road across BLM land is considered by residents as a secondary escape route. Both road portions are adjacent to the American River. Both road portions are a chronic source for sediment delivery into the river, limit the amount of vegetation along the river, and restrict the river flow to a narrow channel. BLM needs to consider/manage a transportation system that provides, in a cost-effective manner, safe travel routes for public and firefighter safety, and allows for management of the public resources.

Fish habitat in portions of the analysis area is currently below the desired future condition identified in the Chief Joseph MFP Addendum 1 (USDI-BLM, 1989a). Streams in the area support both resident and anadromous fisheries, including two species listed as threatened (steelhead and bull trout) and BLM sensitive fish species (spring/summer chinook salmon, westslope cutthroat trout, and Pacific lamprey). Aquatic and riparian conditions in the area, particularly fish habitat, have been degraded through a variety of human uses, but primarily historic mining activities. Natural recovery in these systems is very slow, although several actions are ongoing or have been implemented by the BLM and FS to improve these conditions. Watershed restoration actions are needed to improve the fish habitat conditions from poor/fair and to continue an upward trend.

Elk City is a community dependent on forest products and recreation, due to the remoteness of this area and the large federal land ownership surrounding the town. Elk City relies heavily on the revenues

generated from forest products and recreational activities including hunting, fishing, snowmobiling, and camping. Revenues generated from the federal lands support the community, schools, and other businesses. BLM and NPNF play a major role in the future of Elk City. Wildland fires have the potential to destroy private property and the resources Elk City relies upon. The effects from a wildland fire would be felt for many years into the future. BLM needs to actively manage the public land resources (i.e., forest, wildlife, fisheries, recreation, weeds) in a manner that will benefit the resources and the local economy.

1.4 Proposed Action

The following is an overview of the Eastside Project. The project area is 3,273 acres in the east portion of the Elk City township (see Appendix A, Map 1). Additional project details are further described in Chapter 2 and Appendix D.

The proposed project would include treatments and restoration activities on BLM administered land only. Existing roads and construction of temporary roads across NPNF and private lands would be necessary to reach the treatment areas. The NPNF would make a decision about the BLM constructing temporary roads based on this EIS.

The proposed project would treat about 1,293 acres of public land to create current and future stand conditions that reduce the potential for, and the extent of, high-intensity wild fires within wildland urban interface (WUI) areas on BLM lands. The project would create an area where there would be less crown fire hazard, lower potential flame lengths, and lower ember potential (effects spotting) on BLM lands adjacent to Elk City and the American River Subdivisions. Methods for accomplishing the project include: combinations of commercial timber harvest; understory thinning; prescribed burning and hand or machine piling and burning; and biomass utilization. Treatments would: remove surface and ladder fuels; reduce crown and stand density; reduce the amount of area dominated by lodgepole pine; increase the proportion of Douglas-fir, western larch, and ponderosa pine of current stands and planting these species following fuel treatments.

An important part of the project involves watershed restoration activities designed to support an upward trend toward fair to good condition in the long term for riparian/aquatic habitats within the American River watershed. The proposed action includes riparian tree and shrub planting on reaches of the American River where there is a current deficit of woody vegetation. Streambank re-contouring, along with riparian tree and shrub planting, would occur on reaches of the American River. Queen Creek (a 1.35 mile fish-bearing stream) would be reconnected with American River. River and stream fords would be replaced with ATV bridges and/or hardened. Some existing roads along the American River would be replaced with new roads, converted to ATV trails, or decommissioned.

Implementation of the Eastside Project is expected to begin in early 2007 and could take five to ten years to complete, depending on available funding. Restoration work would take place concurrently with vegetation and fuels treatments.

Timing of some portions to the project would be closely coordinated with the NPNF and implementation of their American and Crooked River Project, which involves similar treatments. Seasonal road closures, road construction, restoration work, and restrictions on entry frequencies in some subwatersheds would require the most coordination.

The project would be implemented through a combination of traditional service contracts, timber sale contracts, stewardship contracts (exchanging goods for services) and local partnership.

1.5 Conformance with Applicable Land Use Plans _____

BLM Chief Joseph Management Framework Plan–North Idaho Timber Management FEIS
The Chief Joseph MFP, as amended, and the North Idaho Timber Management FEIS allocate resource management emphasis to areas based on the land's capabilities. The forested areas are divided into three levels of forest management: intensive, extensive, and custodial. The proposed treatment units lie in the Intensive Timber Management land class. The MFP (p. II-4 and 6) and North Idaho Timber Management FEIS (p. 2–11) state that lands classified for Intensive Timber Management would be managed to maximize timber production on a sustained yield basis. Timber would be the primary goal of management activities.

The MFP (p. II-36–41) outlines visual resource management (VRM) controls. The Eastside Project contains VRM Class III designated lands, where management activities may repeat the dominant qualities common in the landscape and may visually change the essential character of existing dominance factors. However, changes are generally subordinate to the visual strength of the natural landscape.

The Fisheries/Water Quality Refinement of the Chief Joseph MFP (USDI-BLM, 1989a) identifies fisheries/water quality objectives by prescription watershed and includes a set of guidelines to identify potential improvement opportunities or areas needing protection. The Eastside Project includes portions of eight prescription watersheds, seven of which are below the percent habitat potential objective stated in this supplement. For those streams that are below carrying capacity because of a lack of diversity and/or instream cover, the guideline states that timber management can occur concurrent with habitat improvement efforts that show a positive upward trend.

Actions identified in the MFP that can result in an upward trend include reconstructing stream channels, removing migration barriers, rehabilitating stream banks, and imposing recreation use restrictions for intensive aquatic wildlife habitat management (p. II-35 and 36).

Nez Perce National Forest Land and Resource Management Plan
National forest management must be consistent with forest plans prepared under authority of the National Forest Management Act (NFMA) [16 U.S.C. 1604 and CFR 219.10]. Forest Plan implementation includes the identification and scheduling of resource activities (site specific projects) that meet the direction provided by the Forest Plan. The road construction and use proposed by BLM across NPNF lands, if approved, would be in conformance with the Forest Plan and would include FS road standards.

The Northern Idaho Grazing EIS (1981) Record of Decision, and North Idaho Range Management Program (1988)
There are two grazing allotments within the project area that were established as a result of these planning documents.

1.6 Relationship to non-BLM Policies, Plans, and Programs

PACFISH
The Environmental Assessment for the *Implementation of Interim Strategies for Managing Anadromous Fish-producing Watershed in Eastern Oregon and Washington, Idaho and portions of California* (PACFISH) (USDA-USDI, 1995) amended the NPNF Land and Resource Management Plan (Amendment 20). The MFP was not amended by PACFISH; however, BLM implements PACFISH in conformance with the Terms and Conditions of the 1998 Biological Opinions on the MFP for steelhead and bull trout. The Riparian Habitat Conservation Areas (RHCAs) are areas where management activities are subject to specific standards and guidelines in PACFISH and would be applied in the Eastside Project.

North Idaho Fire Management Plan
The North Idaho Fire Management Plan (FMP) (USDI, 2005) recommends objectives and fuels treatment strategies to achieve National Fire Plan and MFP guidance by Fire Management Unit (FMU). The Eastside Project is in the Elk City FMU. The FMP ranks the Elk City FMU as a HIGH priority for allocating prescribed fire and non-fire fuel reduction resources. Fuel treatment priorities include reduction of ground, ladder, and surface fuels within and adjacent to WUI intermix, as well as reduction of stand densities. Objectives for the FMU are 500–1500 acres of prescribed fire in any 5-year period, and 1,300–3,000 acres of mechanical treatments in any 5-year period.

National Fire Plan
The Eastside Project implements key components of the National Fire Plan, as addressed in the 10-Year Comprehensive Strategy (USDA-USDI, 2002), including the reduction of hazardous fuels. The Comprehensive Strategy assigns the highest priority for hazardous fuels reduction to communities at risk, readily accessible municipal watersheds, threatened and endangered species habitat, and other important local features where conditions favor uncharacteristically intense fires.

Following the extreme fire season of 2000, Congress directed Federal land management agencies to work with State governments to develop a national strategy for the restoration of fire-adapted ecosystems. The National Fire Plan was intended to respond to severe wildland fires, reduce impacts on rural communities, and ensure effective firefighting capacity. The result is a 10-Year Comprehensive Strategy (USDA-USDI, 2002) that represents the joint effort of federal, state, tribal, and local governments and non-governmental representatives. The Strategy is meant to facilitate collaboration between fire management organizations and communities to reach local and landscape-level goals, such as protection of property and restoration of fire-prone ecosystems, and to establish cost effective measures and reporting procedures to ensure accountability.

The goals of the 10-Year Strategy are to improve prevention and suppression, reduce hazardous fuels, restore fire-adapted ecosystems, and to promote community assistance. Specific actions designed to reach those goals include: prioritizing management activities so that communities that are most at risk in the wildland urban interface receive priority for hazardous fuels treatments; developing strategies to address fire-prone ecosystem problems that augment fire risk or threaten sustainability; and promoting public knowledge of wildland fire and its role in natural ecosystem processes.

Idaho County Wildfire Mitigation Plan (2005)
The Proposed Action implements recommendations from the Idaho County Wildland Fire and Mitigation Plan (CRCD, 2005), which recommends the project area as a high priority for fuels reduction within the Wildland Urban Interface (WUI).

In 2005, Idaho County completed the Wildfire Mitigation Plan, which identifies communities at risk and the WUI, evaluates the risks, establishes mitigation priorities, and develops mitigation strategies for all communities at risk within the county. This plan identifies Elk City as a community at risk and lists all current and proposed fuels treatment projects within the Elk City region, including the Eastside Project, as high priority.

This plan defines WUI based on four conditions: interface, intermix, occluded, and rural. These WUI conditions were delineated for the county based on structure density and using mathematical formulas and population density indexes to create concentric circles showing high density areas of interface and intermix WUI, as well as rural conditions. Most of the Elk City township, including the entire Eastside Project area, falls within interface and intermix WUI (Appendix A, Map 17).

1.7 Relationships to Laws, Regulations and Statutes

Federal Land Policy and Management Act of 1976 (FLPMA), as Amended
The Eastside Project was developed in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, and the National Forest Management Act (NFMA). The project would be implemented in accordance with the regulations found in 43 Code of Federal Regulations (CFR) 5003 (BLM) and 36 CFR 219 (Forest Service). This EIS is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, and the Council on Environmental Quality regulations at 40 CFR 1500.

Other laws and regulations pertaining to this project include, but are not limited to:

- American Indian Religious Freedom Act of 1978; Executive Order 13007, Indian Sacred Sites; Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
- Clean Air Act of 1970, as amended
- Clean Water Act (Federal Water Pollution Control Act Amendments) of 1972 as amended. The Clean Water Act is addressed through Project Design Features (Table 2.3.1), using Best Management Practices (BMPs) and monitoring (Appendix E). For more information, see Regulatory Framework in the Watershed, and Fisheries Sections in Chapter 3.
- Endangered Species Act of 1973, as amended
- Executive Order 13112, Invasive Species
- Executive Orders 11988 and 11990, providing for protection and management of floodplains and wetlands.
- Executive Order 12898, Environmental Justice
- Executive Order 13186, Migratory Birds
- Federal Noxious Weed Act (1974), as amended
- Idaho Forest Practices Act of 1974
- Idaho Stream Channel Protection Act
- Magnuson-Stevens Fishery Conservation and Management Act of 1966
- Migratory Bird Treaty Act (MBTA) of 1918
- National Historic Preservation Act (NHPA) of 1966 and amendments. Implementation of Section 106 is codified under 36 CFR 800

1.8 Decisions to be Made

The BLM Cottonwood Field Manager will make the following decisions and document them in a Record of Decision following the final environmental impact statement (FEIS):

Should the BLM do fuels/vegetation treatments to create a fuel reduction area on Bureau of Land Management lands to protect adjacent subdivisions, private property, and natural resources from the risks associated with wildland fire? If so:

- What vegetation treatment methods should be used?
- How many acres should be treated?
- Should management activities occur in RHCAs? If so, how and where?
- If timber is harvested, how should harvest unit slash be treated?
- Should some roads be improved, constructed, or maintained to provide access for treatment activities? If so, which?
- Should some roads be obliterated/decommissioned/seasonally closed in order to meet the MFP requirements for a concurrent upward trend of aquatic/riparian areas? If so, which?

- Should some roads be converted to ATV trails with restricted running surface widths in order to meet the MFP requirements for a concurrent upward trend of aquatic/riparian areas? If so, which?
- Should some roads be improved, constructed, or maintained to provide access and escape routes for residential areas? If so, which?
- What design features and mitigation measures should be required to meet MFP and PACFISH standards and guidelines for all resources?
- What monitoring requirements are appropriate to evaluate the implementation and effectiveness of this project?

The Nez Perce Forest Supervisor will make the following decisions and document them in a Record of Decision accompanying or following the environmental impact statement (FEIS):

Should some roads be improved, constructed, or maintained across NPNF lands to provide access for treatment activities on BLM land? If so, which, and what road standards or restrictions should be applied?

1.9 Scoping and Issues

1.9.1 Scoping Summary

In February of 2004, the BLM mailed letters to approximately 200 interested individuals, agencies, the Nez Perce Tribe, organizations, and adjacent landowners regarding the proposal to complete fuels treatments and forest management in the project area. Based on the comments received and further field review, it was determined that analysis using an EIS was appropriate.

The BLM participated in meetings held in the community of Elk City in March and April of 2005 to discuss the project. The meetings were open to all, and the sponsors invited several regional environmental groups. These meetings were attended by 25–30 local residents, landowners, and business representatives.

In July 2005, a Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register*. Over 250 letters were sent to interested individuals, agencies, the Nez Perce Tribe, and organizations requesting comments on the proposal. A public meeting and field tour were held in August 2005. An additional field trip was conducted with a representative from the NOAA, the Nez Perce Tribe, and the Idaho Conservation League in August 2005.

The Interdisciplinary (ID) Team analyzed comments from the public and BLM resource specialists and developed the list of issues and concerns raised about the proposed project. Many of the comments disagreed with, or debated the potential environmental impacts of, the Proposed Action. As such, they influenced the design and evaluation of alternatives to the Proposed Action. Chapter 4 of the EIS contains a synopsis of public comments received during scoping and the Eastside Fuels/Vegetation Project Record contains additional information on the scoping and issue development process.

The Issues are assigned to one of three categories: major issues, other issues, and issues not analyzed in detail. Major issues are used to formulate alternatives, mitigation measures, or project design elements to address the effects of proposed activities. Other issues include resources affected that do not lead to a new alternative but are analyzed in terms of environmental consequences. Issues not analyzed in detail are issues that: are addressed through the project design; were considered to be outside the scope of the analysis; are already decided by law, regulation, the MFP; or are mitigated as standard operating procedures. Issues not analyzed in detail do not require tracking throughout the document.

The major issues carried forward in this document are grouped below by resource and described using an issue statement, brief background information, and a list of indicators that were used to determine/

measure the effects of the proposed activities. Chapter 2 includes a summary that compares the effects of the alternatives on major issues and their indicators. Chapter 3 describes the consequences of the alternatives in terms of the issues.

1.9.2 Major Issues

The BLM defines major issues as those that require project-specific alternatives, mitigation measures, or design elements to address the effects of proposed activities. The Eastside Fuels/Vegetation Project ID Team identified hazardous fuels, water quality, riparian/aquatic habitat, and access management as the major issues.

1.9.2.1 Hazardous Fuels

Two differing viewpoints were expressed during scoping regarding the primary purpose and need for the project, and the extent of the project. Issues 1 and 2 reflect these.

Issue 1: Proposed fuel/vegetation activities are not needed and are ineffective in protecting communities, structures, and reducing the effect of wildfire across the landscape. The dead and dying lodgepole pine in the project area are a natural and periodic occurrence. Removing fuels, tree, and understory vegetation within 200 feet has proven effective in protecting structures. Thinning and logging activities can allow for greater fire spread and severity. The stands in this area have evolved within a fire regime that historically sustained large scale moderate- to high-severity fires.

> **Background:** Models and observation of landscape scale fire behavior and the impacts of fuel treatments clearly suggest that a landscape approach is more likely to have significant overall impacts on fire spread, intensity, perimeters, and suppression capability. Models, field observations, and experiments indicate that for a given set of weather conditions, fire behavior is strongly influenced by fuel structure and composition. Fuels/vegetation treatments adjacent to structures are not a part of the project and are being accomplished through Firewise and defensible space programs funded in part by the BLM. Both existing fuels and those generated through vegetation management activities would be treated on site or utilized off site. Large intense fires within the wildland urban interface are not an acceptable management philosophy. The National Fire Plan was initiated in direct response to large intense fires occurring within WUI areas.

Issue 2: Proposed fuel/vegetation activities are needed to protect the community of Elk City, the American River Subdivision, other subdivisions in the project area, and the natural resources in the area. The large amount of dead and dying lodgepole pine is creating an unacceptable hazard. Doing nothing is irresponsible.

> **Background:** In recent years there have been several large scale fires on the adjacent Nez Perce National Forest. For example, the Slims Fire was near Elk City, and its projected movement pattern showed it coming into the township. It is what generated the evacuation plan and the construction of a contingency line on Anderson Butte. The recent 4,500 acre Blackerby fire occurred in the wildland urban interface near the community of Mount Idaho. At one point, this fire was the number-one priority for wildland fire suppression resources in the country. The fire was suppressed at a cost of approximately 2.5 million dollars. Maps of fire severity made following the fire illustrate that most of the impact occurred in harvested areas with residual slash on private lands, and in areas that have not had any type of fuels/vegetation treatments for several years or not at all.
>
> **Indicators:**
>
> - Area and distribution of current and future fuel model conditions
> - Area and distribution of stands susceptible to fires with high flame lengths and susceptible to high intensity crown fires

- Area and distribution of stands with high potential for wildfire-caused tree mortality
- Acres dominated by lodgepole pine stands susceptible to mountain pine beetle

1.9.2.2 Watershed

Issue 3: Proposed road construction, road reconstruction, road decommissioning, and conversion of roads to OHV trails affect **watershed condition** in the short and/or long term.

Background: Road density (miles of road per square mile of area) affects hydrologic function by increasing surface flow due to soil compaction, channeling flow through ditches and cross drains, and by intercepting subsurface water, thereby increasing the potential for surface erosion.

Project design features and Best Management Practices can greatly reduce impacts from roads, road construction, and reconstruction. Decommissioning roads can eliminate most of the watershed impacts from roads. Conversion of roads to trails can greatly reduce the impacts from roads.

Indicators: Watershed Condition

- Total road density (miles/square mile)
- Road miles within RHCAs
- Miles of new construction, reconstruction, decommissioning

Issue 4: Proposed vegetation treatment activities may increase **water yield** and change timing and duration of peak runoff, thereby decreasing stream channel stability.

Background: Management activities can affect water yield and the timing and duration of peak flow through alterations in forest canopy. Analysis of changes in forest canopy closure can be used to assess potential changes in mobilization of both large and small materials, causing increased erosion and deposition in downstream areas.

Indicator: Water Yield

- Equivalent Clearcut Area

Issue 5: Proposed activities may increase erosion and **sediment yield**, which could impair fish habitat, and affect 303(d) listed streams.

Background: Many watersheds have been affected by past activities such as mining, timber harvest, road building, and grazing. These historic activities have affected water quality through increased sediment delivery to streams. Harvest, fuels reduction, and roadwork have the potential to increase sediment production and delivery into streams. Some watershed improvement projects have the potential to produce sediment in the short-term but are designed to result in long-term reductions in sediment yield.

Indicators: Sediment Yield

- Sediment yield percent over base as modeled by NEZSED
- Sediment yield not modeled by NEZSED–streambank recontour, stream crossing alterations, stream re-connect
- Sediment reductions not modeled by NEZSED

1.9.2.3 Fisheries

Issue 6: Proposed riparian planting and streambank re-contour activities affect fish and fish habitat by increasing streamside shading and the number of trees that may fall into the stream channels, and affect 303(d) listed streams.

Background: Many watershed riparian areas have been heavily affected by past mining activities that have reduced meanders, removed streamside vegetation and created dredge piles with limited potential to support vegetation. Water temperature controls the rate of biologic process, is of critical concern for fish populations, and is a primary indicator of habitat conditions. Past and foreseeable restoration activities in this watershed have and may contribute to an upward trend.

Indicators:

- Stream temperature
- Estimated large woody debris
- Qualitative assessment of debris recruitment, cycling, and how the project could affect future riparian trends concerning this element

Issue 7: Proposed streambank re-contour, harvest, road construction, road reconstruction, and road decommissioning activities have the potential to cause increased short-term sediment delivery to streams in the analysis area, decreasing quantity and quality of spawning, rearing, and over-wintering fish habitat for Federally listed and BLM sensitive species.

Background: Historically, increased sediment yield to the American River watershed has resulted in high levels of deposited sediment in many streams, including mainstream American River. The American River watershed has been identified as a priority watershed for anadromous fish. High levels of deposited sediment reduce the biological carrying capacity for fish and other aquatic organisms and quality of spawning habitat.

Short-term increases in sediment yield from proposed activities may contribute to degraded substrate conditions and further reduce carrying capacity and quality of spawning habitat. Past and foreseeable restoration activities in this watershed have and will contribute to an upward trend. Long-term reduction in sediment yield could result in long-term improvement of substrate conditions.

Indicators:

- Cobble embeddedness (past and present)
- Quality of summer and winter rearing habitat carrying capacity as modeled by FISHSED

Issue 8: The American River has been heavily affected by historic instream mining activities that have reduced fish habitat complexity, e.g., meanders, pools, large woody debris, and pool riffle ratios. Also roads are encroaching on the river channel and are impacting riparian/aquatic habitat.

Background: With reduction in large woody debris, accelerated sediment yield, and impacts to stream channels from instream mining activities, road encroachment, and timber harvest, there are fewer high quality pools in the American River watershed.

Some proposed activities may result in a short-term reduction in pool quality from increased sediment yield. Other proposed activities may result in direct improvement in the number of and quality of pools. Sediment reduction actions should result in long-term improvement in pool quality.

Indicators:

- Poolriffle ratios (past and present)
- Number of pools

Issue 9: Proposed stream reconnect and bridge construction activities may affect stream channels and processes. Bridge construction has the potential to cause increased sediment delivery to streams in the analysis area and a take of some fish species.

Background: The mainstream American River has been heavily affected by past instream mining activities, effectively blocking several tributary streams to fish passage/connectivity and isolating fish populations. Road encroachment has created several sediment producing fords of the American River.

Some proposed activities may in the short-term increase sediment yield, but in the long-term, overall sediment yield should decrease. Other proposed activities would result in direct increase in the number of miles of accessible stream.

Indicators:

- Fords eliminated and erosive banks stabilized
- Additional miles of stream accessible

1.9.2.4 Road/Trail Access Transportation System

Issue 10: Proposed activities (road to trail conversions, road relocation and obliteration, and new road construction) may restrict administrative/public access to Bureau of Land Management lands and affect access routes to homes and private property.

Background: The road segment along the American River in the north end of the project area is considered by local residents to be an escape route from residences along the American River. The road segment from Forest Service road 1809 north along the American River is the primary access route to homes and property along the American River. Some routes, the road segment along the American River on the south end of the project, and few smaller routes are used heavily by off highway vehicles, both winter and summer.

Indicators:

- Miles of new permanent road
- Miles of road decommissioning
- Miles of road converted to ATV trail
- Number of bridges on American River

Issue 11: Proposed activities include temporary road construction to access vegetation/fuels treatment areas. Access to complete management activities requires a transportation network. Designing a transportation system that balances implementing projects cost effectively versus the environmental impacts from the transportation system is an important project consideration.

Background: The BLM lands in the east portion of the Elk City township have had very little active management applied to them in the last 50 years. None of the primary access routes are owned and maintained by the BLM. Except for the area near the Alamance Mine, there are no secondary roads on BLM into any of the fuels/vegetation proposed treatment units. The NPNF has dropped two temporary roads from the American and Crooked River Project that would access BLM lands on the north end of the project. These two temporary roads are now part of this project.

Indicators:

- Miles of temporary road on BLM
- Miles of temporary road on private land
- Miles of temporary road on Forest Service land
- Areas with roadless characteristics (applies to Forest Service lands only)

1.9.3 Other Issues

Other issues do not drive the development of an alternative, but warrant an effects analysis. These issues are tracked in this document and analyzed in the Environmental Effects section in Chapter 3.

1.9.3.1 Air Quality

Issue 12: All the alternatives have potential to affect air quality in Airshed 13 for Class I and Class II areas.

Background: The no action alternative carries the risk of large-scale wildfire, while the action alternatives would reduce the risk. Although wildfires are not subject to air quality regulations, they will have major impacts on air quality. Prescribed burning as proposed in the action alternatives is subject to air quality regulations.

Indicator:

- Particulate matter and visibility

1.9.3.2 Vegetation

Issue 13: Proposed activities can affect vegetative conditions for forest cover types, stand structure (size classes, density, and crown cover).

Background: The proposed activities occur on land identified as within the intensive timber management land class. Timber is the primary goal on these lands, to be managed on a sustained yield basis. Proposed vegetation/fuels treatments can have an effect on timber and non-timber species. The area is sustaining a mountain pine beetle epidemic that is altering the forest conditions throughout the project and adjacent areas.

Indicators:

- Forest cover types
- Stand structure (size classes, density, crown cover)

Issue 14: Proposed activities can affect the habitat and populations of Threatened, Endangered, and Sensitive Plant Species.

Background: Historically vegetation/fuels activities along with road construction altered vegetation habitat conditions and affected individual plants or plant populations.

Indicators:

- Identity and location of Threatened or Endangered Species
- Identity and location of BLM Sensitive Species

Issue 15: Proposed activities can affect the potential for current populations of weeds to expand and for the introduction of new weed species into the project area.

Background: Invasive plants can expand following human caused or natural disturbances and invade degraded as well as intact habitats. There are two known noxious weeds in the projects area. There is the potential for other invasive species considered noxious to become established in the area.

Indicators:

- Identity and location of noxious weeds.
- Amount and location of vegetation and soil disturbance activities

1.9.3.3 Soils

Issue 16: The proposed vegetation/fuels activities may decrease long-term soil productivity and affect soil physical properties.

Background: Random movement of heavy equipment, skyline yarding, site preparation, and slash disposal activities may alter soil properties by compacting, displacing, or puddling. Slope failure can occur in response to management activities, particularly roads.

Indicators:

- Soil compaction and displacement
- Surface and substratum erosion
- Mass erosion

1.9.3.4 Wildlife

Issue 17: Proposed activities can affect the habitat and populations of threatened, endangered, and sensitive wildlife species.

Background: There are three federally listed species, and eight BLM sensitive species, whose home range may include the Eastside Project area. Proposed activities will alter habitat conditions that could increase or decrease wildlife use and populations.

Indicators:

- Threatened or Endangered Species
- BLM sensitive species
- Other species of interest

1.9.3.5 Visual Resource Management

Issue 18: Proposed vegetation activities may affect the ability to meet Visual Resource Management goals for main travel routes through and adjacent to the project area.

Background: Vegetation activities will generate more open forest than currently exists and would alter the visual appearance considerably. Although the visual appearance of the forest would be altered with proposed activities, it could be much less than if an intense wildfire were to occur in the area.

Indicator:

- Class III Visual Resource Objective

1.9.3.6 Cultural Resources

Issue 19: Proposed activities may affect Nez Perce Tribe cultural resources or Traditional Cultural Properties in the analysis area. They may also affect historic properties in the area that may be eligible for the National Register of Historic Places.

Background: Vegetation/fuels activities, road construction, and restoration activities would disturb the surface and could impact prehistoric and historic sites in the project area. Project design would be implemented to avoid or do as little disturbance as possible.

Indicator:

- Number, location, and type of sites

1.9.3.7 Tribal Trust and Treaty Rights

Issue 20: The Project is within the original Nez Perce territory.

Background: Consultation was initiated specifically with the Nez Perce Tribe Cultural Department regarding identification of any cultural resources or Traditional Cultural Properties in the analysis area. The Nez Perce Tribe Natural Resource Subcommittee has also been consulted.

Indicator:

- Cultural resources and treaty rights

1.9.3.8 Grazing

Issue 21: Vegetation and fuels activities may affect the ability of permittees to utilize BLM land for a period of time.

Background: Livestock grazing is currently being done on portions of the project area. Proposed vegetation and fuels activities will interfere with grazing during the implementation of the project. Also, restrictions could be placed on grazing portions of the project area for several years until tree seedlings have an opportunity to become established.

Indicator:

- Number of permittees and restricted use time period

1.9.3.9 Socio Economic

Issue 22: The proposal has potential to influence income and jobs.

Background: The cost of implementing a fuels/vegetation and restoration project compared to the economic benefits of the project is a concern. The economies of communities near the project are influenced by resources from the forest—primarily timber and recreation. Fuels/vegetation projects, and the associated sale of timber, provide economic and socio-economic values and opportunities to local communities. This includes jobs and income.

Indicators:

- Local employment
- Revenues and costs

1.9.3.10 Recreation

Issue 23: Proposed fuels/vegetation treatments and restoration activities may affect existing and future recreation uses and opportunities within the project area.

Background: The proposal may change the existing use patterns by changing road access and reducing tree density. Proposed road management may reduce areas for highway vehicles. Reducing the tree density may allow snowmobiles to enter new areas.

Indicators:

- Resource Opportunity Spectrum Class
- Recreational activities

1.10 Permits and Licenses

All proposed treatment activities are on BLM lands. Any work altering a stream channel, such as the installation of a culvert, would require appropriate permits and authorizations from the U.S. Army Corps of Engineers, Idaho Department of Water Resources, and Idaho Department of Water Quality.

Most of the temporary road construction is on BLM and National Forest System lands. A road license agreement with the NPNF would be necessary to implement all action alternatives.

Access across private land will require the survey, design, and acquisition of temporary easements to implement all action alternatives.

1.11 Project Record

This Final EIS hereby incorporates by reference the complete Project Record, located at the BLM Cottonwood Field Office, to reduce paperwork without repeating detailed analysis and background information available elsewhere. The Project Record contains draft Specialist Reports and other technical documentation used to support the analysis and conclusions in this Final EIS. The record also documents the comments received during scoping, that includes meetings, field trips as well as written correspondences.

Chapter 2. Alternatives Including the Proposed Action

2.1 Introduction

Several alternatives were developed in response to the major issues and concerns and are analyzed in detail. Alternatives considered, but eliminated from detailed study, are summarized in this chapter. The chapter concludes with a tabular comparison of the alternatives' effects on the major issues. The comparison is based on indicators selected by the project Interdisciplinary (ID) Team to evaluate how each alternative responds to the issues and to the purpose and need for action.

2.2 Description of Alternatives

Section 102(2) of the National Environmental Policy Act (NEPA) states that all Federal agencies shall "…study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." These unresolved conflicts, identified by the Bureau of Land Management and the public, are the major NEPA issues related to the Proposed Action.

In addition to responding to unresolved conflicts, an environmental impact statement (EIS) must "…rigorously explore and objectively evaluate all reasonable alternatives." [40 CFR 1502.14(a)]

The courts have established that this direction does not mean every conceivable alternative must be considered, but that selection and discussion of alternatives must permit a reasoned choice and foster informed decision making and informed public participation. Together, these requirements determine the NEPA range of alternatives.

The alternatives considered in detail were developed in response to the major issues described in Chapter 1. Those that were considered but eliminated from detailed study are also discussed below.

2.2.1 Alternatives Considered but Eliminated From Detailed Study

The ID Team considered the past, current, and potential future conditions within the project area, and the purpose and need for management actions, and analyzed a variety of possible vegetation treatments and alternatives. The following alternatives were eliminated for the reasons stated.

Treat More Hazardous Fuels than the Alternatives Carried Forward in this EIS
The ID Team and some respondents identified areas where the fuels and vegetation conditions were similar to those that were being treated. The question arose: Why are these areas being left in their current condition?

Treatment areas were chosen that would best meet the purpose and need of the project. This is also balanced against the effects of the actions on other resource needs, as well as management planning and direction. Treating more acres would not be in conformance with the MFP, as amended.

"Restoration Only" and/or "No Timber Harvest"
Several respondents requested this alternative. This alternative would have considered implementing watershed improvements, such as riparian planting, streambank re-contouring, road decommissioning, improving stream crossings (ATV bridges), etc., with no fuel/vegetation activities considered.

The ID Team determined that this would not meet the MFP goals for intensive forest management, nor would this alternative consider the project's purpose and need regarding the social and economic well being of the Elk City area. This alternative would not respond to the purpose and need of treating existing

and potential fuel loads in the WUI to reduce the effects of potential large-scale wildfire and improving the safety and effectiveness of firefighters in fire suppression activities.

Defensible Space
Several respondents stated reducing trees and brush within 200 feet of structures is a more effective method of protecting structures from wildland fire.

A defensible space alternative (within 200 feet of structures) would focus fuel treatments largely on private lands, where BLM has no jurisdictional authority. This alternative would not treat areas further away from structures and would not meet the purpose and need to treat existing and potential fuel loads to reduce the effects of potential large-scale wildfire and improve the safety and effectiveness of firefighters in fire suppression activities and the general public. It would also fail to address the need for maintaining vigorous forest stands and providing for the economic well being of the community.

Defensible space activities near structures are being supported by the BLM through the NFP Partnership Funds and participation in the development and implementation of the Idaho County Community Wildfire Protection Plan (CWPP). Idaho County is actively pursuing these defensible space measures through their CWPP.

No Road Access across Forest Service Land
Some respondents requested we consider alternatives that required no temporary road construction or access across FS lands, and consider roads originating along the American River.

This alternative would not meet the watershed objectives required by the MFP, as amended. This alternative would have required the construction of roads within RHCAs. The project was designed with the intent that temporary roads needed for implementing fuels/vegetation treatments would have minimal impact on aquatic resources by locating roads outside the RHCAs.

2.2.2 Alternatives Considered In Detail

Four alternatives, including the No Action Alternative (Alt. A), were considered in detail. Table 2.2.1 displays the activities for all the action alternatives (Alts. B, C, and D). Alternative B, the proposed action, and alternatives C and D respond to the major issues outlined in Chapter 1. Alternative B is the preferred alternative.

The amount of fuels/vegetation treatment, other than that listed above in 2.2.1, was not an issue that drew a lot of public responses. Therefore, the area of fuel/vegetation treatment proposed in the alternatives is very similar.

Elements Common to All Action Alternatives:

- Avoid activities in high hazard landslide prone areas.
- Address State of Idaho TMDL limiting factors.
- Implement watershed restoration activities designed to meet the MFP requirements to have a concurrent upward trend in aquatic habitat conditions for prescription watersheds that are below objectives.
- Address the effectiveness of fuel reduction activities.
- Maintain shade and large woody debris within the standards and guidelines prescribed in the PACFISH Strategy, including their application to RHCAs.

The treatment activities would entail changing forest conditions to maintain or increase forest stand resilience to low intensity fire, and insects and disease outbreaks by applying a prescription comprising regeneration, salvage harvests; pre-commercial and commercial thinning; and prescribed burns.

Timber harvest would be done through silvicultural systems that are grouped by regeneration or intermediate stand treatments. Examples of regeneration harvests include irregular shelterwood treatments

where trees would be reserve groups and single trees in all sizes. Seedtree and shelterwood are treatments where trees would be reserved in a somewhat even distribution across an area, primarily made up of larger trees. Commercial and pre-commercial thinning are intermediate stand treatments removing only a portion of the trees; leaving trees well distributed throughout. Salvage concentrates on removing dead and dying trees.

Logging systems would be dictated by topography, economics and the need to protect residual stands. Logging systems would range from ground-based with hand and/or mechanized felling, cable systems with hand felling, to helicopter systems with hand felling or limited mechanized felling.

Logging and fuels treatment access would use existing roads or on new temporary roads. Roads constructed for the project would be decommissioned within the project time period. Temporary roads would be decommissioned within three years of construction. Temporary roads are needed across NPNF land and on private property (an existing permanent easement), and are part of this project.

Fuels treatments would be designed to move the distribution of fuel conditions away from fuel model 10 (potentially very intense burning conditions) towards a fuel model 8 thereby decreasing high-intensity fire conditions. Treatments include whole tree yarding, mechanized piling of slash concentrations, hand piling in selected areas, underburning (protecting reserve tree groups or single trees), and broadcast burning where residual tree survival is of limited concern.

Slash would be treated with prescribed fire and/or grapple piling or be available for biomass utilization.

Appendix D contains a detailed table of all the fuels/vegetation treatment types by unit by alternative. The vegetation section in Chapter 3 contains an explanation of the existing conditions and environmental effects of these alternatives. More information on the developed alternatives is below.

2.2.3 Alternative A (No Action Alternative)

Both BLM and the CEQ regulations require the development of the No Action alternative. This alternative serves as the baseline for comparison of the effects of all action alternatives.

Under this alternative, there would be no change in current management direction or in the level of ongoing management activities within the project area. No fuel reduction/vegetation treatments associated with this project would be implemented. BLM would not be able to enter certain subwatersheds due to the entry frequency criteria, identified in BLM and NPNF land use plans. These frequency guidelines as described in Table H. 1 and Appendix H, would limit entries to once or three times per decade for certain subwatersheds. Since the Forest Service is beginning to implement their American and Crooked River Project, the opportunity to treat much of the area except on a limited basis would be lost for another 10 years. Other projects previously planned that are within and/or adjacent to the project area would still occur as separate projects (Chapter 3; Table 3.0.1, Projects considered for cumulative effects).

2.2.4 Alternative B (Proposed Action–Preferred Alternative)

The proposed action was developed in response to the purpose and need and public comments. This is the preferred alternative.

This alternative would treat approximately 1,293 acres of public land. It would reduce existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments. Vegetation manipulation includes removing mainly dead and dying trees and live ladder fuels in both lodgepole pine and mixed conifer stands. Fuels treatments include biomass utilization, piling and burning and prescribed burning.

This action would create and maintain stand conditions by: reducing the amount of area dominated by lodgepole pine, increasing the Douglas-fir, western larch and ponderosa pine component of current and future stands, and reducing the stand density of current treated stands. This would be accomplished by

implementing silvicultural prescriptions that target lodgepole pine dominated stands, targeting mainly lodgepole pine for removal from mixed conifer stands, and reducing residual stand densities. Planting of Douglas-fir, western larch and ponderosa pine (in limited areas) would occur following fuels treatment. Additional information about harvest methods can be found Table 2.2.1, Appendix D, and Maps 2–4 in Appendix A.

Actions planned for improvement of vegetative /fuel condition include regeneration treatments that would reserve groups and single trees including: approximately 351 acres would be irregular shelterwood, 284 acres would be shelterwood, 286 acres would be seed tree, 123 acres would be commercially thinned, 140 acres would be slashed and broadcast burned, and 109 acres would be salvaged with precommercial thinning.

Roads would be needed to access the treatment units. Miles of existing road on private land totals 2.94 including 2.65 in an existing permanent easement, and 0.29 requiring a temporary easement. Miles of existing road across NPNF totals 7.67. An additional 15.1 miles of new temporary road would be required and includes 12.97 miles across BLM, 0.19 miles across private, and 2.15 miles across NPNF. Appendix J should be referred to for additional details.

This alternative would implement watershed restoration actions. Riparian tree and shrub planting would occur on reaches of the American River where there is a current deficit of woody vegetation. It would be done using adapted native species and would include the seeding or planting of grasses, sedges, forbs, shrubs, or trees on approximately 4.8 miles.

Streambank re-contouring along with riparian tree and shrub planting, would occur on reaches of the American River. Streambank re-contouring would include the creation of a small terrace or floodplain (approximately 8–10 feet in width), immediately adjacent to or above mean high line. This would occur on 1.2 miles.

Queen Creek (a 1.35 mile fish-bearing stream) would be reconnected with American River. This action would include the excavation of a stream channel and installation of a culvert on the existing American River road. Instream structures will be installed in the channel consisting of woody debris and small rock check dams to provide instream cover and create pool habitat. At the road crossing a 7 to 8 foot wide culvert would be installed with substrate placed inside the culvert to simulate a natural stream bottom.

Two fords (one on Lower American River, and one on Kirks Fork) would be closed and replaced with ATV bridges.

One ford on Middle American River would be hardened. The road crossing would be hardened with the placement of concrete planks or suitable substrate that would be secured to bottom and streambanks so that vehicle use or high flows would prevent movement or scouring of the instream ford crossing.

New permanent road would be constructed (0.6 miles) replacing existing road along American River. The existing road would be decommissioned (two segments) and new road constructed in the toe slope area. Existing buried utility lines would be moved and located adjacent to the new road. The new road would be all weather surfaced.

This alternative would convert and restore 1.6 miles of existing roads occurring adjacent to American River to an ATV trail. Some segments of road occurring adjacent to American River may be obliterated when an existing toeslope road may be used for the ATV trail. Minor trail reconstruction or construction would occur in localized areas, generally to avoid riparian habitats or stream channel encroachment.

Approximately 1.9 miles of road would be decommissioned in various locations (primarily in RHCAs). Road decommissioning applies to existing roads and can include treatments ranging from abandonment to re-contouring.

Additional information about restoration can be found in Table 2.2.1, Maps 3 and Appendix I.

In the next section, Table 2.3.1 Project Design Features provides details about design measures that will be used when implementing those listed actions.

2.2.5 Alternative C

This alternative was developed in response to the concerns that the proposed action has too many temporary roads, should include more road decommissioning, and access issues raised by the public. To address these items:

- Aerial logging methods were considered instead of cable logging methods in much of the project, thus temporary road miles are less than the proposed action (10.5 miles instead of 15.1 in Alt. B).
- A 1.1 mile road segment along the American River with a ford (a chronic sediment source) is included for decommissioning. Alternative B called for hardening of the ford only.
- This alternative also considers 0.56 miles of new permanent road (80% outside the RHCA) and an automobile bridge of the American River, to replace 1.1 miles of road described above.

This alternative would treat approximately 1,284 acres of public land. It would reduce existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments. Vegetation manipulation includes removing mainly dead and dying trees and live ladder fuels in both lodgepole pine and mixed conifer stands. Fuels treatments include biomass utilization, piling and burning and prescribed burning.

This action would create and maintain stand conditions by: reducing the amount of area dominated by lodgepole pine, increasing the Douglas-fir, western larch and ponderosa pine component of current and future stands, and reducing the stand density of current treated stands. This would be accomplished by implementing silvicultural prescriptions that target lodgepole pine dominated stands, targeting mainly lodgepole pine for removal from mixed conifer stands, and reducing residual stand densities. Planting Douglas-fir, western larch and ponderosa pine (in limited areas) would occur following fuels treatment. Additional information about harvest methods can be found Table 2.2.1, Appendix D, and Maps 5 and 7 in Appendix A.

Actions planned for improvement of vegetative /fuel conditions include regeneration treatments that would reserve groups and single trees including: approximately 491 acres would be irregular shelterwood, 284 acres would be shelterwood, 286 acres would be seed tree, 123 acres would be commercially thinned, and 100 acres would be salvaged with precommercial thinning. Compared to alternative B this alternative utilizes the same vegetation/fuels treatments with the exception that 140 acres of slashing and burning would be logged with helicopter.

Roads would be needed to access the treatment units. Miles of existing road on private land totals 2.94 including 2.65 in an existing permanent easement, and 0.29 requiring a temporary easement. Miles of existing road across NPNF totals 7.67. An additional 10.5 miles of new temporary road would be required and includes 8.43 miles across BLM, 0.19 miles across private, and 1.89 miles across NPNF. Appendix J should be referred to for additional details.

This alternative would implement watershed restoration actions. Riparian tree and shrub planting would occur on reaches of the American River where there is a current deficit of woody vegetation. It would be done using adapted native species and would include the seeding or planting of grasses, sedges, forbs, shrubs, or trees on approximately 4.8 miles.

Streambank re-contouring would occur along with riparian tree and shrub planting, on reaches of the American River. Streambank re-contouring would include the creation of a small terrace or floodplain (approximately 8–10 feet in width), immediately adjacent to or above mean high line. This would occur on 1.2 miles.

Queen Creek (a 1.35 mile fish-bearing stream) would be reconnected with American River. This action would include the excavation of a stream channel and installation of a culvert on the existing American River road. Instream structures will be installed in the channel consisting of woody debris and small rock check dams to provide instream cover and create pool habitat. At the road crossing a 7 to 8 foot wide culvert would be installed with substrate placed inside the culvert to simulate a natural stream bottom.

Two fords (one on Lower American River, and one on Kirks Fork) would be closed and replaced with ATV bridges.

One ford on Middle American River would be closed.

New permanent road would be constructed (0.57 miles) replacing existing road along American River south of the subdivision. The existing road would be decommissioned (two segments) and new road constructed in the toeslope area. Existing buried utility lines would be moved and located adjacent to the new road. The new road would be all weather surfaced.

New permanent road (0.56 miles) and a bridge would be constructed replacing existing road along the American River north of the subdivision. The existing road would be decommissioned. The new road would connect to the Erickson Ridge road and be 80 percent outside the RHCA. The new road would be all weather surfaced, and closed during the winter to highway vehicles.

This alternative would convert and restore 1.6 miles of existing roads occurring adjacent to American River to an ATV trail. Some segments of road occurring adjacent to American River may be obliterated when an existing toe slope road may be used for the ATV trail. Minor trail reconstruction or construction would occur in localized areas, generally to avoid riparian habitats or stream channel encroachment.

Approximately 2.98 miles of road would be decommissioned in various locations (primarily in RHCAs). Road decommissioning applies to existing roads and can include treatments ranging from abandonment to re-contouring.

Additional information about restoration can be found in Table 2.2.1, Map 6 and Appendix I.

Table 2.3.1 Project Design Features provides details about design measures that will be used when implementing those listed actions.

2.2.6 Alternative D

This alternative was developed in response to the concerns that the proposed action has too many temporary roads; additional roads should not be considered for decommissioning but should be converted to ATV trails; the main subdivision access road along the American River should be left as is; road construction in NPNF “unroaded” areas should not be considered; and other access issues raised by the public and NPNF. To address these items:

- Aerial logging methods were considered instead of cable logging methods in much of the project, thus temporary road miles are less than the proposed action (10.7 miles instead of 15.1 in Alt. B).
- Some treatment areas were dropped that were included in both Alternatives B and C.
- A 1.1 mile road segment along the American River with a ford (a chronic sediment source) is included for conversion to an ATV trail for most of its length, circumventing a short segment (that would be decommissioned) and the ford by improving an existing 0.5 mile ATV trail (a trail not currently designated by the BLM). Alternative B called for hardening the ford only, it was decommissioned in alternative C.
- This alternative also considers a shorter new permanent road (80% outside the RHCA) and bridge of the American River, to replace the road described above.

- Two new permanent road segments that would be constructed to replace portions of the main subdivision access road are excluded.
- Two temporary roads in NPNF "unroaded" areas would not be constructed.

This alternative would treat approximately 1,171 acres of public land. It would reduce existing and potential fuel loads through a combination of vegetation manipulation and fuels treatments. Vegetation manipulation includes removing mainly dead and dying trees and live ladder fuels in both lodgepole pine and mixed conifer stands. Fuels treatments include biomass utilization, piling and burning and prescribed burning.

This action would create and maintain stand conditions by: reducing the amount of area dominated by lodgepole pine, increasing the Douglas-fir, western larch and ponderosa pine component of current and future stands, and reducing the stand density of current treated stands. This would be accomplished by implementing silvicultural prescriptions that target lodgepole pine dominated stands, targeting mainly lodgepole pine for removal from mixed conifer stands, and reducing residual stand densities. Planting Douglas-fir, western larch and ponderosa pine (in limited areas) would occur following fuels treatment. Additional information about harvest methods can be found Table 2.2.1, Appendix D, and Maps 8 and 10 in Appendix A.

Actions planned for improvement of vegetative /fuel conditions include regeneration treatments that would reserve groups and single trees including: approximately 460 acres would be irregular shelterwood, 252 acres would be shelterwood, 266 acres would be seed tree, 93 acres would be commercially thinned, and 100 acres would be salvaged with precommercial thinning. Compared to alternative B this alternative utilizes the same vegetation/fuels treatments with the exception that 120 acres of slashing and burning would be logged with helicopter.

Roads would be needed to access the treatment units. Miles of existing road on private land totals 2.94 including 2.65 in an existing permanent easement, and 0.29 requiring a temporary easement. Miles of existing road across NPNF totals 7.67. An additional 10.7 miles of new temporary road would be required and includes 10.28 miles across BLM, 0.19 miles across private, and 0.25 miles across NPNF. Appendix J should be referred to for additional details.

This alternative would implement watershed restoration actions. Riparian tree and shrub planting would occur on reaches of the American River where there is a current deficit of woody vegetation. It would be done using adapted native species and would include the seeding or planting of grasses, sedges, forbs, shrubs, or trees on approximately 4.8 miles.

Streambank re-contouring would occur along with riparian tree and shrub planting, on reaches of the American River. Streambank re-contouring would include the creation of a small terrace or floodplain (approximately 8–10 feet in width), immediately adjacent to or above mean high water line. This would occur on 1.2 miles.

Queen Creek (a 1.35 mile fish-bearing stream) would be reconnected with American River. This action would include the excavation of a stream channel. Instream structures will be installed in the channel consisting of woody debris and small rock check dams to provide instream cover and create pool habitat. At the road crossing a 7 to 8 foot wide culvert would be installed with substrate placed inside the culvert to simulate a natural stream bottom.

Two fords (one on Lower American River, and one on Kirks Fork) would be closed and replaced with ATV bridges.

One ford on Middle American River would be closed.

New permanent road (0.56 miles) and a bridge would be constructed replacing existing road along the American River north of the subdivision. The existing road would be decommissioned. The new road

would connect to the Erickson Ridge road and be 80 percent outside the RHCA. The new road would be all weather surfaced, and closed during the winter to highway vehicles.

This alternative would convert and restore 2.4 miles of existing roads occurring adjacent to American River to an ATV trails. Some segments of road occurring adjacent to American River may be obliterated when an existing toe slope road may be used for the ATV trail. Minor trail reconstruction or construction would occur in localized areas, generally to avoid riparian habitats or stream channel encroachment.

Approximately and 1.5 miles of road would be decommissioned in various locations (primarily in RHCAs). Road decommissioning applies to existing roads and can include treatments ranging from abandonment to re-contouring.

Additional information about restoration can be found in Table 2.2.1, Map 9 and Appendix I.

Table 2.3.1 Project Design Features provides details about design measures that will be used when implementing those listed actions.

Table 2.2.1 Comparison of Activities and Outputs by Alternative

Proposed Activity–Vegetation/Fuels		Alt B (Proposed)	Alt C	Alt D
Acres of Treatment	Tractor Yard/Excavator Pile or Biomass Utilization	770	761	728
	Tractor Yard/Burn	31	31	27
	Cable Yard/Burn	298	194	135
	Helicopter Yard/Burn		244	238
	Helicopter Yard/Hand Pile	54	54	43
	Slash/Burn Fuels Treatment Only	140		
	Total Acres Treated	**1293**	**1284**	**1171**
	Percent Regeneration	82	83	84
	Percent Partial Cut/Thin	18	17	16
Temporary road construction (miles)[1]		15.1	10.5	10.7
Road improvement (for timber harvest) (miles)[2]		2.4	2.4	2.4
Estimated Green Volume Harvested (MMBF)		9.7	11.1	10.4
Estimated Dead Volume Harvested (MMBF)		4.1	4.1	3.6
Proposed Activity–Restoration		**Alt B**	**Alt C**	**Alt D**
Miles of decommissioned roads[3]		1.9	3	1.5
Miles of American River Stream Bank Re-contour		1.2	1.2	1.2
Miles of New Permanent Road		0.6	1.1	0.6
New Automobile River Crossing (Bridge)			1	1
Number of sites of Watershed Trail Improvements[4]		2	2	3
Stream crossing improvements[5]		3	2	2
Stream crossing closures[6]			1	1
Miles of riparian vegetation planting		4.8	4.8	4.8
Miles of Recreation and Trail improvements			0.2	0.2
Miles Queen Creek re-connect to American River and increased fish habitat access[7]		1.35	1.35	1.35
Access change for vehicle use–Automobile use to ATV restricted use (miles)[8]		1.6	1.6	2.4
Acres of Mine Site Reclamation		0.5	0.5	0.5

[1] Temporary roads will be decommissioned within one to three years of construction.
[2] Road improvement covers a range of activities, such as surface blading, drainage repair, and roadway brushing with occasional culvert installations, slump repairs, and stabilization work. Road widening could occur with major reconstruction. Road improvements stated in this table are not to be considered or confused with routine road maintenance that may include but not limited to road prism brushing, clearing, or hazard reduction activities.
[3] Road decommissioning for this project covers a range of activities, from re-contouring to abandonment due to grown-in conditions. Some decommissioned roads would be replaced by new permanent road.
[4] This is the replacement of two ATV fords with bridges (one on American River, one on Kirks Fork) with rocking of approaches, +ATV trail crossing Alt D.
[5] Stream crossing improvements include upgrading or improving culverts and bridges to improve fish passage and peak water flows and are listed as the number of sites, or ford hardening to remove chronic sediment sources.
[6] This is an access change that closes the current ford on the American River in Section 2.
[7] This is the miles of anadromous fish habitat that will be reconnected to the American River.
[8] This is an access change, which reduces the running surface width and restricts use to two wheeled vehicles or snowmobiles over snow or, all terrain vehicle use (ATV) from previous automobile use. Some roads would be replaced by new permanent road.

2.3 Design Criteria, Mitigation, and Monitoring

The rest of this chapter discusses the design features for the three action alternatives (see Table 2.3.1: Project Design Measures). The monitoring plan that would apply to all action alternatives can be found in Appendix E.

Design criteria associated with the fuels/vegetation treatments, and road construction and reconstruction were developed to avoid or reduce potential resource impacts. Public comments were considered when developing these measures. The following measures and management requirements were designed to apply to all action alternatives and will be applied to all contracts, agreements and partnerships.

Best Management Practices (BMPs) were used to design this project and are in addition to the design criteria in Table 2.3.1 and discussed above. BMPs are the primary mechanism to enable the achievement of water quality standards to ensure compliance with the Clean Water Act of 1972, as amended (1977 and 1987) and Idaho State Water Quality Standards. BMPs are applied as a system of practices that are basically a preventative rather than an enforcement system. BMPs include both broad policy and site-specific prescriptions and are designed to accommodate site-specific conditions. They are tailor-made to account for the complexity and physical and biological variability of the natural environment. As defined in the Idaho State Water Quality Standards (IDAPA 58.01.02), BMPs include the Idaho Forest Practices Act Rules (IDAPA 20.02.01) and Idaho Stream Alteration Rules (IDAPA 37.03.07).

BMPs specifically tailored to this project are defined in the table below and will be included in contracts or other measures used to implement the project.

In addition, watershed and/or fish habitat restoration activities to improve water quality and fisheries habitat in the long-term are required to support an upward trend where timber management activities occur at levels considered to be an entry (USDI-BLM 1985). The restoration actions are designed to support an upward trend to change effects from existing conditions and past activities that have negatively impacted aquatic resources in the affected watersheds. Actions are designed to mitigate effects of harvest activities such as increased sediment yield and road densities. Restoration actions may be implemented prior to, during or post timber harvest depending on the nature of the action. The watershed restoration activities also have specific design criteria and BMPs to reduce the short-term impacts on fish habitat and water quality as addressed below and in Appendix I.

Table 2.3.1 Project Design Features

#	Project Design Measure	Implementation Method	Effectiveness
Areas Excluded from Timber Harvest or Fuel Reduction Activities			
1	No timber harvest or mechanical fuel reduction activities would occur in RHCAs, or areas of high landslide risk.	Project Design, silviculture prescription and field prep.	High, based on inventory, and monitoring data
Vegetation			
2	Silvicultural prescriptions would be written for each unit, including slash treatment and burn guidelines to meet desired stand conditions of species composition and structure and watershed sediment guidelines	Silvicultural prescription, and burn plan	High, based on protocols for silvicultural and burn plan preparation
3	Livestock grazing will be restricted for two growing seasons or until reforestation and restoration objectives are achieved.	Grazing Lease coordination with lessees.	Moderate based on past experience.
Riparian Habitat Conservation Areas			
4	No cutting of trees would be allowed in PACFISH RHCAs, except restoration/habitat improvements, and to facilitate anchoring of cable yarding systems	Project Design, field prep., contract and contract administration/ inspection	High, based on inventory and monitoring data
5	Post harvest burning will be designed and implemented with the intent of restricting burning to stay within the unit boundary. Fire that moves outside the external unit boundary will be suppressed if it poses a threat to riparian resources. On occasion fire will move into RHCA adjacent to the harvest unit. Fire will not be ignited within these areas, but may be allowed to back into these areas under conditions where fire intensity will be low and burning will not result in extensive reduction in canopy cover or exposure of bare soil in these RHCA inclusions.	Silvicultural prescription, burn plan , and BLM Fuels management	High, based on protocols for silvicultural, burn plan preparation, Research, PNW Lab, Starkey Project
6	Landslide prone areas are also considered Riparian Habitat Conservation Areas (RHCAs). No timber harvest would occur in areas of high landslide risk, as described in (1) above. If additional, unmapped landslide prone areas are found during project implementation, areas would be dropped or activities would be modified with watershed specialist oversight to protect slope stability.	Project Design, silviculture prescription and field prep.	High, based on landslide inventory data
Soils, Water, and Fish Habitat			
7	The State of Idaho Best Management Practices (BMPs) would be applied. These are incorporated by reference.	Contract and contract administration/inspection	High, based on past experience

#	Project Design Measure	Implementation Method	Effectiveness
8	Biomass utilization would be applied where feasible in lieu of excavator piling to reduce physical soil damage and to encourage natural regeneration.	NEPA project design, silviculture prescription, and contract	High, to the degree implemented; based on past experience
9	Temporary roads would be built, used, and decommissioned within a 1 to 3-year period, in order to reduce the amount of sediment production. Coordination of temporary road use and decommissioning with the NPNF American and Crooked River project would be required.	NEPA project design and contract administration	Moderate, based on implementation monitoring of timber sale contracts and Burroughs and King, 1989.
10	Construct slash filter windrows at the toe of fill slopes on newly constructed landings and roads concurrent with construction. Limit height of windrows to 3 feet. Provide breaks & limit length of windrow to allow easy passage of wildlife.	Contract and contract administration/inspection	Moderate (Burroughs and King, 1989; Cook and King, 1983)
11	Snow plowing will maintain a minimum of two inches of snow on the road, leave ditches and culverts functional, sidecast material will not include dirt and gravel, and berms will not be left on shoulder unless drainage holes are opened and maintained.	Contract and contract administration/inspection.	
12	Timber harvest, fuel reduction, and stream restoration activities would be limited or suspended when soils are wet, such that resource damage may occur, to reduce rutting, displacement and erosion. However, harvest could occur during frozen conditions. Frozen conditions are defined as greater than 4 inches of frozen ground, a barrier of snow greater than two feet in depth (unpacked snow), or one foot in depth (packed snow).	Contract and contract administration/inspection	Moderate, based on experience, and (USDA-FS, 1988, 1990, 1992, 1999, and 2003d).
13	Excavated skid trails and landings with cut slopes of more than 1 foot would be scarified and recontoured, replacing topsoil as feasible on all landings and trails.	Contract and contract administration/inspection	High (Plotnikoff et al., 1999; Sanborn et al., 1999a, Sanborn et al., 1999b)
14	Restore soil permeability on temporary roads and landings by scarifying compacted soils to a minimum of 16 inches, or depth of compaction. Excavator, winged subsoiler or similar equipment is preferred, to avoid mixing surface ash layer and subsoil. Partially recontour where needed, seeding with native species (including annual grasses), mulching where needed, and pull slash over the surface to achieve 50% ground cover prior to seasonal runoff events.	Contract and contract administration/inspection	High (Johnson, 1995; Luce, 1997)

#	Project Design Measure	Implementation Method	Effectiveness
15	Sediment and erosion control measures such as dewatering culverts, sediment barriers, rocking road surfaces and/or ditches, etc., would be used to protect fish habitat and water quality.	Contract and contract administration	High, based on literature, San Dimas, Road/Water Interaction
16	Activities including stream crossing road improvements would be conducted in fish bearing streams between July 1 and August 15 to avoid sediment deposition on emerging steelhead or chinook redds, or disturbance to bull trout moving to natal streams. These dates may be site-specifically adjusted through coordination with the Central Idaho Level I team and other agencies.	NEPA project design, contract and contract administration/inspection	Moderate to high, based on past experience
17	When designing new structures, consider and give preference to open-bottom arches, bridges and oversized culverts.	NEPA project design, contract and contract administration/inspection	High, based on literature, San Dimas, Road/Water Interaction
18	During restoration habitat improvement activities, tree felling in RHCAs would occur only where that activity would benefit Riparian Management Objectives	Contract and contract administration/inspection	High, based on past experience
19	Prior to instream habitat improvement activities, heavy equipment would be inspected to assure no leakage of oil, fuel, or hydraulic fluid.	Contract and contract administration/inspection	Moderate to high, based on past experience
20	A Spill Prevention Control and Countermeasures Plan (40 CFR 112) would be prepared and implemented that incorporates the rules and requirements of the Idaho Forest Practices Act Section 60, Use of Chemicals and Petroleum Products; and US Department of Transportation rules for fuels haul and temporary storage; and additional direction as applicable.	Contract and contract administration/inspection	High, based on past experience
21	For instream activities in fish-bearing streams that contain listed species, fish are expected to disperse from the activity area. If needed, additional measures would be used to ensure fish are not harmed or killed by instream activity. If electrofishing were necessary, it would be conducted in accordance with NOAA Fisheries electrofishing guidelines found at http://www.nwr.noaa.gov.	Contract and contract administration/inspection	Moderate, based on past experience
Air Quality			
22	Procedures outlined in the North Idaho Smoke Management Memorandum of Agreement would be followed, including restrictions imposed by the smoke management-monitoring unit.	BLM fuels management	High, based on burning approval required daily by smoke monitoring unit

#	Project Design Measure	Implementation Method	Effectiveness
23	Prescribed burning. Priority in scheduling would be given to units accessed by temporary roads scheduled for decommissioning.	BLM fuels management	High, based on past experience, and availability of burn windows and/or personnel
24	Additional restrictions, beyond those imposed by the smoke management monitoring unit, would be considered for prescribed burning for local air quality reasons, including visual.	BLM fuels management	High, based on past experience
Wildlife			
25	Should an active goshawk nest be discovered within 450 feet of timber harvest or fuel reduction activities, the nest tree will be protected, as well as a 10–15 acre no-treatment buffer area around the nest tree	Field prep, contract and contract administration/inspection	Moderate; based on IDFG et al., 1995, State Conservation Effort
26	The integrity of existing access management restrictions on NPNF roads would be maintained within the planning area for wildlife security purposes. No contractor or their representatives may use motorized vehicles to hunt or trap animals on a restricted road.	Contract and contract administration/inspection	High except close to roads; based on standard timber sale contract clauses and past results monitoring
27	Gates/closures will be installed on temporary roads as needed to restrict public vehicle use.	Project design, contract, contract administration.	Moderate, based on past experience.
Cultural Resources			
28	Avoid or protect known historic properties when possible.	Project design, contract administration	High, objective is to achieve a No Adverse Effect
29	When necessary to cross historic mine ditches the following will be implemented. Ditches will be approached perpendicular to the ditch to minimize the affect. The ditch crossing will be documented with photographs and GPSed. Logs, culverts, or other solid material will be laid horizontally up to the berm of the ditch. The harvest equipment or cable corridors will only use these designated areas to transport the logs across the platform. When the treatment operation is complete the material will be removed from the ditch. These crossings will be about 20 feet in width. When sections of ditch may be obliterated by road construction then the same documentation actions will be incorporated as well preparing cross-section profiles.	Project design, contract administration	High, objective is to achieve a No Adverse Effect

#	Project Design Measure	Implementation Method	Effectiveness
30	When historic mine dredge tailings will be impacted the site will be documented with photographs, measured, and GPSed in areas of potential impact.	Project design, contract administration	High, objective is to achieve a No Adverse Effect
31	If additional cultural resources are discovered during project implementation then all activities will cease in that area and the BLM archeologist notified and sites evaluated according to 36 CFR 800.	Contract Administration	Moderate based on contract inspector recognition of resource
32	Treatment activities in units 34 and 35 would be conducted using the frozen conditions noted in #10.	Contract and contract administration/inspections	Moderate, based on past experience.
Noxious Weeds			
33	Desirable vegetation would be promptly established on disturbed areas, such as log landings, road cuts and fills, skid trails etc., using native and non-native plant species as appropriate to reach restoration goals. The species used for restoration / revegetation will be determined by the appropriate Cottonwood FO personnel.	Contract and contract administration/inspection	Moderate based on experience
34	All seed utilized in revegetation will be certified weed free and documentation of the seed inspection test will be provided to the contract administrator. All straw and mulch, prior to being used for restoration or revegetation projects, would be certified as free of noxious weed seed.	Contract and contract administration and inspection	High; based on past experience
35	All mud, soil and plant parts would be removed from all equipment associated with the project before moving into the project area to limit the spread of noxious and other weeds.	Contract and contract administration and inspection	High; based on past experience
36	All private rock used for road surfacing would be county-certified as free of noxious weed seed. Borrow pits and stockpiles will not be used if it is determined, by the appropriate Cottonwood FO specialist, that it is infested with an invasive plant that is not found in the area where the material will be placed.	Contract and contract administration/ inspection	Moderate; based on past experience
37	Small outbreaks of invasive weeds within one mile of the project area, and along all haul routes leading to the project areas will be pretreated prior to ground disturbing activities under the existing weed management program.	Field prep, contract	High: based on past experience

#	Project Design Measure	Implementation Method	Effectiveness
38	Areas disturbed during project activities will be inventoried a minimum of two years post project to detect establishment of noxious weeds. The inventory data will then be forwarded to the weeds program manager for inclusion in the treatment program.	Post project monitoring	High; based on past experience.
39	New weed sites found during inventory efforts will be given a high priority for weed treatment to help prevent further spread.	Post project monitoring, BLM weed program protocols.	Moderate: based on past experience.
Sensitive Plants & Plants of Concern			
40	Candystick, a species of concern, occurs in some management units north of Whitaker Creek. Where live mature lodgepole are associated with candystick, groups of live mature lodgepole pine would be left to protect candystick from management activities.	Project design, field prep, contract and contract administration/ inspection	High based on past monitoring and experience
41	Idaho barren strawberry, a BLM sensitive plant species, occurs in some management units Core areas where it occurs would be protected in tractor skidding units. Areas will be avoided or logged when snow conditions are greater than two feet in depth (unpacked snow), or one foot in depth (packed snow).	Project design, field prep, contract and contract administration/ inspection	High based on past monitoring and experience
Grazing			
42	Any authorized range improvement (i.e., fences, spring developments) would be restored by the BLM if during the logging operation they were removed or damaged.	Contract and contract administration/ inspection	High: based on past experience

2.4 Comparison of Alternatives on Major Issues

Table 2.4.1 compares the alternatives in terms of the environmental effects on the major issues. See Chapter 3 for a complete description of effects, and for the scientific basis for the results in this table.

Table 2.4.1 Comparison of the Effects of the Eastside Project Alternatives on the Major Issues and Their Indicators

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Hazardous Fuels – Issue 1: Proposed fuel/vegetation activities are not needed and are ineffective in protecting communities, structures and reducing the effect of wildfire across the landscape. The dead and dying lodgepole pine in the project area are a natural and periodic occurrence. **Hazardous Fuels – Issue 2**: Proposed fuel/vegetation activities are needed to protect the community of Elk City, the American River Subdivision, other subdivisions in the project area, and the natural resources in the area. The large amount of dead and dying lodgepole pine is creating an unacceptable hazard. Doing nothing is irresponsible.				
Area of future fuel model 8 and 8/10	355 acres 17%	1,036 acres 48%	1,036 acres 48%	957 acres 45%
Future area with low flame length potential, <4′	112 acres 5%	472 acres 21%	472 acres 21%	472 acres 21%
Future area with surface fire potential	227 acres 10%	768 acres 35%	768 acres 35%	725 acres 33%
Future area with potential tree mortality <50%	237 acres 11%	644 acres 29%	644 acres 29%	573 acres 26%
Area dominated by lodgepole pine	1,670 acres 53%	879 acres 28%	879 acres 28%	942 acres 30%
Watershed – Issue 3: Proposed road construction, road reconstruction, road decommissioning, and conversion of roads to ATV trails affect water quality in the short and/or long term.				
Total post project road density American River	2.3	2.3	2.3	2.3
Decreased Road miles in RHCAs	0	2.55	3.70	3.57
New miles permanent construction	0	0.57	1.13	0.56
Miles temporary road construction	0	15.1	10.5	10.7

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Watershed – Issue 4: Proposed vegetation treatment activities may increase water yield and change timing and duration of peak runoff, thereby decreasing stream channel stability.				
Equivalent Clearcut Area % by subwatershed	All nine subwatersheds below 15% ECA	All below 15% except Whitaker at 17%, and Queen at 18%. Risks considered negligible in all subwatersheds because of existing good channel stability	All below 15% except Whitaker at 16%, and Queen at 18%. Risks considered negligible in all subwatersheds because of existing good channel stability	All below 15% except Whitaker at 16%, and Queen at 18%. Risks considered negligible in all subwatersheds because of existing good channel stability

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Watershed – Issue 5: Proposed activities may increase erosion and sediment yield, which could impair fish habitat, and affect 303(d) listed streams.				
Percent over base sediment yield by subwatershed	No change to slight decrease in some subwatersheds	East Fork Am. River, Little Elk Creek – No increase. Middle Am. River, Kirks Fork, Lower Elk Creek <5 % increase. Lower Am. River 7% increase. Whitaker Creek, Box Sing Creeks 26% increase. Queen Creek 22% increase. Whitaker and Queen approaching thresholds set in MFP. All increases short term returning to pre-project levels within 5 years except Mid. Am. And Lower Am. River subwatersheds that decrease to below pre-project levels due to reduction in chronic sources through restoration.	East Fork Am. River, Little Elk Creek – No increase. Middle Am. River, Kirks Fork, Whitaker Creek, Queen Creek, Lower Elk Creek, Lower Am. River <5 % increase. Box Sing Creek 26% increase. All increases short term returning to pre-project levels within 5 years except Mid. Am. And Lower Am. River subwatersheds that decrease to below pre-project levels due to reduction in chronic sources through restoration.	East Fork Am. River, Little Elk Creek – No increase. Middle Am. River, Kirks Fork, Queen Creek, Lower Elk Creek, Lower Am. River <3 % increase. Whitaker Creek, Box Sing Creeks 26% increase. Whitaker approaching thresholds set in MFP All increases short term returning to pre-project levels within 5 years except Mid. Am. And Lower Am. River subwatersheds that decrease to below pre-project levels due to reduction in chronic sources through restoration.

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Fisheries – Issue 6: Proposed riparian planting and streambank re-contour activities affect fish and fish habitat by increasing streamside shading and the number of trees that may fall into the stream channels, and affect 303(d) listed streams.				
Large woody debris & Stream Temperature	Expect increased LWD with increased dead and dying lodgepole pine or other trees falling into streams. Lack of vegetation/fuels treatments may contribute to continued accumulation of fuels, potentially resulting in more severe wildfires, which, depending on size, severity, and location, could affect water temperature.	Restoration activities should decrease stream temperature in the long-term with growth of streamside trees and shrubs, and subsequent increased shading. No timber harvest occurs within any RHCAs. Negligible risk of causing adverse impacts from harvest/fuels activities.	Same as Alternative B.	Same as Alternative B.
Fisheries – Issue 7: Proposed streambank re-contour, harvest, road construction, road reconstruction, and road decommissioning activities have the potential to cause increased sediment delivery to streams in the analysis area, decreasing quantity and quality of spawning, rearing, and over-wintering fish habitat for Federally listed and BLM sensitive species.				
Cobble embeddedness	Amount currently above BO standard all streams	Measurable short-term degradation (i.e., greater than 10%) predicted in Lower Am. River and Queen Creek	No measurable change predicted (i.e., less than 10%) to existing condition in all subwatersheds	Same as Alternative C
Summer Rearing Habitat	Above or near objective for all streams	No measurable change predicted (i.e., less than 10%) to existing condition in all subwatersheds	Same as Alternative B	Same as Alternative B

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Winter Rearing Habitat	Well below objective for all streams	Measurable short-term degradation (i.e., greater than 10%) predicted in Whitaker and Queen Creek	No measurable change predicted to existing condition in all subwatersheds	Measurable short-term degradation (i.e., greater than 10%) predicted in Whitaker Creek
Issue 8: The American River has been heavily affected by historic instream mining activities that have reduced fish habitat complexity, e.g., meanders, pools, large woody debris, and pool riffle ratios. Also roads are encroaching on the river channel and are impacting riparian/aquatic habitat.				
Pool riffle ratios & number of pools	Chronic sources of erosion/sediment such as stream fords, roads, and historic dredge mined areas would continue to contribute sediment to stream channels and subsequent pool filling. Existing non-point sediment sources would slowly recover over time and pool habitat would slowly improve.	Would reduce chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels. Less change than alternative C, but greater than alternative D.	Would reduce chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels. Greatest change of alternatives.	Would reduce chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels. Less change than alternative C, and B.
Issue 9: Proposed stream reconnect and ATV bridge construction activities may affect stream channels and processes. ATV bridge construction has the potential to cause increased sediment delivery to streams in the analysis area and a take of some fish species.				
Fords eliminated	No Change, 2 fords remain on American River, 1 ford remains on Kirks Fork	Middle American River Ford hardened, Lower American River and Kirks Fork fords eliminated.	Middle American River, Lower American River and Kirks Fork fords eliminated.	Same as Alternative C

Indicator	Alternative A (No Action)	Alternative B (Proposed)	Alternative C	Alternative D
Additional anadromous fish habitat accessible	No Change	Queen Creek re-connected to American River, 1.35 miles of increased habitat.	Same as Alternative B.	Same as Alternative B.
Issue 10: Proposed activities (road to trail conversions, road relocation and obliteration, and new road construction) may restrict administrative/public access to Bureau of Land Management lands, and affect access routes to homes and private property.				
Miles new permanent Road	None	0.57 in Lower American River	0.57 in Lower American River, 0.56 in Middle American River	0.56 in Middle American River
Decreased highway vehicle miles	None	2.12	2.62	2.48
Miles of road to ATV trail conversion	None	1.62	1.62	2.39
Number of public bridges (highway vehicle)	No change, 1 bridge on road 1809, 1 bridge on road 443	No change, one bridge on road 1809, 1 bridge on road 443	New bridge in Middle American River, bridge on road 1809, bridge on road 443 total 3	Same as Alternative C
Issue 11: Access to complete management activities requires a transportation network. Proposed activities include a large amount of temporary road construction. Designing a transportation system that balances implementing projects cost effectively versus the environmental impacts from the transportation system is an important project consideration.				
Miles of temporary road on BLM	None	12.97	8.43	10.28
Miles of temporary road on Private	None	0.19	0.19	0.19
Miles of temporary road on Forest Service	None	2.15*	1.89*	0.26
Areas with roadless characteristics (applies to Forest Service lands only)	None	One affected area, American-2, impact to unroaded character**	One affected area, American-2, impact to unroaded character**	None

* Includes 1.89 miles that was included in the FEIS for the American and Crooked River Project
** Area was included in the FEIS for the American and Crooked River Project

Chapter 3. Affected Environment–Environmental Consequences

3.0 Introduction

This chapter describes the environmental components that may be affected by implementation of the proposed action or an alternative to the proposed action in the Eastside Project area. *Affected Environment* and *Environmental Effects* have been combined into one chapter to give the reader a more concise and connected depiction of what resources exist in the project area and what the effects to those resources would be. This chapter describes the direct, indirect, cumulative, irreversible, and irretrievable effects by indicator.

3.0.1 Scope of the Analysis

The existing condition describes the baseline condition against which environmental effects can be evaluated and from which progress toward the desired condition can be measured. Data and analysis are commensurate with the importance of the possible impacts.

Environmental consequences form the scientific and analytical basis for comparison of alternatives, including the proposed action, through compliance with MFP and NFMP standards and a summary of monitoring required by the National Environmental Policy Act (NEPA). The discussion centers on direct, indirect, and cumulative effects. Irreversible and irretrievable effects are also discussed for each resource indicator. Effects of the action can be neutral, beneficial, or adverse. These terms are defined as follows:

Direct effects are caused by the action and occur at the same time and place.

Indirect effects are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable.

Cumulative effects are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Irreversible effects are permanent or essentially permanent resource use or losses; they cannot be reversed, except in the extreme long-term. Examples of irreversible effects include minerals that have been extracted or soil productivity that has been lost.

Irretrievable effects are losses of productivity or use for a period of time; one example is road construction on suitable timberlands. Timber growth on the land is irretrievably lost while the land is used as a road, but the timber resource is not irreversibly lost because the land could grow trees again in the near future.

3.0.2 Cumulative Effects Analysis

Cumulative effects are discussed for each indicator under each resource. The cumulative effects analysis area will vary for each resource. Past activities (including grazing, timber harvest, road building, prescribed fire, stream and meadow restoration in the American River watershed, etc.) are considered part of the existing condition and are covered under the applicable section. Table 3.0.1 displays the past, present, and reasonably foreseeable future activities within the American River watershed.

Table 3.0.1 Projects considered for cumulative effects within and adjacent to the Eastside Project Area[1]

Project	Location	Activity	Time Period
Buffalo Gulch Timber Sale	BLM Buffalo Gulch Cr	Timber sale	Past
Maurice Creek Timber Sale	BLM Maurice and Buffalo Gulch Creeks	Timber sale	Past
Crooked River Demonstration	NPNF Crooked River	Fuel reduction demonstration	Past
Whiskey South	NPNF and BLM Campbell Creek, South Fork Face, Crooked River	Treating fuels, creating fuel breaks, timber harvest, watershed restoration, roading	Past
Buffalo Gulch Heap Leach Mine	Pvt on BLM Buffalo Gulch Creek	Vegetation clearing, site development	Past
Little Campbell Creek Timber Sale	BLM South Fork Face, Crooked River Face	Timber sale, road development	Past
Forgotten 400	BLM Lower American River	Timber harvest, roading, instream fish habitat improvement	Past
Bennett Logging	Private land Section 36	Timber removal on approximately 640 acres and roading	Past
Logging on Private Land	Private land Various in township	Timber removal on approximately 100 acres	Past
Private land development	Private land Various in township	Structure and road development	Past
Red River Instream Improvements BPA	NPNF Red River	Instream Structures and Riparian Planting	Past
Crooked River Instream Improvements BPA	NPNF Crooked River	Instream Structures, Riparian Planting, Side Channels, Connecting Ponds	Past
American River Instream Improvements	BLM American River	Instream Structures and Riparian Planting	Past
Relief Creek Instream Improvements	NPNF Relief Creek	Instream Structures and Riparian Planting	Past
Red River DSP	NPNF Red River	Defensible space burning project	Past
East Fork Crooked River Bridge	NPNF Crooked River	New bridge construction	Past
Box Sing Creek	BLM Box Sing Creek	Channel re-connect, removal of passage barrier	Past

[1] The table does not include projects that were, or will be, completed using categorical exclusions.

Project	Location	Activity	Time Period
Blanco Burn	Blanco and Lower Main Stem of Red River	1,000 acres of rehabilitation	Present
Lower Red River Meadows Restoration	NPNF Red River		Present
Red River Roadside Hazard Tree	NPNF	Removal of trees likely to fall on or across roads. Placement of large woody debris	Present
Noxious Weed Program	NPNF and BLM lands	Spot treatments of herbicide applications	Present
Crooked River Mining Activity (Golden Eagle Operation)	NPNF Crooked River	Placer Mining	Present
Recreational Suction Dredging	BLM and NPNF Upper Main stem of South Fork	Small suction dredging	Present
Nez Perce Tribe	NPNF Tribal restoration projects	Watershed and fish habitat improvement	Present
Watershed improvement projects	NPNF Forest wide	Improving road surface–graveling and grading work	Present
Crooked River Channel Maintenance	NPNF Crooked River	200 yards of channel restoration	Present
Red River Road Surfacing	NPNF Red River		Present
Range Allotments	NPNF and BLM American, Red and Crooked Rivers	Livestock use	Present
Developed Recreation Site maintenance and Trail Maintenance	NPNF various	Maintenance	Present
American and Crooked River Project	NPNF American River and Crooked River	Timber harvest, salvage, road decommissioning, watershed improvement	Present
Buffalo Gulch Culvert Replacements	BLM Buffalo Gulch	Replace culverts which block fish passage	Present
Buffalo Gulch Brook Trout Removal Project	BLM Buffalo Gulch	Brook trout removal project	Present
Whiskey South II	NPNF and BLM Campbell Creek, South Fork Face, Crooked River	Treating fuels, creating fuel breaks, timber sale and roading, road decommissioning	Foreseeable Future

Project	Location	Activity	Time Period
Upper Red River	Tribal restoration projects on the Nez Perce	Culvert replacement & road decommissioning	Foreseeable Future
Buffalo Gulch Road Obliteration	BLM and Framing Our Community Buffalo Gulch	Road obliteration	Foreseeable Future
Orogrande DSP	NPNF	Defensible space burning project	Foreseeable Future
Red Pines EIS	NPNF Red River	Fuel reduction, watershed and fish habitat improvement	Foreseeable Future
Templeton	NPNF	Suction Dredging	Foreseeable Future
Genesis	NPNF	Suction Dredging	Foreseeable Future
This-is-it Placer	NPNF Crooked River	Mining	Foreseeable Future
American River Restoration Projects	BLM Middle American River	Fish passage barrier replacement, instream habitat improvement, road stabilization and surfacing, channel reconnect, road to trail conversion	Foreseeable Future
South Fork Clearwater River Restoration Project	BLM East of Junction Flats	Rearing channel maintenance, riparian planting, road decommissioning	Foreseeable Future

3.0.3 American River Historic Activities

The post-settlement development history of American River dates to the mid-19th century. Gold discoveries provided the initial impetus for mining, road and trail development, grazing, homesteading, and early timber harvest. In recent decades, watershed and instream improvement projects have been implemented. These activities have affected the aquatic and terrestrial conditions in American River. Further description of these activities and analysis of their effects on various resources are provided in the individual resource sections.

What follows in this section are summaries of specific BLM and NPNF timber harvest projects and historic road construction in the American River watershed. These data contributed to the cumulative effects analysis in specific resource sections. The information displayed in this document is a compilation of available known historic data. No other known historic data is available (40 CFR 1502.22).

Records were queried to determine historic timber harvest in American River. Most of the larger timber sales also included road construction. From the NPNF Watershed Database, total recorded timber harvest in the 1950s was 142 acres; 1960s was 2,687 acres; 1970s was 2,591 acres; 1980s was 1,977 acres; 1990s was 999 acres; and 2000s to date has been 809 acres. The watershed database includes activities on private lands within American River. Timber harvest occurred prior to the 1950s, associated with mining and homesteading activities. This data is unavailable (40 CFR 1502.22).

The NPNF Timber Stand Database (TSMRS) and BLM timber harvest records were queried to determine harvest area associated with named timber sales. Table 3.0.2 shows the results of that query for timber sales by name greater than 100 acres in size.

Table 3.0.2 NPNF and BLM Timber Harvest History in American River

Timber Sale	Time Period	Acres
Erickson Ridge	1957–1966	297
Little Elk	1962–1967	739
Big Elk	1962–1969	481
Haysfork Creek	1965–1970	238
Wart Creek	1969	190
East Fork/Flint Creek	1972–1975	263
Buffalo Gulch	1978	35
Box Sing	1976–1981	125
Maurice Creek	1977	300
Limber Luke	1978–1981	661
Flint Creek	1982–1984	398
Little Campbell Creek	1984	148
Kirks Fork	1983–1985	241
Wigwam	1985–1986	100
Buffalo Gulch Mine Site	1991	250
Sparky	1992–1994	293
East Fork American	1994–1996	412
Forgotten 400	1996	159
Limber Meadows	1998	194
Misc unnamed and small projects	Various	1367
Total		**6891**

Road construction history in American River was summarized from the NPNF Watershed Database. The earliest road construction recorded in the database was dated 1890.

Table 3.0.3 Historic Road Construction–American River

Year	Miles of Road
Prior to 1950	49.40
1950–1959	5.70
1960–1969	75.00
1970–1979	48.40
1980–1989	40.40
1990–1999	47.10
2000–2004	3.30
Total to date	**269.30**

3.0.4 Environmental Effects

The discussion of affected environment and environmental consequences is organized by resource. Under each resource, the existing conditions are described for each indicator, followed by the environmental effects discussion, by indicator, for each alternative.

3.1 Fire and Fuels

3.1.1 Introduction

This project proposes to reduce hazardous fuels at a minimum of two scales. First, at an individual site scale, the treatment of fuels at this scale is important and is critically needed to address reducing wildland fire intensities within and adjacent to the wildland urban interface (WUI). Treatments would reduce the amount and distribution of surface fuels, both living and dead in all size classes. It would also reduce the vertical and horizontal continuity of fuels that can promote and support large wildland fire growth and increase the resistance to control. On the acres treated, the conditions would change from those that support torching and crowning to a condition that would moderate fire behavior and be more likely to restrict a wildland fire to the surface of the forest floor.

Secondly, this project looks at the larger drainage or watershed level. Considering both the Eastside Project and the NPNF American and Crooked River Project, can help create a pattern that would restrict the potential for wildland fires to become large to very large events that might threaten communities, road infrastructures and critical resource areas. The treatment areas will have the effect of modifying (interrupting) severe fire behavior when fires burn through them under conditions that have historically produced large intense fires.

These areas of modified fire behavior provide fire suppression resources opportunities to safely initiate fire control efforts. Firefighters will have anchor points and areas with less intense burning characteristics to work from. This allows a better chance to safely reduce the risk of large fires to "at-risk communities" or "communities of interest" such as Elk City, Ericson Ridge, and Upper American River along with road infrastructures, and natural resources. An example of how these factors are considered in the context of large wildfire events can be found in the Structure Protection Contingency Plan for the Elk City township and Red River Area, prepared by the Incident Command Team for the Slims Fire in 2003 (USDA-FS, 2003d).

The focus of these specific treatments is to reduce the amount of hazardous fuels on BLM lands, adjoining private and National Forest lands. The reduction of hazardous fuels serves several purposes. Treating wildland fuels changes the probability that wildland fires move across the landscape, and whether they ultimately impinge on urban areas containing structures, or result in fires of different sizes and ecological effects (Finney and Cohen, 2003). Therefore, treatments would create a buffer area that would help protect lands, improvements and structures in and around this portion of the Elk City township from the threat of wildland fire. It is recognized that wildland fuel treatments are not sufficient alone to abate threats to home ignition. Treatments would break up the continuity of existing heavy fuel loads both horizontally and vertically that can support high intensity wildland fires that move through surface vegetation and into tree crowns during periods of high fire danger. These periods of high, very high and extreme fire danger typically occur during late July, August, and early September. Conditions have become more volatile by repeated occurrence of drought and increasing levels of insect mortality.

In accordance with MFP (USDI BLM 1981a), slash would be reduced on all treatment areas, for hazard reduction, through a combination of machine piling and burning, broadcast burning or underburning.

3.1.1.1 Scope of the Analysis

The Eastside Project analysis area for fire and fuels includes the entire project area. Fuel models, using Anderson (1982) represent the surface fuel profile within the project area. Fuel models in the project area include fuel models 1, 3, 5, 8 and 10. Descriptions of the fuel models can be found in Appendix F. Stand structure and species composition are also components of wildland fuels. These

parameters when combined with the surface fuels models are used to determine the aerial component of the entire fuel profile.

3.1.1.2 Desired Condition

The desired condition can best be described by analyzing conditions based on the following indicators: (1) forest fuels, amount and distribution of fuels models; (2) fire behavior, flame lengths and fire type as it affects risk to life, property, natural resources, and fire fighter effectiveness, and; (3) tree mortality.

One purpose of the Eastside Project is to reduce hazardous fuels and treat natural and activity fuels to a level that reduces the risk of undesirable wildland fires, providing fire protection to adjacent subdivisions and additional private property.

When planning an activity, the intent is to either maintain a desired condition, or to trend toward the desired condition. If an area is already within the range of desired conditions, a management action should either keep the area within the desired ranges, or when the action results in moving outside the range, a mechanism to move conditions back into the range should be provided.

3.1.1.3 Fuel Models

Fuel models are sets of parameters that describe physical fuel properties, including fuel loading, fuel bed depth, and moisture of extinction (Anderson, 1982). Descriptions of the fuel models can be found in Appendix F. Each fuel model is typically used to represent a range of conditions in which fire behavior may be expected to respond similarly to changes in fuel moisture, wind, and slope. Fuel models are used as input in fire behavior prediction models.

The desired condition is for predicted fire behavior and associated flame lengths to decrease after timber harvest, thinning activities, prescribed burning, and slash treatment occur due to the changes in the fuel profile. The fuel profile, including small diameter woody material and small diameter understory trees, would resemble a Fuel Model 2 or 8 rather than a Fuel Model 10 or 12 (Anderson, 1982). In a Fuel Model 2, fire spread is primarily through the fine herbaceous fuels and fires are generally surface fires, and less than 3-inch fuel loading is estimated at 4 tons per acre (Anderson, 1982). In a Fuel Model 8, slow burning surface fires with low flame lengths are generally the case, although fire may occasionally encounter a heavy fuel concentration. Less than 3-inch fuel loading in this fuel model is estimated at 5 tons per acre (Anderson, 1982). Ladder fuels and the grass-forb-shrub component are kept in check by recurring mechanical or prescribed fire entries. Ladder fuels are continuous vertical vegetation that connects surface fuels to the crown fuels of overstory trees, forming a ladder by which a fire can spread into tree or shrub crowns (DeBano et al., 1998).

3.1.1.4 Fire Behavior (Flame Length/Fire Type)

Firefighter effectiveness, or the ease with which firefighters are able to suppress a fire, is based on the flame lengths, rates of spread, fire type (surface or crown), and torching. These fire behavior characteristics are dependent on the fuel loading and horizontal and vertical continuity of the fuels.

The North Idaho Fire Planning Unit Fire Management Plan (FMP) (USDI-BLM, 2005) objectives and strategies for the Elk City FMU state that all fires will be suppressed at <10 acres 90% of the time to protect the WUI and resource values.

Vegetation treatments that reduce stand densities and stratum layers as well as reducing fuel loading would decrease the potential flame lengths, alter the type of fire (surface versus crown), and intensity, thereby decreasing the risk to life (including fire suppression crews), property, and natural resources should a wildfire occur. The desired condition is to create conditions that allow fire suppression crews to effectively suppress most wildfires with hand tools. With the use of hand tools only, fire

suppression crews can successfully suppress fires burning with flame lengths less than four feet which is typical of fuel model 8 (Andrews, 1986).

3.1.1.5 Tree Mortality

Fire severity is the ecological effects of fire (DeBano et al., 1998). For trees, severity is often measured as percentage of basal area removed (Agee, 1993) The degree of mortality caused by fires is a function of stand structure and species composition, fuels loads, vertical continuity of fuels (live and dead) and the environmental conditions at the time of the fire. Fires with more intense burning conditions (i.e., high flame lengths, crowning) generally kill more trees.

Analyzing potential fire-caused mortality provides a mechanism for assessing risk to many other important forest values (i.e., late-successional habitat, water quality, soil productivity, and scenic beauty) that need to be protected at a scale larger than within 200 feet of structures. However, even surface fires that burn fine fuels can damage soils, and weaken or kill overstory trees, and provide an ignition source for homes and other property (Hungerford et al., 1991; Graham et al., 2000; Cohen and Stratton, 2003). Higher potential mortality means the risk is higher.

3.1.1.6 Analysis Methods

Stands (excluding major RHCAs and private inholdings) within the project area were sampled in 2004. Data collected included the existing fuel model along with stand characteristics that could be used to predict future fuel model conditions using the Fire and Fuels Extension to the Forest Vegetation Simulator (FFE-FVS) modeling. FFE-FVS simulates fuel dynamics and potential fire behavior over time, in the context of stand development and management (Reinhardt and Crookston, 2003). Strengths and weaknesses of modeling are discussed in Appendix G. Existing stand structure and species composition, existing fuel conditions and the ongoing mountain pine beetle epidemic were modeled. Also fuel modeling for the American and Crooked River FEIS (USDA-FS, 2005a) are incorporated by reference. The existing condition fuel models were then compared with the predicted fuel models ten years hence to determine the potential fuel condition for each Alternative.

3.1.2 Indicator 1–Fuels

3.1.2.1 Existing Condition

The American River area was impacted heavily by large fires in the latter part of the 19th and early part of the 20th century. This created a large area dominated by even-aged stands of early seral species, such as lodgepole pine, that are interspersed with areas of mixed conifer species. The increased effectiveness of fire suppression in western forests since the 1930s has been followed by a subsequent decrease in large fire occurrences. With diminished large fire occurrences and ongoing stand successional patterns, litter has built up, tree density has increased, and fuel continuity has increased both vertically and horizontally in many areas. This can result in large fires and increased fire intensity when a fire does occur.

The American and Crooked River FEIS describes the fuels in the American River (USDA-FS, 2005a). There are of a variety of fuel conditions, described by fire behavior fuel models (Anderson, 1982). The fuel models within the area were derived based on potential vegetation, VMP dominance type, size class, and canopy cover for stands located within the watershed area. Table 3.1.1 displays the acreage of each fuel model currently within the American River watershed.

Table 3.1.1 Current Fuel Models Present in the American River.[1]

	1	2	4	5	8	10	99
Acres	831	203	3504	6617	23038	24397	5
Percentage	1	<1	6	11	39	42	<1

[1]Table adapted from American Crooked FEIS (USDA-FS, 2005a)

Fuels on BLM managed lands within the Eastside Project are dominated by models 8 and 10, or a combination of 8 and 10, with fuel model 12 occurring incidentally where there is a large amount of dead and down trees. Table 3.1.2 depicts the fuels outside of the major RHCAs and private inholdings. Walk-through surveys verify that the RHCAs along East Fork of the American River, Queen, Box Sing, and Whitaker creeks mostly resemble fuel conditions similar to the adjacent upland. Fuels on much of the private inholdings are characterized by models 1, 2, 5, and 8 and are reflected above in Table 3.1.1. Fuel models outside the major RHCAs are illustrated on Map 11 in Appendix A.

Table 3.1.2 Current Fuel Models Eastside Project

	8[1]	8/10[1]	10[1]
Acres	913	773	490
Percentage	42	36	22

[1]Fuel plot data was determined using photo guides for appraising downed woody fuels sampled 2004.
Does not include RHCAs or private inholdings.

3.1.2.2 Environmental Effects

Fuel quantity is an important element to consider in reducing undesirable fire behavior. Direct effects of fire result from the characteristics of the heat regime of the fire, which is controlled by the manner in which fuels burn. Managing fuel quantity and arrangement across the landscape can help moderate the heat regime of a fire. Additionally, treated areas provide locations where fire suppression resources can safely and more effectively initiate fire control measures.

Alternative A (No Action Alternative)

Under the "no action" alternative, the fuel loadings, both live and dead, would continue to increase. There would be an increase in fuel model 10 and a subsequent decrease in fuel model 8 as these stands age and change over time. Additionally, with the mountain pine beetle infestation, most of these stands will continue to experience high mortality which would lead to an increase in the dead fuel load making these stands best represented by fuel model 12. Wildland fires that occur within Fuel Models 10 and 12 offer tremendous resistance to control due to greater flame lengths characteristic of these models (Andrews, 1986). In a fuel model 10, fires burn with greater intensity than the other timber litter models and crowning, spotting, and torching are more frequent. Fuel model 12 is characterized as a continuous layer of slash. Fires burning in fuel model 12 spread quickly through the fine fuels and build in intensity as the larger fuels start burning. Active flaming is sustained for long periods and can generate a wide variety of firebrands that cause spotting and control problems. See Table 3.1.3 below, as well as Map 12 (Appendix A), for predicted fuel model acreage and percentages by alternative for the Eastside Project.

Alternatives B, C, and D

With these alternatives the fuel conditions in the project area would continue to change from fuel model 8 to fuel models 10 and 12 as the untreated stands age and fuels accumulate, but at a lesser rate than Alternative A. Alternatives B, C, and D would reduce the fuel loadings and continuity over the project area. These treatments will modify the fuel models from fuel models 10 and 12, which result

in fires with high intensities and severity, to fuel models 1 and 8, with lower intensities and severities. The areas where the fuels have been modified will help slow fire spread and reduce intensities, which would improve the likelihood of successful fire suppression. These fuel treatments would remain effective for up to 20 years then, as the vegetation grows, they will become less effective. However, if left untreated, the current and increasing fuel buildup would remain for a much longer time frame and potential fires would be high intensity and severe in nature.

Alternatives B, C, and D would treat fuels located within the wildland urban interface (WUI) areas within the project area. Therefore, Table 3.1.3 below also identifies the acres treated within the WUI by each alternative. As shown the action alternatives are similar in impact. Fuel model 8 increases 24–26 percent, while fuel models 10, 10/12, and 12 have combined decreases of 28–31 percent compared to No Action. Appendix A, Map 13 shows the effects of vegetation and fuels treatments for alternative B that is very similar to alternative C. Alternative D would not alter the fuel models in the northwest corner of the project.

Table 3.1.3 Predicted Fuel Models in Year 2015, Eastside Project

Fuel Model[1]	Alternative							
	A		B		C		D	
	Acres	% Area	Acres	% Area	Acres	% Area	Acres	% Area
8	60	3	628	29	628	29	577	27
8/10	295	14	406	19	406	19	380	18
10	1450	66	874	40	865	40	942	43
10/12	299	14	245	11	254	11	254	11
12	72	3	23	1	23	1	23	1

[1]Calculated in FFF-FVS (Reinhardt and Crookston, 2003) from reconnaissance data gathered in the proposed area and based on proposed treatments. Does not include RHCAs or private inholdings.

3.1.3 Indicator 2–Predicted Fire Behavior

3.1.3.1 Existing Condition

The risk of undesirable fire, including crown fire, can best be described by examining predicted fire behavior resulting from existing stand conditions. To analyze the alternatives with respect to predicted fire behavior, one can examine fire behavior attributes such as flame length, and potential fire type. Table 3.1.4 depicts the potential fire behavior and fire type for the Eastside Project area, if a fire were to occur in the existing forested stands under moist low wind (MLW) and very dry high wind (VDHW) fuel moisture burning conditions.

Table 3.1.4 Current Fire Behavior Attributes for the Eastside Project

Burning Conditions	Potential Flame Length Fire–Acres[1]			
	1–4 Feet	4–8 Feet	8–20 Feet	>20 Feet
Moist Low Wind	2,176			
Very Dry High Wind	685	56	630	742
	Potential Fire Type–Acres[1]			
	Surface	Conditional Crown	Passive Crown	Active Crown
Moist Low Wind	2,062		114	
Very Dry High Wind	227	399	1,362	188

[1]Calculated in FFF-FVS (Reinhardt and Crookston, 2003) from reconnaissance data gathered in the proposed area and based on moist and very dry summer weather and fuel moisture conditions.

The fuel plot data was analyzed in FFE-FVS to determine the fire behavior attributes. FFE-FVS displays measures of fire hazard as they change during the course of stand development and in response to management actions and other disturbances. How management actions affect potential flame lengths, fuel loading and fire intensity are key questions. As is depicted in Table 3.1.4, under very dry burning conditions, much of the area has predicted flame lengths greater than four feet, and the predicted fire type is predominately a crown fire.

3.1.3.2 Environmental Effects

Predicted fire behavior (flame length and fire type) is an important element to consider when determining the effectiveness of proposed management actions. Suppression resources with hand tools are generally successful, and hand line should hold the fire, with flame lengths of zero to four feet (Andrews, 1986). Four to eight foot flame lengths require mechanized equipment for successful suppression operations, and hand line cannot be relied on to hold fire (Andrews, 1986). Fire may present serious control problems, such as torching out, crowning, and spotting, and control efforts at the fire head will be ineffective with eight foot or greater flame lengths (Andrews, 1986).

Alternative A (No Action Alternative)

Under the “no action” the amount of area susceptible to increased flame length and crown fire would continue to increase. With the lack of management actions most stands would continue to evolve in the near future with increased fuel loads, and the continued increase in ladder fuels. In some cases, due to the effects of the mountain pine beetle, there will be a loss of most of the overstory trees creating a condition of regeneration interspersed with large amounts of dead and down fuels. Table 3.1.5 below provides acreage of differing potential characteristics by alternative for the Eastside Project. There would be a decrease in firefighter and public safety due to fire behavior conditions that exhibit a high resistance to control. There would be an increased risk of damage to homes and improvements on private property, and impacts to other natural resources.

Alternatives B, C, and D

With these alternatives, the untreated stands would continue to evolve and produce increased flame lengths and crown fire potential as they age and fuels accumulate, but at a lesser rate than Alternative A. Alternatives B, C, and D would reduce the flame lengths and crown fire potential over the project area. Reduced fire intensity potential would improve the likelihood of successful fire suppression. The treated area would reduce the potential for wildfire originating on NPNF land impinging on urban areas. The Eastside Project, when combined with the adjacent NPNF American and Crooked River Project, reduces the potential for a large scale wildland fire originating within the WUI.

Alternatives B, C, and D would treat fuels all located within the WUI areas within the project area. Therefore, Table 3.1.5, also identifies the acres within the WUI by each alternative. The treatments proposed under Alternatives B, C, and D are meant to decrease the probability that structures or natural resources on the eastside of the Elk City township would be threatened by undesirable fire or spotting. This treatment includes reducing fuels on BLM lands that could produce firebrands, which may threaten natural resources or private homes downwind of the treatment areas.

The risk of fire starts, natural or human-caused, would not change as a result of implementing any of the alternatives considered in detail; only the risk of undesirable fire behavior is being analyzed in this section of the analysis. FFE-FVS is not intended to predict the probability of fire or the spread of fire between stands (Reinhardt and Crookston, 2003).

Table 3.1.5 Potential Fire Behavior Attributes for the Eastside Project in Year 2015

Potential Flame Length[1]	Alt A		Alt B		Alt C		Alt D	
	Acres	% Area	Acres	% Area	Acres	% Area	Acres	% Area
1–4 Feet	112	5	472	21	472	21	472	21
4–8 Feet	108	5	248	11	248	11	212	10
8–20 Feet	263	12	258	12	258	12	191	9
>20 Feet	1,730	78	1,235	56	1,235	56	1,335	60
Potential Fire Type–Acres[1]	**Alt A**		**Alt B**		**Alt C**		**Alt D**	
Surface	227		768		768		725	
Conditional Crown	399		113		113		113	
Passive Crown	1,362		938		927		981	
Active Crown	188		357		357		357	

[1]Calculated in FFF-FVS (Reinhardt and Crookston, 2003) from reconnaissance data gathered in the proposed area and very dry high wind conditions.

3.1.4 Indicator 3–Tree Mortality

3.1.4.1 Existing Condition

The potential for direct fire related tree mortality is based upon stand characteristics, vegetation and fuels that control the amount of heat affecting living plant tissues. Current conditions on the Eastside Project show the potential for high levels of tree mortality from crown scorch alone, including stand densities, multiple tree canopy layers (ladder fuels), and heavy fuel loads as represented by fuel model 10. Table 3.1.6 depicts the potential fire-caused tree mortality by percent of basal area (a measure of the cross sectional area of trees on an area), for the Eastside Project area, if a fire were to occur in the existing forested stands under moist low wind (MLW) and very dry high wind (VDHW) fuel moisture burning conditions.

Table 3.1.6 Acres of Current Potential Fire Caused Tree Mortality for the Eastside Project

Burning Conditions	Potential Mortality % Basal Area Acres[1]			
	<25	25–50	50–75	75–100
Moist Low Wind	780	1352	44	
Very Dry High Wind	131	535	133	1377

[1]Calculated in FFF-FVS (Reinhardt and Crookston, 2003) from reconnaissance data gathered in the proposed area and based on moist low wind and very dry high conditions.

The fuel plot data was analyzed in FFE-FVS to determine the fire behavior attributes. FFE-FVS displays measures of tree mortality as they change during the course of stand development and in response to management actions and other disturbances. How management actions effect potential tree mortality is a key question on potential impacts to other resources values such as soils, wildlife habitat, sensitive or protected fish and visuals. As is depicted in Table 3.1.6, the potential mortality is greater than 50 percent on 69 percent of the area under very dry burning conditions.

3.1.4.2 Environmental Effects

The small diameter classes of each species are less fire resistant, with grand fir, alpine fir and Engelmann spruce the least resistant species. However, the large percentage of the area with greater than 50 percent mortality is an indication that large trees will be killed on 69 percent of the area under very dry burning conditions.

Alternative A (No Action Alternative)

Under the "no action" the amount of area susceptible to increased tree mortality would continue to increase. With the lack of management actions most stands would continue to evolve in the near future with increased fuel loads, and the continued increase in ladder fuels, thereby creating conditions favorable to increased mortality of large trees. In some cases due to the effects of the mountain pine beetle there will be a loss of most of the overstory trees creating a condition of regeneration interspersed with large amounts of dead and down fuels. In these areas virtually all of the trees would be killed by a potential wildfire. See Table 3.1.5 above for acreage of differing potential characteristics by alternative for the Eastside Project.

Alternatives B, C, and D

With these alternatives the stand conditions would continue to evolve that create conditions for increased tree mortality from a potential wildfire, but at a lesser rate than Alternative A. Under Alternatives B, C, and D, residual tree mortality would be lowered due to two contributing factors: (1) removal of ladder fuels and reduction of surface fuel loads; and (2) retention of larger diameter and more fire resistant tree species, such as western larch, Douglas-fir, and ponderosa pine. Additionally, tree mortality from future fires would be lower following proposed treatments due to more open stand conditions and the retention of fire resistant species.

Alternatives B, C, and D leave stand conditions where the potential for fire caused mortality is lessoned. The alternatives are very similar with a reduction of 20–23 percent in area with a potential mortality of 75–100 percent. Table 3.1.7 gives a complete breakdown by alternative.

Table 3.1.7 Potential Mortality Attributes for the Eastside Project–2015

Potential Mortality % Basal Area[1]	Alt A		Alt B		Alt C		Alt D	
	Acres	% Area	Acres	% Area	Acres	% Area	Acres	% Area
<25	107	5	164	7	164	7	128	6
25–50	130	6	480	22	480	22	445	20
50–75	56	2	165	7	165	7	165	7
75–100	1920	87	1404	64	1404	64	1475	67

[1]Calculated in FFF-FVS (Reinhardt and Crookston, 2003) from reconnaissance data gathered in the proposed area and based on moist and very dry summer weather and fuel moisture conditions.

Irreversible or Irretrievable Effects–Fuels, Potential Fire Behavior, Potential Tree Mortality (Common to All Alternatives)

No irreversible commitments are proposed under any of the alternatives. Tree mortality and loss of other plant life due to wildfire would be irretrievable but not irreversible as trees and other plant life could be regenerated over time**.** However all untreated areas, including RHCA buffers, could contribute to increased risk of high intensity, lethal fires. Under the No Action Alternative, undesirable wildfires could occur within the project area in the future. Natural resources and private property could be threatened or destroyed.

3.1.5 Cumulative Effects–Fuels, Potential Fire Behavior, Potential Tree Mortality

The cumulative effects analysis area for fuels is the American River watershed. The cumulative effects of the alternatives considers the past, present and reasonably foreseeable actions. The effects of the past actions are included in the existing condition by indicator. Past BLM categorical exclusions are described in greater detail below. Present and foreseeable actions other than categorical exclusions are listed in Table 3.0.1.

Common to All Alternatives

The fuels management projects adjacent to the project area are the Transportation Corridor Project on BLM land and Idaho County has received a Partnership Grant to complete treatments on the road corridors on private land that adjoin BLM treatment areas. The purpose of these treatments is to reduce available vegetation/fuels within 200 feet of private and public ingress and egress routes, and provide suppression opportunities. The size and scope of these treatments are small, but assist in creating a dispersed pattern of fuels reduction on BLM lands within the WUI.

The Sultan 60 and Tailings 40 projects are small timber sales that include fuels reduction. The Sultan 60 abuts the Eastside Project and Tailings 40 project lies west of the Ericson Ridge road on the north end of the Elk City township. The Borowicz 40 completed in 2003 comes up to the Ericson Ridge road on the north end of the Elk City township, and also modified the vegetation and fuels conditions. All are small projects within the WUI and assist in creating a dispersed pattern of fuels reduction on BLM lands.

The NPNF is implementing the American and Crooked River Project adjacent to the Eastside Project area. “The purpose of this project is to reduce existing and potential forest fuels, create conditions that will contribute to sustaining long lived fire tolerant tree species (ponderosa pine, western larch) and contribute to the economic and social well being of people who use, and reside with the local area” (USDA-FS, 2005a). By implementing the silvicultural prescriptions, that portion of the American and Crooked River Project that is in the American River will provide beneficial effects to these communities at the landscape scale. The project employs a dispersed treatment strategy, that when combined with the Eastside Project, would reduce the effects of a large scale wildland fire. This combination of dispersed treatment units over both projects would modify the fuel models from fuel models 10 and 12, which result in fires with high intensities and severity, to fuel models 1 and 8, with lower intensities and severities. While it is recognized that the area within 200 feet of structures has the most influence on if they would survive a wildfire, it is also recognized that fuels management extending away from urban locations reduces the likelihood that wildland fires will spread to urbanized areas and pose ignition threats (Finney and Cohen, 2003). Also the BLM lands lie between Elk City, the subdivisions along the American River and the NPNF lands. Therefore, the Eastside Project would also help protect NPNF lands from wildfire originating on private lands. The Eastside Project helps with the landscape level goals by complementing the American and Crooked River Project.

Private Lands–Much of the non-corporate private land adjacent to and within the fuel treatment project area has been impacted by recent efforts by the land owners to deal with dead and dying lodgepole pine

on their properties. Bennett Forest Industries has logged their holdings in the southern portion of the Elk City township along the south boundary of the Eastside Project. Elk City Alliance and Framing Our Community (a nonprofit organization) have been working through the FIREWISE program with Idaho Department of Lands and local landowners in the area doing fuel treatment adjacent to some structures. All of these actions provide positive benefits to the private land and the BLM lands in the Elk City township, and decrease the risk of property and resource damage, and firefighter and public injury.

Any future development within the project area subdivisions and additional private property would benefit from reduced fire risk under Alternatives B, C and D because of the added fire protection these alternatives offer.

Alternative A (No Action Alternative)

This alternative would have no immediate effect on fuel conditions in the project area. However, in the short to long term, fuel loadings, both live and dead, would continue to increase, stand structure and species composition would change with more late seral species (grand fir, alpine fire, Engelmann spruce) becoming established. The result is that more of the project area could sustain fires with greater flame lengths, more crown fire potential, and more potential for tree mortality. Over time fire suppression options would become more limited, increasing the risk of property and resource damage, and firefighter and public injury.

Alternatives B, C, and D

These alternatives all provide mechanical and prescribed fire fuel reduction treatments, differing in the amount and location of those treatments. The fuel reduction can reduce the intensity and severity of a fire burning through those areas.

A recent compilation of available research (Graham et al., 2004) points out that realistic objective of fuel treatments is to reduce the likelihood of crown fire and other fire behavior that would lead to a loss in value or lead to undesirable future conditions, not to guarantee elimination of crown fire. It goes on to say that “the most effective strategy for reducing crown fire occurrence and severity is to (1) reduce surface fuels, (2) increase height to live crown, (3) reduce canopy bulk density, and (4) reduce continuity of the forest canopy.” It also points out that “fuel treatments can increase the probability of modifying fire behavior during most weather conditions. Extreme weather conditions (low fuel moisture contents, low humidity, high winds) can create fire behavior that can burn through or breach most fuel treatments (Finney et al., 2003).

3.2 Air Quality

3.2.1 Introduction

3.2.1.1 Scope of the Analysis

The area potentially affected by smoke emissions includes the project area and the airsheds that immediately surround it. The project area is located in Idaho Airshed No. 13. The analysis of air quality includes identifying the adjacent and down wind airsheds of concern (Class I and non-attainment areas) and comparing the amounts of smoke and particulate matter to be produced as a result of the fuels treatment activities associated with each alternative. The analysis includes discussion of the consequences of wildfire in regards to air quality.

3.2.1.2 Regulatory Framework

The Clean Air Act, passed in 1963 by the US Congress as amended, is the primary legal instrument for air resource management. The Clean Air Act amendments of 1977 established the designation of Class I and II areas for air quality management. Class I areas receive the highest levels of protection under the Prevention of Significant Deterioration (PSD) program. This program regulates air quality in these areas through application of numerical criteria for specific pollutants and use of the Best Available Control Technology (BACT).

The Bureau of Land Management is a party to the North Idaho Smoke Management Memorandum of Agreement (MOA), which initiated the joint smoke management program with the state of Montana through the Smoke Management Monitoring Unit located in Missoula, Montana. This MOA can be found in the project file. The Operating Guide for the Montana/Idaho Smoke Management Group is based upon the Environmental Protection Agency Interim Air Quality Policy on Wildland and Prescribed Fires. The Smoke Monitoring Unit coordinates prescribed burn activities through meteorological scheduling in order to ensure that cumulative air quality impacts are minimized.

Air quality impacts due to prescribed fire smoke result from a combination of emission production and atmospheric dispersion (Sandberg et al., 2002). Dispersion is dependent on meteorological conditions including seasonality, large-scale prevailing wind patterns, atmospheric stability, and local terrain-influenced weather patterns. The Smoke Monitoring Unit utilizes dispersion forecasts as a tool for making daily burn recommendations to members of the MT/ID Smoke Management Group.

The Clean Air Act requires that the Environmental Protection Agency (EPA) identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. Each state is also required to develop an implementation plan to maintain air quality. The EPA has issued National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead and particulate matter 10 microns in diameter or smaller (PM 10) and 2.5 microns and smaller (PM 2.5). Idaho maintains similar standards for these pollutants.

Table 3.2.1 National Ambient Air Quality Standards for PM 10 and PM 2.5

		NAAQS
PM 10	24-hour average	50μg/m^3
	Annual arithmetic Mean	150μg/m^3
PM 2.5	24-hour average	15μg/m^3
	Annual arithmetic Mean	65μg/m^3

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3.2.1.3 Analysis Methods

Particulate emissions production was calculated using the First Order Fire Effects Model (FOFEM). FOFEM predicts the quantity of natural or activity fuel consumed by prescribed fire and the resultant emissions. Fuel loadings are derived from forest cover type classifications as represented in the analysis area.

FOFEM operates under the assumption that the entire area of concern experiences fire. For discontinuous burns, the results should be weighted by the percent of the area burned. For the purposes of this analysis, it is assumed that 60 percent of the acres to be treated by fire would actually produce particulate emissions.

The assumptions and methods used in FOFEM for modeling emissions were taken from (Reinhardt et al., 1997). Emissions production depends both on fuel consumption and on the combustion efficiency of the fire. Therefore, it is important to note that emissions quantities are derived from tons of fuel consumed and not tons of fuel treated. FOFEM models emissions production, not visibility or dispersion. Categories of emissions estimated are PM 2.5 and PM 10. About 90 percent of PM 10 is actually in the PM 2.5 category (Peterson, 2001). Idaho and Montana monitor for both categories, therefore the amount of both are modeled in this analysis.

A "Decision Analysis for Smoke Modeling" (Acheson et al., 2000) was used to select the level of modeling for this analysis. A threshold in this decision analysis for PM emissions is established at 100 tons/year. This threshold is based on the minimum increase required to establish the existence of a major source for non-compliance in PSD for downwind Class I areas or to exceed the NAAQS standards. Since none of the alternatives in the analysis area approaches or exceeds 100 tons/year based on 10 year implementation, no further analysis is required.

The model input parameters and the output values as well as the emissions worksheets can be found in the project file.

3.2.2 Indicator–Particulate Matter and Visibility

3.2.2.1 Existing Condition

Air quality associated with the Eastside Project analysis area is generally considered good to excellent most of the year. Local adverse effects result from dust from native-surfaced roads and smoke from prescribed burning, agricultural burning, and wildfires. Due to active fire suppression, current smoke emissions are significantly reduced from historical averages, especially during the wildfire season (Quigley and Arbelbide, 1997).

The Eastside Project analysis area is unclassified, but is considered to be in compliance with the NAAQS. The closest non-attainment areas include portions of Missoula County, Montana (approximately 100 air miles to the northeast), and Boise and Sandpoint, Idaho (approximately 200 air miles to the southwest and northwest, respectively). The average large-scale airflow is generally from a westerly direction throughout the year. However, local and regional climatic conditions, as well as topography, influence smoke concentrations and dispersal.

The Selway-Bitterroot Wilderness, 9 air miles to the northeast, and the Hells Canyon National Recreation Area, 40 air miles to the southwest, are the closest Class I areas to the Eastside Project analysis area. All other areas, including the Eastside Project analysis area, are designated Class II areas.

3.2.2.2 Environmental Effects

All action alternatives would require prescribed burning to reduce fuel loadings to an acceptable level. The resulting smoke would affect air quality. Fugitive dust generated from road related activities and increased vehicle traffic from logging operations would also temporarily affect air quality.

Four methods of prescribed burning would be used to accomplish fuel load reduction (see Table 3.2.2. below):

- Broadcast burning would be used in slash and burn treatments. Because combustion is efficient, a convection column forms which lifts most of the smoke above the mixing air layer.
- Underburning would be used to reduce activity created fuels. The objective is to reduce fuel loading while protecting the residual overstory trees from damage due to heat and flames. Since the burning is deliberately cool and slow, combustion is likely to be inefficient. More particulate matter per acre of fire is often produced with this method of burning than with other methods.
- Machine pile burning would be used for activity created fuels. This type of burning concentrates slash in specific locations to eliminate the need to broadcast or underburn. Slash is gathered and piled mechanically throughout the unit or at the landing. Piles are burned after a season of curing when the fuel moistures are low resulting in efficient combustion, thus lessened particulate matter. This type of burning has less effect on air quality compared to underburning.
- Hand pile burning would be used for activity created fuels on steep ground where machines cannot operate and other types of burning are not acceptable options. These piles are typically smaller and cleaner than machine piles.

Table 3.2.2 Burn Type Acreage by Alternative

Burn Type	Alt B	Alt C	Alt D
Broadcast burn	287	287	256
Underburn	182	182	144
Burn excavator piles	770	761	728
Burn hand piles	54	54	43
Total	**1293**	**1284**	**1171**

The following discussion compares the direct and indirect effects of all the alternatives. Table 3.2.3 displays the PM 10 and PM 2.5 emissions expressed in tons/year by alternative is included at the end of the discussion.

Alternative A (No Action Alternative)

There would be no direct effects on the existing condition of air quality from this alternative because no prescribed burning would occur. No particulate matter would be produced and visibility would not be impaired due to prescribed burning.

Indirect effects would be that fuel loadings continue to increase and wildfires would continue to occur. Wildfires tend to burn much larger acreages than under a controlled prescribed fire scenario, and are not planned around other wildfire events or meteorological conditions that would allow for dispersion and transport away from impact zones. Wildfire occurrence without previous fuel reduction is likely to produce two to four times greater particulate matter emissions than would be generated by prescribed fire (Quigley and Arbelbide, 1997).

Common to All Action Alternatives

The alternatives differ only in the amount of particulate matter produced (see Table 3.2.3). Fugitive dust generated from road activities and increased vehicle traffic would also temporarily affect air quality by implementing any of the action alternatives.

Indirect effects would be a long-term decrease in fuel loading following implementation of prescribed burning. Therefore, there would be a decrease in particulate matter emissions and the impairment of visibility from wildfires when they occur.

Table 3.2.3 Approximate Annual Emissions by Alternative,
Based on 10-year Implementation (tons per year)

	Alt B	Alt C	Alt D
PM 10	51.4	51.2	47.0
PM 2.5	43.6	43.3	39.8

Irreversible or Irretrievable Effects

Impacts from smoke to the air resource are temporary; therefore there are no irreversible or irretrievable effects on the air quality resource under any of the alternatives.

3.2.2.3 Cumulative Effects

The cumulative effects area for air quality is Airshed 13. Consideration of cumulative effects for air quality takes a different approach than for other resources. Past activities in the analysis area don't necessarily enter consideration, except in the sense that use of existing roads and facilities may contribute to fugitive dust levels as described above. Present use of and activities in the analysis area are continuing with a current assessment of good to excellent air quality.

All the action alternatives would affect air quality. Alternatives B and C would have similar effects on air quality, with Alternative C producing slightly lower emissions. Alternative D would have the least effect on air quality because it has the least total acres to be treated and produces the least total quantity of particulate emissions. Locally adverse and cumulative impacts to air quality could be expected if extensive prescribed burning occurred under any of the action alternatives, particularly if that burning occurred in conjunction with on-going wildfires or other prescribed burning activities in and adjacent to the airshed. Other potential prescribed burning projects that could have an impact are listed in the Table 3.0.1 at the beginning of this chapter (description of the past, present and foreseeable future actions). However, design measures and procedures outlined in the North Idaho Smoke Management Memorandum of Agreement are intended to increase the efficiency and effectiveness of communications about, and coordination of, prescribed burning to avoid adverse cumulative effects.

3.3 Vegetation

3.3.1 Introduction

This project proposes vegetation treatments along with the associated reduction of hazardous fuels. This section will address the vegetative responses to the alternatives for the major tree species. In addition the direct and indirect effects to threatened and endangered plant species and weed species will be analyzed.

3.3.1.1 Scope of the Analysis

The vegetation section considers habitat capability, disturbance mechanisms, and successional processes. It is closely linked to the fuels section.

The geographic scope of the vegetation analysis considers the American River watershed as a whole. Very specific analysis for existing condition and direct and indirect effects of the alternatives is the Eastside Project area. The American River watershed defines the area of cumulative effects.

3.3.1.2 Regulatory Framework

The Chief Joseph Management Framework Plan (MFP), as amended, and the North Idaho Timber Management FEIS (NITMEIS) govern management of the forested areas of the Cottonwood Field Office. The proposed treatment units lie in the Intensive Timber Management land class calling for maximum sustained yield timber production (USDI-BLM, 1981a p II-4 & II-6) (USDI-BLM, 1981b p 2-11).

The MFP and NITMEIS also state that all final harvest and reforestation projects will be designed to achieve full stocking on 90% of the treated area within 5 years.

The MFP (p. II-36–II-41) outlines visual resource management (VRM) controls. The Eastside Project contains VRM Class III designated lands that are subject to the following VRM controls:

- A management activity may repeat the dominant qualities common in the landscape and may visually change the essential character of existing dominance factors and are generally subordinate to the visual strength of the natural landscape.
- Clearcuts may be seen but must simulate typical natural openings. No geometric shapes are allowed. Size shall not be greater than 50 acres.
- Shelterwood or selective logging with a maximum cut of 60 percent is a modification of textural contrast. Therefore, resulting openings appear natural. They shall not exceed a 60 percent cut. Some feathering may be necessary to meet class objectives.

Although the MFP was not amended by PACFISH: BLM implements PACFISH in conformance with the Terms and Conditions of the 1998 Biological Opinions on the MFP for steelhead and bull trout. The Riparian Habitat Conservation Areas (RHCAs) are areas where management activities are subject to specific standards and guidelines. These PACFISH standards and guidelines for timber harvest would be applied for all action alternatives.

The above factors were used in the design of vegetation treatments, for both location and extent.

3.3.1.3 Analysis Methods

The data for analysis of the existing vegetation condition came from BLM and NPNF data sources. The data specific to BLM managed lands came from Forest Vegetation Information System (FORVIS) stand exam information collected in 2004, and rare plant/botanical surveys done in 2004. Stand delineation was based upon species composition, stand structure, and physiography of the area. The information in

FORVIS was analyzed using the Forest Vegetation Simulator (FVS), the Stand Visualization System (SVS) and Geographic Information System (GIS) layers.

NPNF information derived for the American and Crooked River FEIS (USDA-FS 2005) was used for other areas and the data and methodology is incorporated by reference. The data includes stand exam information from the Field Sampled Vegetation Database (FSVEG), activities from the Forest database (TSMRS), Forest Inventory and Analysis (FIA), Region 1 Vegetation Map (R1VMAP), aerial photo interpretation, and field surveys.

Potential treatment areas were based on insect and disease severity mapping, aerial photograph interpretation, field review, and proximity to the wildland urban interface (WUI). The pattern of potential treatment areas was further influenced by potential fire behavior attributes of the current landscape and wildlife use patterns. The characteristics of vegetation in the analysis area was analyzed utilizing the FORVIS data base and GIS, including acres, slope, trees per acre, species composition, size class distribution, volume per acre, habitat type, and forest type. RHCA widths were identified based on stream characteristics and fish presence/absence, and include landslide prone area identification. Areas within RHCAs, landslide prone acres were identified and eliminated from further consideration. Harvest systems were assigned to the potential harvest areas based on topography, slope and access. Percent harvest removal was based on a desired residual target stand and utilized FORVIS data, projections from FVS, aerial photograph interpretation, and field review. The residual base target for stands was set to meet VRM restrictions. Prescribed harvests would reduce the overstory canopy by approximately 70 percent in irregular shelterwood, 80 percent in seed tree units, 70 percent in shelterwood, and 50–60 percent on thinned acres (for all action alternatives).

Forest succession, insect and disease activity, timber harvest, fire and fire suppression have resulted in changed cover types and forest structure since pre-settlement (USDA-FS, 2003a). Changes in forest cover types and structure (size class, stand density and canopy layers) are used as indicators to quantify effects on forest vegetation. Other vegetation indicators analyzed include threatened, endangered, or sensitive plants, and weeds.

3.3.1.4 Setting

The historic and existing condition of vegetation in the American River is discussed in general terms in the South Fork Clearwater Landscape Assessment (USDA-FS, 1998a) in Chapter 3 (pp. 20, 82–98) and Chapter 4 (pp. 138–141). The Landscape Assessment is not a decision document, but does provide important synthesis of existing condition and resource potential in the watershed.

Plant communities in the analysis area can be seen as a mosaic of patches that change in composition, size, and position in relation to one another over time. Wildlife and humans respond in varying ways to a particular pattern of vegetation. Processes like fire, plant community succession, insect and disease activity, drought, and grazing all change the pattern that exists at any given time. Features such as climate, soil, slope, aspect, and elevation control the bounds within which patterns can change. The terms Vegetation Response Unit (VRUs) are used to describe these bounds. The VRU is intended to be a compilation of lands having similar capabilities and potentials for management. As mapped areas these units have similar patterns in potential natural communities (habitat types), soils, hydrologic function, landform and topography, rock formations, climate, air quality, and natural disturbance processes (fire regimes, succession, productivity, nutrient cycling). Within individual areas of any VRU over time, the proportion of age and size classes, successional stage, impacts of fire and/or disease will be dynamic as natural and managed disturbances occur. The VRUs for the Eastside Project are shown in Figure 3.3.1. Within these delineations, presettlement processes (e.g., climate, fire, insect, and disease activity) likely operated within somewhat predictable ranges. These ranges are at the landscape scale, e.g., the South Clearwater subbasin. Understanding these past disturbance regimes and the pattern of vegetation change is a tool that can be used for current management of ecosystems. This tool can be used to help design

management structures that sustain patterns of vegetation at the scale, frequency, and degree of change that native species are adapted to.

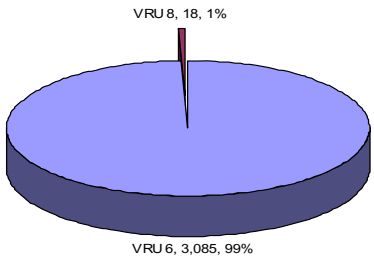

Figure 3.3.1 VRUs for the Eastside Project

(*VRU 6*: Cold basins, grand fir and subalpine fir, *VRU 8*: Breaklands, cedar and grand fir habitat types.)

The following assessment of insect and disease disturbance mechanisms was done for the American and Crooked River FEIS and is applicable to the Eastside Project.

Recent scientific studies and reports, including those from the Science Integration Team of Interior Columbia Basin Ecosystem Management Plan (ICBEMP), point to a loss of landscape integrity as indicated by potential tree mortality from insects and disease at nearly twice the historical levels. The shift to more insect and disease vulnerable forests can be attributed to fire exclusion and past harvest practices (Hessburg et al., 1999). The Interior Columbia Basin Scientific Assessment (Quigley and Arbelbide, 1997) found forest integrity to be low in the South Fork Clearwater River subbasin, based on the reduction of seral tree species, changes in tree size classes, and disruption to fire regimes, among other factors. The Interior Columbia Basin Scientific Assessment categorized the American River area as Forest Cluster 3. It states that Forest Cluster 3 has low forest integrity with high mean departures in fire frequency and severity (Quigley et al., 1996:96–117).

BLM records indicate that 10 acres of previous roadside thinning/salvage has occurred on BLM land west of the American River. Much of the private property within and abutting the project area has been harvested. Much of this harvest has been in recent years in response to the current mountain pine beetle epidemic.

The NPNF estimates that in the American River portion of the American and Crooked River Project, immediately adjacent to the Eastside Project, approximately 3,082 acres of harvest have occurred dating from the 1950s to the present (USDA-FS, 2005a). Harvest methods included 1,126 acres of thinning/salvage, 742 acres of shelterwood/seed tree, and 1,214 acres of clearcut.

Mountain Pine Beetle

Mountain pine beetle is a native bark beetle with a one- to two-year life cycle that is the prime insect agent affecting lodgepole pine ecosystems. Adults select green trees of sufficient size and phloem thickness to nourish their larvae. The pitch tubes on the bole and boring dust at the base of the tree are evidence of beetle entry. Beetles are subject to mortality from parasites, predators such as woodpeckers, cold winters, drying of the pine following infection, and resin from the host tree. Infestations tend to occur at 20 to 40 year intervals, depending on the age, size, and density of lodgepole stands (Cole and Amman, 1980). A prior beetle outbreak occurred in the 1980s in American and Crooked River, followed by salvage and logging. This approach to beetle treatment favors rapid reestablishment of lodgepole pine and renewal of the cycle. Salvage, thinning and prescribed fire, augmented by planting beetle and fire resistant species could help interrupt some continuity of dense lodgepole pine and slightly reduce susceptibility to this cycle. Thinning can help reduce susceptibility to mountain pine beetle through both physiological response of the remaining trees and changed microclimate within the stand (Mitchell, 1994).

Lodgepole pine is characteristic of interior montane basins like American River where cold air impoundment favors establishment of the species. Much of the lodgepole in American River regenerated after fires between 1870 and 1898. These trees have become highly susceptible to mountain pine beetle because the majority of these trees have reached an age and size suitable for beetle reproduction. If not for fire suppression, landscape patterns may have developed differently and large contiguous areas of mountain pine beetle susceptible lodgepole pine may have been supplanted by now.

Mountain pine beetle infestations can kill 30 to over 90 percent of trees 5 inches or larger in a stand, but trees 8 inches or larger are preferred. After each infestation, residual lodgepole pine and shade tolerant species like grand fir increase their growth and the trend is toward uneven age stands with multiple canopy layers and shade tolerant species. This has been observed in response to the 1980s epidemic in American River. In mixed lodgepole and ponderosa pine stands, beetles may attack both lodgepole and ponderosa pine.

For the past decade, a mountain pine beetle epidemic has been causing mortality in mature lodgepole pine in the upper reaches of the South Fork Clearwater River. The epicenters have been concentrated in the Red River drainages and are spiraling out to adjacent drainages, including the American River on the north. This is the most extensive and damaging outbreak in the Northern Region. The highest concentrations of beetle-caused mortality were noted around Red River and Elk City. Analysis of 2004 FORVIS stand exam data for the project area determined that lodgepole pine overstory mortality was at 50 to 60 percent. However, walk through ocular field surveys in 2005 illustrated the lodgepole mortality was advancing.

Western Balsam Bark Beetle
This beetle is a native wood-boring insect that attacks subalpine fir, and rarely Engelmann spruce (Garbutt, 1992). In American River they have been identified in the upper elevation spruce-fir stands, but numbers of affected trees are currently relatively low. Their successional function is to kill old subalpine fir, favoring establishment of new subalpine fir. This may not change Cover Types, but can contribute to development of more uneven-age structure, and fuel accumulations. It is estimated that this beetle is at endemic levels and would remain so unless environmental factors change significantly.

Balsam Woolly Adelgid
This is a sucking insect introduced from Europe that is now found in the American River watershed in a few areas, but the extent to which it may increase in population and activity is not known. Stem attacks can lead to eventual tree mortality. Crown attack can ultimately affect bud formation and upward growth and can also lead to tree mortality. This insect more often attacks young trees so its successional effect is to reduce stand density and reduce vertical canopy layering by affecting understory fir. Cold winters control populations, while warm summers favor their survival.

Douglas Fir Beetle
This is a native bark beetle that is not typically very aggressive and usually attacks wind thrown, fire-damaged trees or trees weakened by other pathogens or drought (Hagle et al., 1987; Schmitz and Gibson, 1996). Where Douglas-fir occurs with early seral larch or pine, beetle activity would help maintain the early seral species. On grand fir and subalpine fir habitat types, like those that dominate American River, Douglas-fir beetle activity creates openings where more shade-tolerant species like grand fir will grow and push the stand more quickly toward late seral conditions and uneven aged stand structure (Hagle et al., 2000).

Observed pockets of Douglas-fir beetle in the watershed have been small and occur in areas where past fires were not stand replacing so that large old Douglas-fir remain. Many of these pockets are associated with old growth and will provide large Douglas-fir snags.

Because of extensive fire in the late 1800s and subsequent harvest, large Douglas-firs in dense stands are not abundant in the watershed so the potential for extensive beetle outbreaks is relatively low.

Root Diseases
Root diseases are fungi that can affect all sizes, ages and species of tree (Hagle et al., 1987; Hagle et al., 2000). In the watershed, grand fir and Douglas-fir are most highly susceptible and the prevailing root pathogens affecting them are armillaria and annosus root rots. With the loss of lodgepole pine to mountain pine beetle, grand fir and subalpine fir will increase, and root disease will likely also increase. However this change is not toward conditions that are outside historic ranges. Where Douglas-fir has encroached on ponderosa pine stands, these will be more susceptible to root disease.

Fire and root disease appear to have contributed historically to the maintenance of larch in mixed conifer stands. Without fire, root disease is unlikely to sufficiently limit grand fir to keep larch from being eventually eliminated.

Root disease has probably increased a small amount in average severity. The older stands become and the more they shift toward grand fir, the more severe root disease will be. Root disease may recover a more important role if lodgepole dominance is reduced and Douglas-fir and grand fir increase. It will affect canopy cover, Cover Types, size, and age distribution of trees, and timber productivity. The effects will be to create forest openings, favoring shrubs and regeneration of more susceptible grand fir or increased dominance by less susceptible species.

Over the long term, without fire or harvest to sustain less susceptible species, more tree species will become susceptible.

Blister Rust
Virtually no western white pine or whitebark pine has been inventoried in the drainage so the potential for blister rust is low. The historic potential for these tree species appears to have been very low also.

Dwarf Mistletoe
Dwarf mistletoes are parasitic plants that extract water and nutrients from living conifer trees (Hagle et al., 2000). Lodgepole pine dwarf mistletoe is the species most active in the American River watershed, because of the prevalence of this cover type. Initial effects are to reduce stand density and size dominance within the affected species and size class.

Successional effects where mistletoe is severe are to accelerate succession toward grand fir or subalpine fir. Fires that kill host species also reduce mistletoe.

Overall, dwarf mistletoes affect a relatively small proportion of the American River project area. Compared to mountain pine beetle, the effects of dwarf mistletoe in lodgepole pine are likely to be minor. The thinning effect of mountain pine beetle will reduce dwarf mistletoe on lodgepole pine in the American River area.

3.3.2 Indicator 1–Forest Cover Types

3.3.2.1 Existing Condition

A combination of wildfire, intentional fire, timber harvest, fire suppression, and forest succession has shaped the existing pattern and composition of vegetation in the American River watershed. The greatest changes from historic vegetation conditions include (USDA-FS, 2005a):

- Declines in lodgepole pine-dominated communities due to harvest, fire suppression and forest succession.
- Increases in more shade tolerant tree species, such as subalpine fir and grand fir, due to fire suppression and forest succession.
- Declines in shrubland, riparian shrub, and riparian meadow due to forest encroachment, agricultural conversion, mining, and forest succession.
- Whitebark pine has seriously declined from blister rust, fire exclusion and mountain pine beetle. This species does not occur within the Eastside Project, and will not be discussed further.
- Early seral structural stages, including forest openings, seedling and sapling, and pole stands, with snags and down wood, have decreased because of fire suppression. Medium and large tree classes have increased in most areas except larch and ponderosa pine forests.

Figures 3.3.2 and 3.3.3 display current cover types in the American River Watershed and Eastside Project area. Lodgepole pine is the dominant cover type in the Eastside Project Area—53 percent of the forested area.

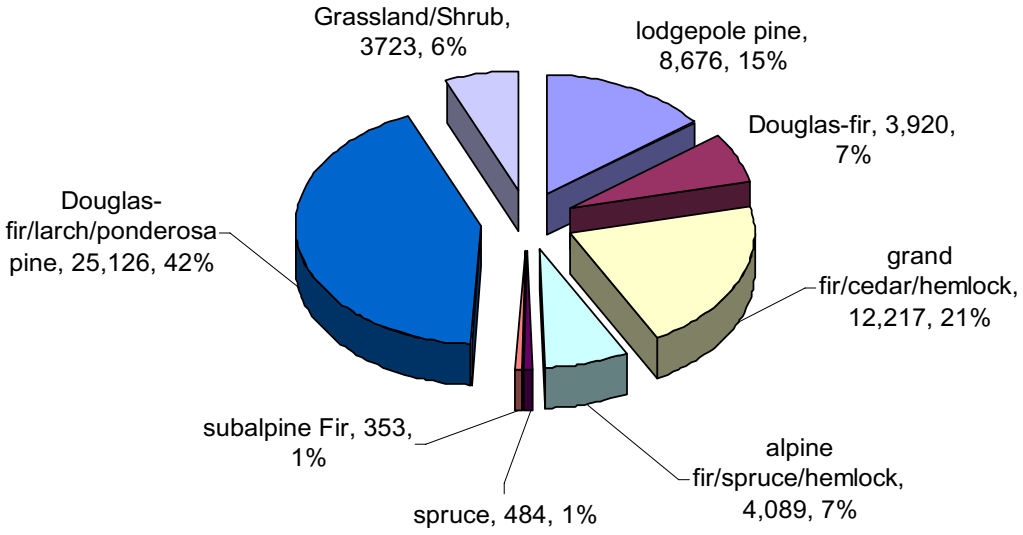

Figure 3.3.2 American River Species Dominance

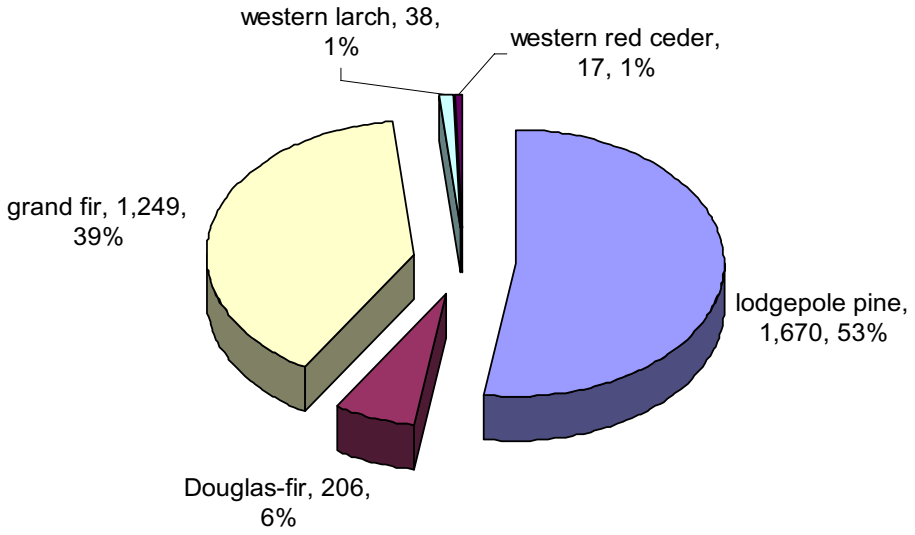

Figure 3.3.3 Eastside Species Dominance

3.3.2.2 Direct Effects–Cover Types

Alternative A (No Action Alternative)

There are no direct effects to cover types associated with this alternative. Cover types in the project area would continue to change without direct intervention. Changes through time will vary depending on the intensity of disturbances such as fire, weather events, disease, and insect epidemics.

Alternative B

Timber harvest and fuel reduction treatments would occur on approximately 1,293 acres. Direct effects on species dominance and cover type would vary by the type of harvest method, residual stand, and tree planting that would produce the desired future stand. The outcome should be viewed in both the short term (less than 10 years) and the long term. Approximately 351 acres would be irregular shelterwood, 284 acres would be shelterwood, 286 acres would be seed tree, 123 acres would be commercially thinned, 140 acres would be broadcast burned, and 109 acres would be salvaged.

Acres of herbaceous conditions would increase by approximately 1,061 acres that include areas of irregular shelterwood, seed tree, shelterwood, and potential slash and burn areas. This short term change would decrease as trees become reestablished on these acres and canopy closure excludes herbaceous ground cover. In the long term these acres would move towards a mixture of lodgepole pine and planted Douglas-fir and larch. Immediate change in lodgepole pine cover type would be a reduction of approximately 791 acres (47 percent). Immediate change in grand fir cover types would be a reduction of approximately 226 acres (18 percent). Immediate change in Douglas-fir cover types would be a reduction of approximately 44 acres (21 percent). There would be no reduction in western red cedar, or western larch cover types.

Alternative C

Timber harvest and fuel reduction treatments would occur on approximately 1,284 acres. Direct effects on species dominance and cover type would vary by the type of harvest method, residual stand, and tree planting that would produce the desired future stand. The outcome should be viewed in both the short term (less than 10 years) and the long term. Approximately 491 acres would be irregular shelterwood, 284

acres would be shelterwood, 286 acres would be seed tree, 123 acres would be commercially thinned, and 100 acres would be salvaged.

Acres of herbaceous conditions would increase by approximately 1,061 acres that include areas of irregular shelterwood, seed tree, and shelterwood. This short term change would decrease as trees become reestablished on these acres and canopy closure excludes herbaceous ground cover. In the long term these acres would move towards a mixture of lodgepole pine and planted Douglas-fir and larch. Immediate change in lodgepole pine cover type would be a reduction of approximately 791 acres (47 percent). Immediate change in grand fir cover types would be a reduction of approximately 226 acres (18 percent). Immediate change in Douglas-fir cover types would be a reduction of approximately 44 acres (21 percent). There would be no reduction in western red cedar, or western larch cover types.

Alternative D

Timber harvest and fuel reduction treatments would occur on approximately 1,171 acres. Direct effects on species dominance and cover type would vary by the type of harvest method, residual stand, and tree planting that would produce the desired future stand. The outcome should be viewed in both the short term (less than 10 years) and the long term. Approximately 460 acres would be irregular shelterwood, 252 acres would be shelterwood, 286 acres would be seed tree, 93 acres would be commercially thinned, and 100 acres would be salvaged.

Acres of herbaceous conditions would increase by approximately 978 acres that include areas of irregular shelterwood, seed tree, shelterwood, and potential slash and burn areas. This short term change would decrease as trees become reestablished on these acres and canopy closure excludes herbaceous ground cover. In the long term these acres would move towards a mixture of lodgepole pine and planted Douglas-fir and larch. Immediate change in lodgepole pine cover type would be a reduction of approximately 728 acres (44 percent). Immediate change in grand fir cover types would be a reduction of approximately 223 acres (18 percent). Immediate change in Douglas-fir cover types would be a reduction of approximately 27 acres (13 percent). There would be no reduction in western red cedar, or western larch cover types.

3.3.2.3 Indirect Effects–Cover Types

Alternative A (No Action Alternative)

Passive management is a conscious decision with short and long-term ecosystem consequences. Forest succession would continue and current desirable characteristics of these dynamic ecosystems may not remain intact. Processes would take place whether at the hand of man or randomly (as under the “no action” alternative). Anticipated effects of processes that would occur with no human intervention can provide a benchmark against which to measure effects of active management.

Forest cover types in the project area would shift toward mixed conifer (primarily grand fir) cover types. Susceptibility to insect attacks and root diseases affecting conifer species would be expected to increase. Mountain pine beetle would continue to cause extensive mortality to lodgepole in the project area until host depletion results in a decline in the beetle population to endemic levels. As grand fir and Douglas-fir establish and dominate in stands previously dominated by lodgepole pine, they would in time play host to their own disease and insect regimes. The dieing lodgepole pine component of the stands would contribute to increased fuel loadings in these stands for the next 20 years.

Fire suppression would continue throughout the project area, allowing fuels to build up and disrupting the natural fire disturbance pattern. Low severity ground fire would not occur in the project area. At some point, an intense fire would likely reestablish lodgepole pine dominance in areas where seed sources exist and mineral soil is exposed, creating favorable seedbeds for conifer reestablishment.

With current conifer stocking and growth rates, and elevated levels of insects and disease, the “no action” alternative would not help attain MFP goals nor meet the purpose and need of this project. This

alternative would not help achieve the MFP goal for intensive management that could be achieved by maintaining forest stands dominated by relatively pest-resistant species to maintain a sustainable condition. Under this alternative, no reduction would be made in total tree numbers or stocking levels of pest-prone tree species. Improvements such as reduction in susceptible species as well as enhanced growth and vigor of residual trees through timber harvest and prescribed burning would not be made to enhance forest health and ecosystem sustainability.

Stocking levels of live trees would continue to increase while individual tree vigor would decrease, increasing susceptibility to damaging insects and disease. Early seral, shade intolerant trees such as lodgepole and western larch would decrease in numbers while the shade tolerant species grand fir would increase. The shrub, forb, and grass component of forest stands would continue to decline.

Forest stands where the principle species is Douglas-fir, grand fir, or Engelmann spruce are highly susceptible to outbreaks of defoliators such as western spruce budworm and Douglas-fir tussock moth. In recent years portions of the American River have experienced damaging levels of hemlock lopper. The following factors make forest stands within the analysis area particularly susceptible to defoliator attack.

Many forest stands are multi-storied. In a tussock moth, budworm or other defoliator infestation, the larvae feed on new growth of larger trees. As the caterpillars mature, they drop off the tree for a variety of reasons (wind, exhaustion of food supply, etc.). Landing on foliage suitable for foraging (such as Douglas-fir or grand fir) results in additional damage.

Older trees in many forest stands are not vigorous. Damage from defoliators, bark beetles, and other insect pests could trigger eventual mortality. The conifers in many of the forest stands in the American River Analysis Area are stagnant. Many of these trees are particularly vulnerable to defoliator and bark beetle attack.

Root disease is apparent in portions of the project area. During a defoliator or bark beetle attack mortality is often first noticed in root centers because of the weakened state of the trees.

Precipitation in the 1990s was below average. Over several years, coupled with higher than historical stocking levels, this can have a negative effect on stand growth. Trees become more likely to sustain significant damage from insects during or following drought cycles. Forest stands that have southeasterly to westerly aspects are particularly susceptible to problems associated with drought because of the drying effects of direct sunlight and the prevailing winds on these aspects.

Increases in other insects such as fir engraver and Douglas-fir beetle often accompany a defoliator outbreak. Insects are often at endemic levels in the forest, but become more apparent and increase in numbers as a defoliator infestation progresses. Often these insects will "finish off" trees previously weakened by other pests or pathogens.

Any combination of the above listed factors could elevate the level of damage from defoliation to mortality. Additional mortality would add to fuel loads and increase the risk of stand replacement wildfire.

Alternatives B, C, and D

Indirect effects would include enhancement of Douglas-fir and fire resistant western larch, and regeneration of lodgepole pine cover types in the project area. Increased vigor and resistance to damage from fire, insects and disease can be expected in other forest cover types in the project area. Openings created through removal and prescribed burning would create favorable conditions for establishment of fire resistant species such as ponderosa pine (which occurs only as scattered trees) and western larch, as well as lodgepole pine. Retention of Douglas-fir and western larch for seed and shelter trees should increase the percentage of these species in future stands. In areas usually dominated by lodgepole pine, this species would be expected to reestablish rapidly from local seed sources. In areas where Douglas-fir and western larch are desired these species would be planted to assure reestablishment.

Irreversible or Irretrievable Effects–Cover Types

There are no irreversible or irretrievable effects to cover types associated with any of the alternatives. All action Alternatives would temporarily affect herbaceous cover types, short-lived fire susceptible, and mixed conifer cover types. However, vegetation normally present in those types would reestablish naturally.

3.3.2.4 Cumulative Effects–Cover Types

Alternative A (No Action Alternative)

Wildfires start almost every year somewhere in the American River watershed. Fire spread depends on weather (temperature, wind, and relative humidity), topography, and fuel (fuel model, and fuel moisture). The longer fire or fuel management is absent from an area the greater the total biomass quantity and continuous fuel. When a wildfire starts these factors result in more intense fire behavior and increased resistance to control allowing larger fires. Fires with the higher intensities and increased area cause more vegetation to be damaged or destroyed. This includes large, old trees, which may have withstood fires for centuries.

The implementation of Alternative A, with current forest conditions (live and dead biomass) provides a greater risk of epidemic stand loss to diseases and insects. In these finite systems of moisture and sunlight only a certain amount of live biomass can be supported per acre. Consequently, the more individual trees on an acre, the smaller the allocation of water and the necessary elements per tree resulting in subsequent lower vigor and growth per individual tree. Plants produce different hormones and other chemicals when growing at various rates that affect the potential size of these plants. Plants that receive more moisture and sunlight grow faster and have t he potential to achieve a larger size.

Insect infestation would increase with no management action. Forest stands under stress have a higher potential to attract bark beetles. When trees are stressed they produce chemicals which are natural attraction signals to bark beetles. Bark beetles are a natural thinning agent and a necessary part of the ecosystem in creating habitat for certain wildlife species, and reducing stress for the remaining live trees. With the increase in vulnerable food supplies (stressed trees) insect populations can build to epidemic proportions. Epidemics of beetles can destroy even the healthiest trees due to mass attacks. Bark beetles can also carry spores that inoculate trees with saprophytic microorganisms that can weaken the bole and increases the rate of bole snap and decomposition. This effect would cause many trees (snags) killed by beetles to fall to the ground in a relatively short time decreasing their value for cavity nesters, and increasing the amount of fuel for high intensity wildfire.

The majority of forest stands proposed for treatment in the Eastside Project are in a state of relatively poor vigor. Trees are generally more susceptible to root rots and disease when at low vigor. With the selection of Alternative A, tree vigor would continue to decline and would likely result in more tree deaths attributable to root rot, especially the more susceptible grand fir.

Reduced acres of lodgepole pine cover types can be expected in time due to mountain pine beetle induced mortality and forest succession favoring establishment of climax species. The small amount of western larch cover type can also be expected to decrease over the long term.

The dominance of the grand fir cover type could be expected to increase.

Alternatives B, C and D

The NPNF is implementing the American and Crooked River Project. Private landowners within the American River watershed would probably continue to change cover types on their ownerships with the progression of the current mountain pine beetle epidemic; however, by what amount is unknown. Other activities and ongoing hazard tree removal and firewood cutting also have potential to affect forest cover

types on additional acres in the drainage, but are unquantifiable. Table 3.3.1 shows the effect on cover types for the Eastside and American and Crooked River Projects.

Table 3.3.1 Acres of Change in Cover Type by Alternative

Species Dominance	Acres of Change by Alternative				NPNF
	Alt A	Alt B	Alt C	Alt D	FEIS[1]
Grassland/Shrub	0	+1,061	+1,061	+978	+383
lodgepole pine	0	-791	-791	-728	-227
Douglas-fir	0	-44	-44	-27	
grand fir	0	-226	-226	-223	-209[2]
western larch	0	0	0		0
western red cedar	0	0	0	0	

[1] American & Crooked Project Chosen Alternative (USDA-FS, 2005a)
[2] Mixed Conifer

3.3.3 Indicator 2–Structure (Size Classes, Density, and Crown Cover)

3.3.3.1 Existing Condition–Size Class

Stand tree size varies depending on year of origin, tree species, growing conditions and successional stage. Stands that originate from a single event, such as a fire, tend to be made up of trees that are fairly even in size until a certain age at which the overstory begins to die out and smaller trees become established in the understory. In the absence of a stand replacing event such as fire or insect attacks, stands would continue to have small openings occur in the overstory canopy allowing for the initiation of smaller understory trees. Approximately 7 percent of the American River watershed consists of areas with little overstory and with less than five inches diameter at breast height (dbh) trees that originated following logging or some other stand initiation event such as fire or insects. Stands dominated by overstory trees of five inches dbh or greater occur on 93 percent of the area. Figures 3.3.4 and 3.3.5 show dominant stand tree size classes in the American River and Eastside Project area.

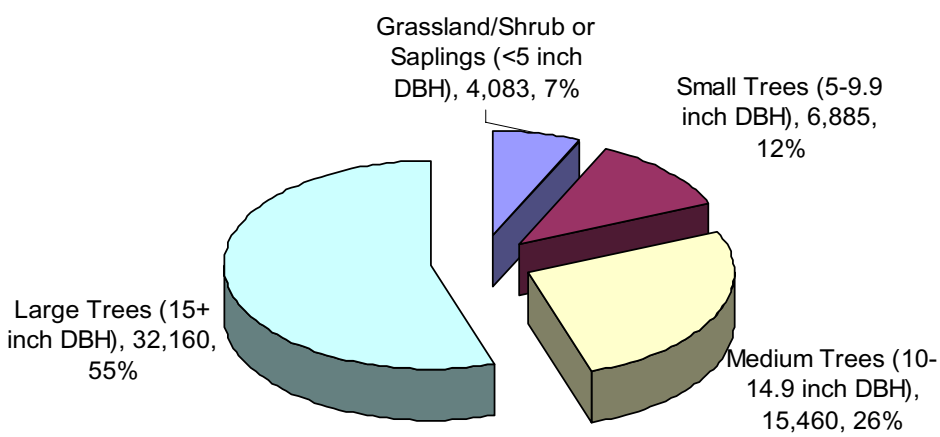

Figure 3.3.4 American River Size Class Distribution

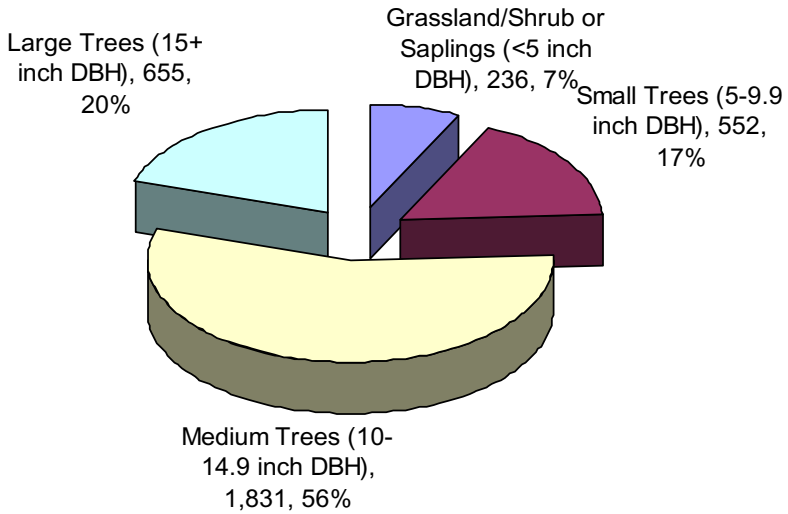

Figure 3.3.5 Eastside Size Class Distribution

3.3.3.2 Direct Effects–Size Class

Alternative A (No Action Alternative)

There are no direct effects to size classes associated with this alternative.

Alternatives B and C

Direct effects to tree size classes would include an increase in seedling/sapling, and small tree stands on approximately 1,007 acres. This would be through the implementation of 1,007 acres in shelterwood, seed tree, irregular shelterwood, and broadcast burn treatments. Medium size tree stands would be reduced on 924 acres. Large tree (15+ inch dbh) stands would be reduced on 83 acres. Large trees would be favored for retention in stands where they occur.

Alternative D

Direct effects to tree size classes would include an increase in seedling/sapling, and small tree stands on approximately 940 acres. This would be through the implementation of 940 acres in shelterwood, seed tree, irregular shelterwood, and broadcast burn treatments. Medium size tree stands would be reduced on 860 acres. Large tree (15 + inch dbh) stands would be reduced on 80 acres. Large trees would be favored for retention in stands where they occur.

Table 3.3.2 displays direct effects of implementation of each alternative to tree size classes in the project area.

Table 3.3.2 Change in Size Class Acres by Alternative

Size Class	Acres by Alternative				NPNF
	Alt A	Alt B	Alt C	Alt D	FEIS[1]
Grassland/Shrub or Saplings (<5 inch dbh)	0	+1,007	+1,007	+940	+384
Small Trees (5–9.9 inch dbh)	0	0	0	0	-99
Medium Trees (10–14.9 inch dbh)	0	-924	-924	-860	-184
Large Trees (15+ inch dbh)	0	-83	-83	-80	-100

[1] American & Crooked Project Chosen Alternative (USDA-FS, 2005a)

3.3.3.3 Indirect Effects–Size Class

Alternative A (No Action Alternative)

Size class diversity would temporarily increase as shade tolerant grand fir and subalpine fir continue to establish in stands in the project area. Small and medium trees would dominate creating continuous fuel ladders, increasing the potential for severe fire. Large fire resistant ponderosa pine and western larch could eventually become extirpated due to stress induced by competition for water and nutrients, lack of suitable conditions for regeneration, or severe fire. In time, there is a high probability that a high intensity, stand replacement fire would occur, resulting in reestablishment of single size class stands in burned areas.

Alternatives B, C and D

Indirect effects associated with harvest and fuel reduction treatments would be increased growth and vigor, as well as resistance to damage from fire to remaining trees. Remaining trees in all size classes would benefit through reduced competition for sunlight, water, and nutrients.

Irreversible or Irretrievable Effects–Size Class

There are no irreversible or irretrievable effects to size classes associated with any of the alternatives. Alternatives B, C, and D would have some effects on size classes in the project area, though this would be temporary.

3.3.3.4 Cumulative Effects–Size Class

Alternative A (No Action Alternative)

There would be no cumulative effects to size classes in the American River drainage.

Alternatives B, C and D

The NPNF is implementing the American and Crooked River Project. Private landowners within the American River watershed would probably continue to change size classes on their ownerships with the progression of the current mountain pine beetle epidemic, however, by what amount is unknown. Other activities and ongoing hazard tree removal and firewood cutting also have potential to affect forest size classes on additional acres in the drainage, but are unquantifiable. Table 3.3.2 above shows the affect on tree size classes for the Eastside and NPNF American and Crooked River Project.

3.3.3.5 Existing Condition–Stand Density

Stand density, measured in basal area per acre, vary widely across the project area. Variations are due to elevation, aspect, soils and moisture, as well as stand history. Stand basal area was measured for stands in the project area with tress greater than five inches dbh. Stands with higher basal area are more susceptible to perturbations, including insect and disease outbreaks. The current mountain pine beetle epidemic has greatly increased the amount of standing dead material in much of the Eastside Project area. Within ten years this material would end up as dead and down, increasing the potential for very intense fire scenarios with a high resistance to control (see Section 3.1 Fire and Fuels). Figure 3.3.6 shows basal area ranges in the Eastside Project area.

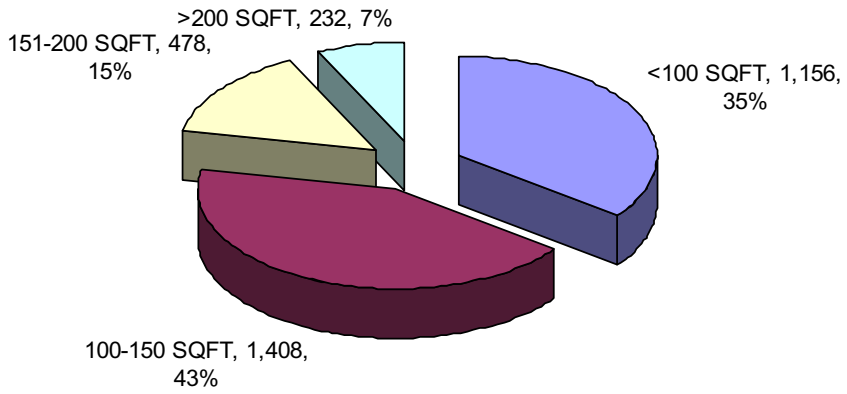

Figure 3.3.6 Eastside Live Basal Area

3.3.3.6 Direct Effects–Stand Density

Alternative A (No Action Alternative)

There are no direct effects to density of stands associated with this alternative.

Alternatives B, C and D

Direct effects would be reduced basal area density on approximately 1,293 acres in the project area for alternative B; 1,284 acres for alternative C and 1,171 acres in alternative D.

3.3.3.7 Indirect Effects–Stand Density

Alternative A (No Action Alternative)

In the short term, as lodgepole pine is removed by the mountain pine beetle, basal area per acre would decrease. However, trees per acres would increase in the short term as lodgepole stands are replaced by mainly grand fir and Douglas-fir to a lesser extent. Barring fire, insect or disease epidemics, trees per acre would decrease as stands mature and competition results in stem exclusion. Also as trees become larger, basal area per acre would increase to the point that eventually creates conditions leading to some type of insect and/or disease perturbation.

Alternatives B, C, and D

Increased vigor and resistance to damage from fire, insects and disease would be expected for all tree species in the harvest and fuel reduction areas. Reduced density and fuels reduction would create openings and favorable conditions for establishment of fire resistant species such as ponderosa pine (which occurs only as scattered trees) and western larch, as well as lodgepole pine. Retention of Douglas-fir and western larch for seed and shelter trees should increase the percentage of these species in future stands. In areas usually dominated by lodgepole pine, this species would be expected to reestablish rapidly from local seed sources. In areas where Douglas-fir and western larch are desired these species would be planted to assure reestablishment.

3.3.3.8 Cumulative Effects–Stand Density

Alternative A (No Action Alternative)

There are no cumulative effects to stand densities associated with this alternative.

Alternatives B, C, and D

Stand densities would be reduced on approximately 2,510 acres in the drainage for Alternative B; 2,501 acres for Alternative C, and 2,388 acres in Alternative D. This would include the approximately 1,217 acres on the American & Crooked Project being implemented by the NPNF (USDA-FS, 2005a). Percent changes by alternative are 4.3 percent for Alternatives B and C, and 4.1 percent for Alternative D

Irreversible or Irretrievable Effects–Densities

There are no irreversible or irretrievable effects to stand densities associated with any of the alternatives. Alternatives B, C, and D would reduce stand densities in the project area, though this effect would be temporary.

3.3.3.9 Existing Condition–Crown Cover

Stand crown cover is a function of tree size, species composition, and stand density. Crown cover illustrates how much of the forest floor would be sheltered from some environmental factors including light, precipitation, and temperature. It is also an indicator of stand susceptibility to intense fire behavior such as torching and crowning. The mountain pine beetle epidemic has and will continue to cause a decrease in crown cover on the project area. Figures 3.3.7 and 3.3.8 show crown cover in the American River and Eastside Project area.

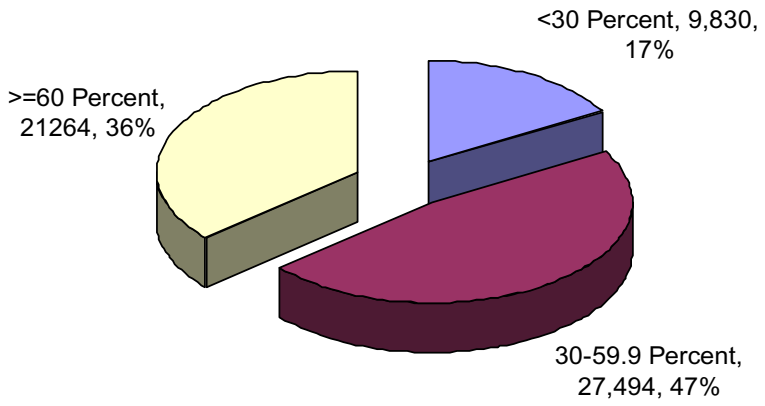

Figure 3.3.7 American River Percent Canopy Cover (acres, percent of area)

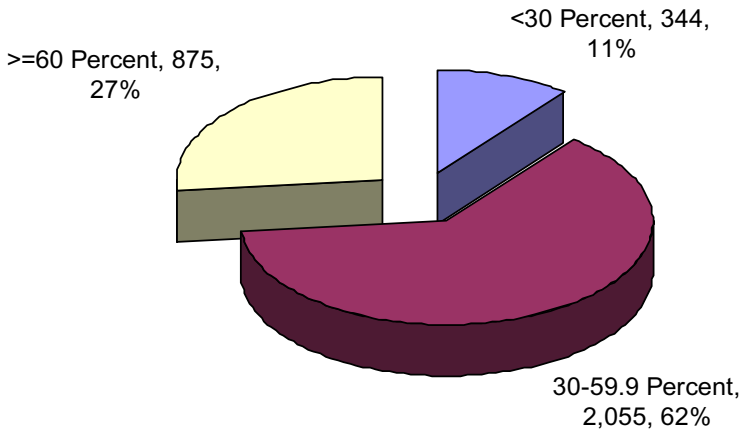

Figure 3.3.8 Eastside Percent Canopy Cover (acres, percent of area)

3.3.3.10 Direct Effects–Crown Cover

Alternative A (No Action Alternative)

There are no direct effects to crown cover associated with this alternative.

Alternative B

Direct effects to crown cover would include decreases in area with greater than 30% crown cover. Area with less than 30% crown cover would increase by 804 acres. Some residual canopy would occur on all treatment acres, there are no clearcuts. Areas with 30–59.9% would be reduced by 682 acres. Areas with greater than 60% would be reduced on 152 acres.

Alternative C

Direct effects to crown cover would include decreases in area with greater than 30% crown cover. Some residual canopy would occur on all treatment acres, there are no clearcuts. Area with 30% crown cover would increase by 804 acres. Areas with 30–59.9% would be reduced by 682 acres. Areas with greater than 60% would be reduced on 143 acres.

Alternative D

Direct effects to crown cover would include decreases in area with greater than 30% crown cover. Some residual canopy would occur on all treatment acres, there are no clearcuts. Area with 30% crown cover would increase by 714 acres. Areas with 30–59.9% would be reduced by 618 acres. Areas with greater than 60% would be reduced on 126 acres.

3.3.3.11 Indirect Effects–Crown Cover

Alternative A (No Action Alternative)

In the short term, as lodgepole pine is removed by the mountain pine beetle, crown cover would decrease, the depletion coming mainly from those stands in the 30–59 percent category. Crown cover in mixed conifer stands could also decrease as these stands age, and become more susceptible to defoliating insects.

Alternatives B, C, and D

Increased vigor and resistance to damage from fire, insects and disease would be expected for all tree species in the harvest and fuel reduction areas. With the change in species composition and increased regeneration, canopies would close relatively quickly.

Irreversible or Irretrievable Effects–Crown Cover

There are no irreversible or irretrievable effects to canopy cover associated with any of the alternatives. Alternatives B, C, and D would temporarily reduce canopy cover in the project area.

3.3.3.12 Cumulative Effects–Crown Cover

Alternative A (No Action Alternative)

There are no cumulative effects to stand densities associated with this alternative.

Alternatives B and C

Canopy cover would be reduced on approximately 2,510 acres in Alternative B and 2,501 acres in Alternative C. This would include the approximately 1,217 acres on the American & Crooked Project being implemented by the NPNF (USDA-FS, 2005a). This would change stand densities in approximately 4.3 percent of the drainage.

Alternative D

Canopy cover would be reduced on approximately 2,388 acres in the drainage. This would include the approximately 1,217 acres on the American & Crooked Project being implemented by the NPNF (USDA-FS, 2005a). This would change stand densities in approximately 4.1 percent of the drainage.

3.3.4 Threatened, Endangered, and Sensitive Plants

3.3.4.1 Regulatory Framework

Special status plant species management on BLM managed public lands is authorized under and/or directed by the FLPMA and Endangered Species Act. Further guidance can be found in BLM Manual 6840 and BLM directives.

According to U.S. Fish and Wildlife Service list # SL 06-0146 (letter dated 12/01/2005), two plants listed as Threatened may occur on lands managed by the Cottonwood Field Office: Macfarlane's four-o'clock (*Mirabilis macfarlanei*) and Spalding's catchfly (*Silene spaldingii*).

Sensitive Species are protected, managed, and conserved in the same manner as candidate species. Rare, vulnerable, and representative habitats, plant communities, and ecosystems are conserved through monitoring, implementation of plans, and collaboration with other agencies, governments, and interested groups.

The minimal level of protection for sensitive species is the level of protection provided to candidate species, which includes the following actions: considering these species in land use plans; developing plans, strategies, and assessments to conserve these species and their habitats; ensuring BLM actions are consistent with objectives for managing these species; and monitoring to determine if objectives are being met.

3.3.4.2 Existing Condition

Threatened and Endangered Species
After extensive special status plant surveys were conducted during the late spring and summer of 2004, over the majority of the project area, it was determined that no listed or candidate plant species on the Bi-annual Cottonwood Field Office Species List from the U.S. Fish and Wildlife Service (SL 06-0146, December 1, 2005) occur in the project area.

Therefore, there would be no effect on threatened or endangered plant species through implementation of any action alternative, and a biological assessment for the project proposal is not necessary.

BLM Sensitive Species
Sensitive plant species found in the project area include Idaho barren strawberry, Payson's milkvetch, and Case's corydalis that occurs in the project area along Kirks Fork. Deerfern has potential habitat present, but was not found in the project area. A summary of these species characteristics follows.

Locations of the BLM sensitive species and other species of concern listed below, which occur on Forest Service and/or private lands, were obtained from the Idaho Fish & Game Conservation Data Center's element occurrence records or plants database (2005).

Idaho barren strawberry (*Waldsteinia idahoensis*) is known only from north-central Idaho and one location in adjacent Montana. This species is usually found on early- to mid-successional moist forest sites, from toe to mid-slopes in grand fir, western redcedar, and subalpine fir zones. It is infrequently found on poorly drained sites. Idaho barren strawberry is scattered throughout the project area and occurs in most of the proposed harvest units, along proposed roads, and where fuel breaks would be constructed. There are four other known occurrences of this species on BLM, Forest Service, and private lands within one air mile of the project area.

Payson's milkvetch (*Astragalus paysonii*) grows on early- to mid-successional sites dominated by lodgepole pine with scattered Douglas-fir and western larch present. It is found on north, northeast, and east aspects on flat to moderate slopes (up to 45%). It occurs between approximately 4,600 and 5,800 feet elevation. One population is found in the project area approximately 40 feet downhill from an existing road and approximately 80 feet from Units 32 and 33. There are at least 23 other known occurrences of this species on private and Forest Service lands within one air mile of the project area.

Case's corydalis (*Corydalis caseana* var. *hastata*), a member of the fumitory family, is a strictly riparian species usually found in or on margins of small streams and also near springs. It generally grows from 3,000 to 5,000 feet elevation in western redcedar forests but also may occur in grand fir forests and the lower subalpine fir zone. One population occurs in the project area in the riparian zone of Kirks Fork downhill (approximately 120–200 vertical feet) below Units 38, 46, and 47. There are five other known occurrences of this species on Forest Service land within 2.5 air miles of the project area.

Deerfern (*Blechnum spicant*) is a coastal disjunct species found in northern and central Idaho. It occurs at lower elevations (less than 4,200 ft.) within dense, moist, generally mature western red cedar and western hemlock forests. It most often grows in western redcedar/wild ginger, western hemlock/wild ginger, or western hemlock/oakfern habitat types. It usually occurs on northern aspects and moderate slopes (10–60%). No individuals or populations were found in the project area; however, potential habitat is present and there is one known population of this species on Forest Service land within 0.5 air miles of the project area.

Other Species of Concern
Clustered lady's-slipper is on the USDA-FS Northern Region sensitive species list. Potential habitat for this plant occurs in the project area, but plants were not found in the project area.

Candystick remains a locally important plant for the Nez Perce National Forest, although it was dropped from the USDA-FS Northern Region sensitive species list (effective October 28, 2004) because there is

no longer a concern for population viability (USDA-FS 2005a). Also, it is a State Sensitive Species for North Central Idaho on the Idaho Native Plant Society (INPS) lists. Candystick occurs in the project area and on adjacent FS lands in close proximity to the project area.

Clustered lady's-slipper (*Cypripedium fasciculatum*) is a perennial, terrestrial orchid that usually blooms from May through June in Idaho. In Idaho, this plant is primarily found in shaded, moist to dry western redcedar forests but can also occur in grand fir forests or Douglas-fir stands. This species grows from elevations of 1,700 to 4,600 feet. No individuals or populations were found in the project area; however, potential habitat is present and there are two known occurrences of this species in the South Fork Clearwater drainage.

Candystick (*Allotropa virgata*) is a mycotrophic plant (lacks chlorophyll) that obtains its carbohydrates from a mycorrhizal fungus associated with its roots (Lichthardt, 1995). The fungal mycelium is shared with a photosynthesizing plant that indirectly supplies nutrients to the candystick plant via the fungus. The photosynthesizing plant for candystick is lodgepole pine. For this reason, candystick is limited to forest habitats in which lodgepole pine are dominant or in a few cases at least a significant component.

Two subpopulations occur in the analysis area: one on the south side of Telephone Creek downhill (approximately 40 vertical feet) from Unit 16, and the other on the northwest side of Whittaker Creek near the common boundary of Units 16 and 18 and approximately 300 feet downhill of a proposed road. Two other known subpopulations of this species occur on Forest Service land within 0.5 air miles of the project area.

3.3.4.3 Environmental Effects

Common to All Alternatives

Threatened and Endangered Species
No listed or candidate plant species were found during field surveys; therefore, there would be no effects.

Alternative A (No Action Alternative)

Plant succession would continue toward the potential natural community. Over a period of years, sites in the project area capable of supporting more dense forest vegetation would become dominated by shade-tolerant species, until a future disturbance such as logging, wildland fire, insect infestation, or disease creates openings in the canopy. The amount of suitable habitat for Idaho barren strawberry and Payson's milkvetch may decrease during later stages of succession as forest canopy progresses from more open to more closed. As long as hydrologic requirements are met, Case's corydalis would likely continue to persist. Development of shady, moist conditions characteristic of later stages of succession would favor persistence of candystick, and provide more potential habitat for deerfern and clustered lady's-slipper. As candystick is dependent on mid-age to mature lodgepole pine for its symbiotic relationship, the continuing mortality in lodgepole pine due to mountain pine beetle will result in decline in suitable habitat and the population.

Impacts to plant populations due to wildfire are expected to be similar to those resulting from hazardous fuels treatments. However, a wildfire could potentially have more widespread effects to plant populations than prescribed burning under the action alternatives, since it would not necessarily be confined to specific treatment units. A wildfire may open more sites to invasion by shade-intolerant competitive species such as noxious weeds, or might affect a larger portion of forest stands than the action alternatives would. A wildfire has the potential to be stand-replacing, but may also create a mosaic of burned and unburned vegetation in certain areas, depending upon variation in fire behavior.

Alternative B–Proposed Action Alternative

Forest species composition and structure in the project area would shift for a period of time, since certain tree species and size classes are targeted for removal or retention, and slash treatment would reduce density of smaller diameter woody plant species such as tree seedlings and shrubs. Due to habitat requirements of this diverse group of plant species, certain populations or subpopulations may be more resilient to vegetation changes resulting from the action alternatives since they persist under early- to mid-successional conditions. Other species requiring moist and/or shaded conditions for growth and survival may be less resilient to these changes since they are linked to habitats in later stages of ecological succession. Post-project management actions, weed invasion, or wildland fire may affect the course of ecological succession for the project area.

Vehicles and equipment traveling over the road system in the project area have the potential to distribute weed seed or fragments in proximity to existing plant populations. Also, weed seed may be spread into disturbed areas by air currents or animal movement. Noxious weed species may compete with native special status plant species for light, water, nutrients, or pollinators. The project design features include requiring harvest equipment to be cleaned prior to entry to greatly reduce the potential for spreading new weeds species into the area. All temporary roads would be closed to public entry, again reducing the potential for spreading weeds in these areas.

Idaho barren strawberry/Payson's milkvetch. Reducing canopy closure would create habitat conditions favorable for growth of these two species. Major ground disturbance, such as skidtrails, could kill or injure individuals or portions of the barren strawberry population. Other shade-intolerant non-native or common native plant species also could thrive under these circumstances and compete with the barren strawberry and milkvetch for water, nutrients, pollinators, and light.

Case's corydalis. It is expected that the occurrence of this species would be protected indirectly through adherence to riparian buffers designed to address fisheries and water quality concerns. The Kirks Fork RHCA is an area where fire would not be allowed to back into the RHCA; therefore, there would be no direct impact.

Deerfern/Clustered lady's-slipper. Due to canopy removal, potential habitat for these shade-tolerant plant species may be negatively impacted because resulting warmer, drier growing conditions might not be suitable for survival of individuals or populations. Although populations of clustered lady's-slipper have been found in drier Douglas-fir forest types, the plants were associated with shrubs or small conifers, indicating a need for a certain level of canopy cover to maintain moisture and light requirements. Also, favorable growing conditions may be created for other shade-intolerant plant species that may compete with clustered lady's-slipper and deerfern for water, nutrients, pollinators, and light.

Candystick. As noted in the American Crooked EIS Environmental Effects analysis, "Generally, the greatest threat to candystick in the Idaho range is habitat loss due to harvest (Lichthardt, 1995). Candystick is most common in older lodgepole pine communities; thus, successional processes that regenerate lodgepole pine on the landscape are necessary to replenish suitable habitat. Consequently, altered fire regimes brought about through fire suppression may also pose a threat to candystick populations (Lichthardt, 1995). The current extensive mortality of lodgepole pine forests will also cause a decline in habitat and the loss of populations as the host trees die."

The candystick subpopulation growing on the northwest side of Whittaker Creek would be affected by this alternative. Tree-falling or tractor skidding in Units 16 and 18 could cause injury or death of individuals or perhaps the entire subpopulation, depending upon proximity to harvest-related disturbance. Removal of 70% of the forest canopy in this unit would result in warmer, drier habitat conditions which would likely not be suitable for the survival of certain individuals or possibly the entire candystick subpopulation.

Alternative C

General project impacts to the forest setting would be similar to Alternative B, except for slightly less ground disturbance due to more acres logged by helicopter instead of tractor/cable logging.

Idaho barren strawberry/Payson's milkvetch. Ground-based impacts to barren strawberry would only be slightly less than Alternative B because the units converted to helicopter logging under Alternative C contain zero to very small amounts of this species compared to the rest of the project units. Reduction in canopy closure would benefit both species, but there would still be threats from other shade-intolerant non-native or common native plant species that could thrive under these circumstances and compete with the barren strawberry and milkvetch for water, nutrients, pollinators, and light.

Case's corydalis. Same as Alternative B.

Deerfern/Clustered lady's-slipper. Potential habitat for these shade-tolerant plant species may be more impacted under this Alternative because units scheduled for only broadcast burning under Alternative B would be helicopter logged and then burned. As with Alternative B, favorable growing conditions may be created for other shade-intolerant plant species that may compete with clustered lady's-slipper and deerfern for water, nutrients, pollinators, and light.

Candystick. Same as Alternative B.

Alternative D

General projects impacts to the forest setting would be less than Alternatives B and C because certain units would not be treated.

Idaho barren strawberry/Payson's milkvetch. Ground-based impacts to barren strawberry would be less than Alternatives B or C because 10 units where the species occurs would not be treated. Reduction in canopy closure in the remaining units would benefit both species, but there would still be risk from other shade-intolerant non-native or common native plant species that could thrive under these circumstances and compete with the barren strawberry and milkvetch for water, nutrients, pollinators, and light.

Case's corydalis. Same as Alternative B.

Deerfern/Clustered lady's-slipper. Less potential habitat for these shade-tolerant plant species would be impacted under this Alternative than Alternatives B or C because 11 units would not be treated.

Candystick. Same as Alternative B.

3.3.4.4 Cumulative Effects

The area for cumulative effects analysis includes the American River watershed. Included in this is the American and Crooked River Project (see Map 7a, USDA-FS, 2005a) (approximately 15,600 acres), private lands (approximately 7,825 acres), and BLM's Eastside Project area (see Appendix A, Map 1) (approximately 3,100 acres). These two project areas adjoin one another. Only species of concern that were found to occur or have potential habitat present (in the Eastside Project area) which could be impacted by project implementation will be discussed.

BLM Sensitive plants found in the project area include Idaho barren strawberry, Payson's milkvetch, and Case's corydalis. Case's corydalis occurs in the project area along Kirks Fork; however, this fish-bearing stream will have a 300-foot no-treatment buffer. Therefore, there will be no direct effects from the proposed project, and there will be no further discussion in this cumulative effects section for this species. Deerfern a BLM Sensitive species was not found but does have potential habitat present. Other Species of Concern include candystick, found in the project area, and clustered lady's-slipper that has potential habitat present.

Cumulative effects for plants are addressed through consideration of past, present, and reasonably foreseeable actions. It is not possible to directly quantify effects of specific past activities that are several years or decades old on species of concern today. The status and occurrence of sensitive plants was not known for much of the management history of the American River watershed. Historically the changes in condition and abundance of specific habitats important to these species are also unknown. Therefore, the effects of these past projects can only be qualified through general discussions. However, the results of past projects contribute to the current existing condition, which can be used to discuss and quantify effects of proposed activities on this group of plant species.

In general terms and on lands in Federal and private ownership in the vicinity of Elk City, the following cumulative effects have or could be expected to occur:

BLM and NPNF land: Past, present, and reasonably foreseeable activities are documented in Table 3.0.1. The American and Crooked River Project would protect Sensitive plant populations, although it would impact Sensitive plant potential habitat. The selected alternative would impact 8 percent of the potential habitat for barren strawberry; 13% of the potential habitat for milkvetch; 4 percent of the potential habitat for clustered lady slipper; and 1% of the potential candystick habitat, not a designated sensitive species (USDA-FS, 2005a).

Private lands: Additional habitat for Idaho barren strawberry and Payson's milkvetch has been or would be created where disturbance has or would re-set ecological succession to early- to mid-stages. Losses of Case's corydalis individuals, subpopulations, populations, or habitat on private lands has occurred or could occur if riparian buffers were not or are not established or are inadequate for protection. Decreases in habitat for candystick and loss of individuals, subpopulations, or populations has occurred or could occur where mature lodgepole pine stands were or will be harvested. Harvested forest communities that provide potential habitat for clustered lady's-slipper and deerfern have or could become unsuitable as habitat until later successional characteristics redevelop.

Discussion of cumulative effects for sensitive species and species of concern can be addressed through the general trend of habitat type groups found in this cumulative effects analysis area as a result of past, present, and future management actions. The analysis area for cumulative effects contains several Habitat Type Groups (HTGs) which contain the micro-features that are important to the plant species discussed above. The two HTGs which cover the most acres in this analysis area are Cool and Dry Grand Fir (HTG 3) and Moist Grand Fir (HTG 4). Approximately 95% of the Eastside Project Area is composed of Cool and Dry Grand Fir (HTG 3) and 5% is composed of Moist Grand Fir (HTG 4); and approximately 30% of the American and Crooked River Project Area in the American River Watershed is composed of Cool and Dry Grand Fir (HTG 3), 60% is composed of Moist Grand Fir (HTG 4), and 10% is composed of other Habitat Type Groups which won't be discussed here (see Map 4, USDA-FS, 1998a). Portions of the discussion on the two HTGs below is from the American and Crooked River Project, FEIS, March 2005, and is applicable to both BLM and FS lands in the cumulative effects analysis area.

Cool and Dry Grand Fir (HTG 3)

This Habitat Type Group is very common in much of the analysis area and contains such habitats in the grand fir and Douglas-fir series as beargrass (*Xerophyllum tenax*) and twinflower (*Linnaea borealis*) among others that indicate relatively cool and dry sites for these forests types. This HTG is found on approximately 7,625 acres of the analysis area.

Much of this zone has seen significant management activity in the past. Seedling and sapling forest structure are increased due to even-aged management. Road densities are relatively high in portions of the zone, and some livestock grazing occurs along roads and in forest openings. Exotic plants are scattered along these roads and openings. Mining activity was once common but is not abundant today. Cool and dry grand fir does not provide habitat for many sensitive species and species of concern but does support habitat and populations of Payson's milkvetch and Idaho barren strawberry. Seral forests dominated by lodgepole pine provide the necessary habitat for some populations of candystick.

Disturbance to the landscape through timber harvest and temporary roads is relatively common. The overall effect expected on potential sensitive plant habitat would be static to improved conditions. Where Payson's milkvetch or Idaho barren strawberry are present in these habitats, both species are well documented to not only withstand light ground disturbance, but generally are increased by it (Crawford, 1980). As a result, population viability for these species is not a concern.

Occurrences of candystick are expected to decline due to extensive lodgepole mortality from a combination of mountain pine beetle, timber harvest, temporary road construction, and fuels reduction. Management activity may improve candystick habitat in the long-term by providing future seral lodgepole pine habitats and allowing the lodgepole pine to develop into 60–80 year old stands. However, candystick habitat will continue to decline for the foreseeable future, and it is unknown at this time the extent of the affects on existing populations of this unique plant.

Moist Grand Fir (HTG 4)
The Moist Grand Fir Habitat Type Group covers approximately 9,515 acres in the analysis area. The majority is found on FS lands north and east of the BLM lands in the Eastside Project area. The Grand-fir mosaic is well represented in this HTG and is a common habitat on the FS lands mentioned above.

Generally this zone has seen significant management activity over past decades. Seedling and sapling forest structure are increased due to even-aged management. Road densities are relatively high in portions of the zone, and some livestock grazing occurs along roads and in forb and alder glades within the Grand-fir mosaic zone. Historic mining has occurred along the main river bottoms of the American River watershed, but this activity is less common today. Noxious weeds such as spotted knapweed and Canada thistle (see Section 3.3.5 Weeds) are present along roads. Moist grand fir provides habitat for deerfern, clustered lady's slipper, Idaho barren strawberry, and ridges dominated by seral lodgepole pine support candystick.

Disturbance to the landscape through timber harvest, mining, grazing, and roads is relatively common and may continue in the future. Overall effect on potential sensitive species and species of concern habitat would be a slight decrease in the amount and quality of suitable habitat. Long-term trends would be static to slightly downward. A slight downward trend in habitat quality would not lead to concerns for population viability since moist grand fir habitats are common in the upper portions of the watersheds.

3.3.4.5 Conclusions

In the analysis area, there will be some impacts to sensitive species and species of concern and/or their habitats. Due to the amount of temporary roads that will be constructed in the analysis area, the ground disturbance associated with timber harvest, and use of fire as underburns, etc., and the potential for invasion by noxious and other weeds, the following effects determinations were made:

For **Alternative A**: No impact (to individuals, subpopulations, populations, or habitat) for Idaho barren strawberry, Payson's milkvetch, Case's corydalis (found to occur), deerfern and clustered lady's-slipper (potential habitat present) or candystick (found to occur).

For **All Action Alternatives**: May impact individuals or habitat, but is not likely to cause a trend toward Federal listing or reduce viability for the populations or species for Idaho barren strawberry or Payson's milkvetch, which occur in the project.

This proposed project would not contribute to the need to list Idaho barren strawberry as Threatened or Endangered because: 1) thousands of Idaho barren strawberry plants have been documented by field surveys in the Elk City area, and a lot of potential habitat remains unsurveyed and possibly occupied; 2) mitigation would be applied, when possible (logging on snow), to reduce impacts; 3) it does seem to be favored by a certain level of disturbance; and 4) relatively speaking, only a small percentage of plants and habitat would be affected by the alternatives.

The proposed project would not contribute to the need to list Payson's milkvetch as Threatened or Endangered because it would impact individuals and/or subpopulations; therefore, the species as a whole is expected to still persist. The impact on habitat is variable, with short-term negative impacts but possible long term beneficial impacts.

Also Payson's milkvetch and Idaho barren strawberry are Type 3 Idaho BLM Sensitive Species. These species are, at the rarest, Type 3 species, (Rangewide / Globally Imperiled Species – Moderate Endangerment: Includes species that are globally rare with moderate endangerment factors. Their global rarity and inherent risks associated with rarity make them imperiled species). Impacting individuals will not cause a decline sufficient to trigger these species moving to the Type 2 Sensitive Species Category, much less the Type 1 (listed, proposed, or candidate) Sensitive Species Category.

The project may impact potential habitat for deerfern and clustered lady's-slipper which do not occur in the proposed project area. Therefore, the project would not contribute to the need to list these species as Threatened of Endangered. Also Design Item #38 was incorporated after this analysis was completed, therefore the project would not effect the known populations of this plant.

Candystick is not a BLM Sensitive Species. As noted previously it was dropped from the USDA-FS Northern Region sensitive species list (effective October 28, 2004) because there is no longer a concern for population viability (USDA-FS 2005a). Therefore, the project would not contribute to the need to list this species as Threatened or Endangered. Also Design Item # 40 was incorporated after this analysis was completed, therefore the project effect on the populations of this plant would be mitigated.

3.3.5 Indicator 4–Weeds

3.3.5.1 Regulatory Framework

BLM

Noxious weed control has been recognized through land use planning and the NEPA process with decisions to take appropriate action for control and eradication. Analysis and evaluation of invasive plants in this EIS is based on direction contained in the following laws, executive orders, EISs, etc.:

The Federal Noxious Weed Law (1974) as amended.

Executive Order 13112 for Invasive Species:

Section 2 (a) (3) directs federal agencies to "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determinations that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions."

Final Environmental Impact Statement (FEIS)–Vegetation Treatment on BLM Lands in Thirteen Western States, May 1991.

Idaho Record of Decision (ROD) to the FEIS above dated July 1991.

Idaho Noxious Weed Control Record of Decision dated May 5, 1987.

Northwest Area Noxious Weed Control Program Final EIS of December 1985 as Supplemented (FSEIS).

State law mandates the eradication/control of noxious weeds (Idaho Noxious Weed Law-Title 22, Chapter 24, Idaho Code). Weed control is in conformance with meeting our (BLM's) legal mandates in the Federal Land Policy and Management Act of 1976 (3 U.S.C. 1700 et seq.); the Taylor Grazing Act of 1934 (43 U.S.C. 15 et seq.); the Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901 et seq.); the Federal Noxious Weed Act of 1974 (7 U.S.C. 2801-1813), as amended by Sec. 15, Management of

Undesirable Plants on Federal Lands, 1990; and the Carlson-Foley Act of 1968 (P.L. 90-583) Environmental Assessment for Noxious Weed Control on the Coeur d'Alene District ID060-94-05.

Nez Perce National Forest
Analysis and evaluation of Invasive plants in this EIS is based on direction contained in The Federal Noxious Weed law (1974) as amended, Executive Order 13112 for Invasive Species, Forest Service policy (2080), Northern Region Supplement (R1 2000-2001-1**)** Implementation of Integrated Weed Management on National Forest System lands in the Northern Region, and the Nez Perce National Forest Plan (II-7, II-20, II-26, III-6).

In general, the Forest is directed to implement an effective weed management program with the objectives of preventing the introduction and establishment of noxious weeds; containing and suppressing existing weed infestations; and cooperating with local, state, and other federal agencies in the management of noxious weeds.

Section 2081.03 of Forest Service policy 2081 Management of Noxious Weeds directs Forests to determine the risk of introducing or spreading noxious weeds as a result of any ground disturbing action or activity. For projects having moderate to high risk of spread, the project must identify noxious weed control measures that must be undertaken during project implementation.

3.3.5.2 Existing Condition

Portions of the first two paragraphs are from *American River/Crooked River–Final Environmental Impact Statement,* Chapter 3 Pages 329 and 330.

Invasive plants have been identified as a significant threat to western ecosystems. As invasive plants invade and establish, native species richness and frequency may be reduced (Forcella and Harvey, 1983), erosion rates may increase (Lacey et al., 1989), ecological processes may be altered (Whisenant, 1990) and rare plants could be threatened (Rosentreter, 1994). Bedunah (1992) noted that exotic plants have the potential to alter ecological equilibrium to a point where the change is permanent. Invasive plants can clearly alter ecosystem processes in the west (Dukes and Mooney, 2001). Significantly higher rates of sedimentation from runoff in knapweed dominated sites have been documented in Montana (Lacey et al., 1989).

Invasive plants can expand following human-caused or natural disturbances, and invade degraded as well as intact habitats (Tausch et al*.,* 1994; Parker, 2001; Willard et al., 1988). At present, the analysis area has two known noxious weeds occurring. Spotted knapweed (*Centurea stoebe* ssp. *micranthos*) is currently occupying disturbed sites along roads and in dredge tailings. Canada thistle (*Cirsium arvense*) commonly occurs in areas impacted by various surface disturbing activities. There is the potential for other invasive species considered noxious to become established in the area. One species that occurs in similar habitats is orange hawkweed (*Hieracium aurantiacum*). It is not currently known to exist in the analysis area but does occur within a fifty-mile radius. The seed of this species is airborne and may be introduced into the area via air currents or human travel vectors.

The Elk City township, which includes the project area, contains treatment sites for noxious weed control in the Field Office (FO). Integrated pest management activities presently occurring in the analysis area include herbicide, mechanical, revegetation, and biological treatments. These activities are conducted in concert with cooperators in the Clearwater Basin Weed Management Area based upon annual operating plans agreed upon by members. Treatments are conducted in order of priority beginning with treatment of new invader species and moving toward reducing the size and density of established weed infestations. At present, weed control is being conducted mainly along travel corridors. The Eastside Project would not change the weed treatment areas or methods. If a population of noxious weeds is discovered, they would be mapped and reported to the weed coordinator for further evaluation.

3.3.5.3 Environmental Effects

The first three paragraphs are from: *American River/Crooked River–Final Environmental Impact Statement,* Chapter 3, pages 330 and 331, and are entirely applicable to the project area for the Eastside Project EIS.

Weed expansion in the project area is greatly influenced by habitat susceptibility, seed availability, seed or propagule dispersal, and habitat disturbance. The probability that weeds will expand in the analysis area depends on the interaction of these four factors. Weed expansion begins with the dispersal of seed from existing weed infestations adjacent to uninfested areas.

Land use practices and resource conditions may be important factors that encourage the initial invasion of exotic plants (Hobbs, 2000). In mountainous habitat roads and trails are the primary means by which people and their equipment interact with the environment and therefore may be an important spread pathway. These linear corridors act as dispersal conduits for exotic plants (Gelbard and Belnap, 2003; Marcus et al., 1998). In addition, road and trail management creates sustained levels of soil disturbance that promotes establishment of exotic plants thereby increasing seed or propagules for ongoing dispersal (Parendes and Jones, 2000). From these small isolated infestations along roads and trails, invasive plants may colonize adjacent native habitats or may respond to periodic disturbance by spreading into previously uninfested areas.

Disturbance creates spatial and temporal openings where sites become suitable for plant establishment, where usable light, space, water and nutrients are available to meet the specific growing requirements of the plant. Disturbance may increase the susceptibility of an otherwise intact plant community to weed invasion by increasing the availability of a limited resource (Hobbs, 1989). Natural or human-caused fires along with timber harvest and grazing are broad scale disturbances that influence the amount of available habitat for weed establishment and may promote invasion of exotic plants (D'Antonio, 2000; Belsky and Gelbard, 2000; Pauchard et al., 2003).

Alternative A (No Action Alternative)

Under Alternative A, current conditions and trends will continue. The Elk City area receives significant recreational activity by a variety of users. These activities include hunting, fishing, ATV riding, horseback riding, sight-seeing, etc. Many of these activities have the potential to cause disturbance and introduce new invasive plant propagules which may then become established. These uses also encourage the spread of those weeds currently in the area further along travel corridors. There are also commercial activities, i.e., outfitted hunting, timber harvest on other Federal and private lands, mining, etc. occurring which can spread invasive plants through the same methods.

Given the current trend in lodgepole pine mortality and the fuel accumulation documented in the Fuels section (Section 3.1), there is a high probability of stand replacing fire(s) occurring in the analysis area. While the extent cannot be accurately predicted, the result would be substantial areas of disturbed surface which would be conducive to weed invasion. Suppression actions involving mechanical and hand firelines would also provide vectors for weed propagation.

Common to All Action Alternatives

All of the action alternatives have potential to spread noxious and other weeds due to ground disturbing activities from timber harvest activities including fire (broadcast burns, underburns, and burning slash piles) and road construction (temporary and permanent) and maintenance. Table 2.2.1 provides a summary of disturbance area for each alternative. Spotted knapweed is present along roads leading to and within the project area. Canada thistle is also present on previously disturbed areas (natural and human-caused) adjacent to and within the project area and along roads throughout the area. Canada thistle seeds are primarily dispersed by wind (airborne seeds), so it may spread to disturbed areas away from roads as

well as along roads. Spotted knapweed plants produce up to 25,000 seeds each that are viable for up to eight years and are dispersed by wind, animals, and people. Spotted knapweed will likely continue to spread primarily along roads and trails.

Proposed restoration activities are similar between all the action alternatives. Areas that are disturbed by these activities along American River will be highly susceptible to increased infestations of both spotted knapweed and Canada thistle, because both are currently present in the area. Spotted knapweed is currently present along American River (both along the road and in dredge tailings). Canada thistle currently occurs along the road and in previously disturbed areas adjacent to where ground disturbing restoration activities would occur.

Alternative B

Alternative B would result in the most disturbed acres from ground based timber harvest activities and temporary road construction therefore, it would have the largest area available for spotted knapweed, Canada thistle, and other weeds to invade and occupy. Table 2.2.1 provides specific information on timber harvest acres and methods, etc.

Alternatives C and D

These two alternatives have a relatively similar total amount of disturbance associated with them. Alternative C has more acres of ground based timber harvest and total acres proposed for treatment than Alternative D, but it has fewer miles of temporary roads proposed. Conversely, Alternative D has less acres of ground based timber harvest and total acres proposed for treatment than Alternative C, but it has more miles of temporary roads proposed. Table 2.2.1 provides specific information on timber harvest acres and methods, etc.

3.3.5.4 Cumulative Effects

The cumulative effects analysis for weeds is the American River watershed. Most noxious and other weed infestations occur on disturbed areas in the analysis area. It is foreseeable that increased disturbance would occur both inside and outside of the analysis area. Timber harvest, road construction, etc. are likely to occur on both public and private lands. These various disturbances would increase the area for new and established noxious and other weeds to invade and occupy.

Past and present disturbances associated with vegetation treatments added to reasonably foreseeable actions would create a cumulative effect on weed expansion by the combination of distribution of weed seed, ground disturbance and creation of spread pathways. The degree of the cumulative effect would vary depending upon the number and size of disturbances over time, distribution of disturbance across the analysis area and acres disturbed (USDA-FS, 2005a). The degree of cumulative effect would also depend upon the success of prevention measures, inventory actions, and subsequent effective weed control treatment actions taken. Implementation of organized weed control activities along with partners significantly decreases the impact of newly established invaders over time. The impacts of cumulative effects incurred by the action alternatives to risk of weed expansion would be reduced with the implementation of preventive measures and weed management actions described in Table 2.3.1: Project Design Measures.

3.4 Watershed

3.4.1 Introduction

This section substantially relies on much of the analysis done for the NPNF American and Crooked River Project FEIS for the base line conditions within the American River watershed. The descriptions of indicators from a cumulative effects standpoint, the geographic scope, the regulatory framework and analysis methods are very similar. Cumulative effects for the Eastside and American and Crooked River Projects were analyzed using the Forest Service's NEZSED model.

BLM personnel have collected considerable on-the-ground data and maintain ongoing monitoring programs for streams within BLM-administered lands. Interpretation of field data and model predictions are considered together in analyzing potential effects of proposed alternatives.

3.4.1.1 Scope of the analysis

This section analyzes watershed condition, considers physical processes such as water yield and sediment yield, including effects on channel morphology and water quality. It is closely linked to the soils and fisheries sections.

The geographic scope of the analysis for watershed resources includes the 5th code watershed, American River. American River contains fifteen 6th code subwatersheds. Eastside Project activities are located in nine of the fifteen 6th code subwatersheds in American River (see Appendix A, Map 17).

The affected area for cumulative effects analysis includes the American River and the mainstem South Fork Clearwater River to immediately downstream of the confluence with Crooked River. The time period for the water yield analysis from project activities is about ten years. For a regeneration harvest to recover to pre-treatment conditions in terms of water yield is considerably longer. However, most effects from timber harvest should be manifested within ten years. Water yield effects from existing activities are considered since the late 1950s, which is about when timber harvest records begin. Timber harvest activities associated with the early mining period (1860s–1930s) are assumed to have recovered in terms of water yield. Large wildfires have not occurred in American River since 1919. Water yield effects from historic fires are assumed to have largely recovered.

The time period for the sediment yield analysis from project activities is about ten years. Sediment yield effects from project activities are expected to be recovered within that time period. Cumulative effects of sediment yield from wildfires and human activities are considered since about 1870.

3.4.1.2 Regulatory Framework

Clean Water Act and Idaho State Water Quality Standards
The Clean Water Act stipulates that states are to adopt water quality standards. Included in these standards are provisions for identifying beneficial uses, establishing the status of beneficial uses, setting water quality criteria, and establishing BMPs to control non-point sources of pollution.

The Idaho Water Quality Standards designated beneficial uses for American River (IDAPA 58.01.02). Tributaries of American River within the project area do not have designated beneficial uses. However, they do support existing beneficial uses and these are protected under the water quality standards. There are numerous private and two-State water uses adjacent to or downstream of the project area. Designated and existing beneficial uses are detailed in Sections 3.4.2 American River.

The South Fork Clearwater River Subbasin Assessment and Total Maximum Daily Loads (TMDLs) address water quality-limited streams listed under Section 303(d) of the Clean Water Act (IDEQ et al., 2004). The Assessment and TMDLs are a joint effort of the Idaho Department of Environmental Quality (IDEQ), the Environmental Protection Agency (EPA), and the Nez Perce Tribe. The Bureau of Land

Management participated in the assessment and TMDL development, with technical input and representation on the Watershed Advisory Group. The TMDLs applicable to the analysis area are for water temperature and sediment and were approved by the EPA in July, 2004.

The BLM along with other federal, state and partners participated in the development of the South Fork Clearwater TMDL Implementation Plan (South Fork Clearwater Watershed Advisory Group, 2006). It is the expectation of the Idaho Department of Environmental Quality that this document will be updated as necessary.

The sediment TMDL targets a 25 percent reduction in human-caused sediment yield to the South Fork Clearwater River. No specific targets were set for tributaries, but it was recognized that much of the sediment yield reduction would need to take place in the tributaries. The water temperature TMDL calls for canopy density or shade targets on a stream reach basis throughout the subbasin, including American River. Different analytical approaches were used for forested reaches than for the non-forested reaches and the mainstem South Fork Clearwater River.

The Eastside Township Fuels and Vegetation Project, along with BLM ongoing and proposed restoration actions, support achievement of South Fork Clearwater River temperature and sediment TMDLs in the long term. BLM lands comprise 2 percent of the South Fork Clearwater River subbasin and 13 percent of the American River watershed. Consequently, BLM's small watershed ownership limits our ability to have large impacts on the TMDL achievement and is reflected in the South Fork Clearwater TMDL Implementation Plan (South Fork Clearwater River Watershed Advisory Group, 2006). The restoration actions in the Eastside Project are reflected in the pollutant control strategies included in Table 2 of that plan contain. The South Fork Clearwater River subbasin TMDL does not identify a specific time frame for full achievement and recognizes that a reduction of existing levels over baseline would be accomplished with many projects.

Within the South Fork Clearwater River Subbasin, 13 water bodies were listed on the 1998 IDEQ 303(d) list. Three of these were in the American River watershed, and include Buffalo Gulch (sediment), Big Elk Creek (temperature), and Little Elk Creek (temperature). The main stem of the South Fork Clearwater River was listed for sediment and water temperature from its mouth upstream to the confluence of Red and American Rivers.

In June 2003, the IDEQ issued a draft Integrated 303(d)/305(b) Report for Idaho. Waterbodies affected by the Eastside Project and listed as impaired in the IDEQ draft 2003 integrated 303(d)/305(d) report are as follows: Little Elk Creek (temperature), American River downstream from East Fork American River (temperature), and South Fork Clearwater River (sediment and water temperature). It is assumed that all of the streams above will be moved to Section 4a, waters having an approved TMDL.

The project is expected to comply with implementation guidelines under the South Fork Clearwater River TMDLs for sediment and water temperature.

Section 404 of the Clean Water Act requires permits to dredge or fill within waters of the United States. The US Army Corps of Engineers administers these provisions. Most of the instream activities proposed under the Eastside Project will require authorization under Section 404 through application of either nationwide or site-specific permits.

3.4.1.3 Analysis Methods

Existing condition synthesis was obtained from the South Fork Clearwater Landscape Assessment (USDA-FS, 1998a), South Fork Clearwater River Biological Assessment (USDA-FS, 1999a) and South Fork Clearwater River Subbasin Assessment and TMDLs (IDEQ et al., 2004). Parts of the analysis relied on the Nez Perce National Forest Soil Survey (USDA-FS, 1987c). Additional information was obtained from fieldwork conducted in the summers of 2002, 2003 and 2004. New field data collected for this project included watershed condition inventories (e.g., road and culvert surveys), headwater channel

surveys and reconnaissance fish habitat surveys. GIS- generated reports were also used. This analysis compares the effects of the alternatives on the five watershed resource indicators detailed below. Though discussed independently, there is considerable interaction between these indicators within the watershed and stream channel system.

3.4.1.4 Indicators

Indicator 1–Watershed Condition

Watershed condition indicators are a series of metrics that can be used to index the level of disturbance in a watershed. They are usually expressed as densities or discrete amounts of various disturbances within a watershed. For example, road density expressed in miles of road per square mile (mi/mi2) of watershed area is a common watershed condition indicator. Extensions of that include road density within riparian habitat conservation areas (RHCAs) or landslide prone terrain (LSP). Other indicators include various forms of timber harvest density, such as percent of the watershed harvested, percent of RHCAs harvested and percent of LSP terrain harvested.

Various guidelines have been employed to rate watershed condition based on these indicators. One local version is a matrix that rates watersheds into low, moderate or high condition based on assembling a broad array of indicators (NOAA-NMFS et al., 1998). Within the matrix, road density is one of several criteria used to rate watershed condition. Other pertinent matrix indicators which may be affected by Eastside Project are discussed and included in the following Indicator sections.

Indicator 2–Water Yield

Equivalent Clearcut Area (ECA) analysis is a tool used to index the relationship between vegetation condition and water yield from forested watersheds. The basic assumptions of the procedure are that removal of forest vegetation results in water yield increases and that ECA can be used as an index of these increases. Depending on the interaction between water yield, sediment yield, and stream channel conditions, such increases could have impacts on stream channels.

Water yield increases can be directly modeled, but equivalent clearcut area (ECA) is often used as a surrogate. The ECA model is designed to estimate changes in mean annual streamflow resulting from forest practices or treatments (roading, timber harvest, and fires), which remove or reduce vegetative cover, and is usually expressed as a percent of watershed area (Belt, 1980). The index takes into account the initial percentage of crown removal and the recovery through regrowth of vegetation since the initial disturbance. For purposes of assessing effects of this project, ECA will be used to index changes in water yield through time based on timber harvest and roading disturbances. The ECA associated with historic wildfires is also considered in the cumulative effects analysis.

There are a number of physical factors that determine the relationship between canopy conditions and water yield. These include interception, evapotranspiration, shading effects and wind flux. These factors affect the accumulation and melt rates of snow packs and how rainfall is processed. Within the habitat types being treated under this project, the time frame for complete ECA recovery to occur is estimated to be 65 to 85 years, though the majority of recovery would occur in 20 to 30 years (USDA-FS, 1974).

Additional factors affecting water yield include compacted surfaces due to roads, skid trails, and landings. Existing and new roads are considered as permanent openings in the ECA model. Decommissioned roads are considered as openings, so the road decommissioning projects do not contribute to reductions in ECA.

Various ECA thresholds of concern have been in use in the Northern Region since the 1960s (Gerhardt, 2000). Early cutting guides recommended a limit of 20–30 percent ECA within a watershed (Haupt, 1967). More recently, ECA thresholds have been rejuvenated through consultation under the Endangered Species Act. A recent Biological Opinion on several Land and Resource Management Plans for the Forest

Service stipulated that watershed analysis should be conducted prior to actions that would increase ECA in 3rd to 5th order priority watersheds, where ECA exceeds 15 percent (NOAA-NMFS, 1995).

Recently, concern over water yield changes relative to stream channel condition has focused on smaller headwater catchments. Research in the nearby Horse Creek watershed study has demonstrated instantaneous peak flow increases up to 34 percent and maximum daily flow increases up to 87 percent resulting from road construction and timber harvest in small catchments (King, 1989). Recent observations have suggested that channel erosion from these streams may be contributing to increased bedload sediment in the 3rd order receiving channel (Gerhardt, 2002).

The studies by Belt (1980) and King (1989) have also served as field tests of the ECA procedure. Belt concluded that the ECA procedure is a rational tool for evaluation of hydrologic impacts of forest practices. King recommended local calibration of the model and a greater emphasis on conditions in 1st and 2nd order headwater streams.

Stednick (1996, p. 88) reports a response resulting from a wide range of percent timber harvested; as little as 15 percent and up to 50 percent depending on hydrologic region. In general Stednick states harvest of less than 20 percent will not necessarily equate to a change in annual water yield. While it is clear that removal of live vegetation can result in increases to peak flow, the percent vegetation removal for effects to become observable is not clear.

King (1993) found in his study of north Idaho streams, that 25 to 37 percent removal of forest vegetation in small headwater watershed (54 to 364 acres) resulted in an average increase in water yield of 14 inches annually. Increases in water yield, particularly peakflows, essentially increase the sediment transport capacity of smaller streams (King, 1993, p. 219).

Troendle and King (1987, p. 145) also found an increase in peak flow as the result of harvesting. Thirty-five to forty percent of the stand was harvested in two small subwatersheds (101–193 acres) of Deadhorse Creek, Colorado. No effect to, or observation of, the stream channel were reported in this study.

Megahan et al. (1995, p. 777) found that a clearcut on 23 percent of a 162-hectare (400 acres) watershed in the Idaho Batholith produced little change in water yield response from the logging and burning activities.

Further disclosures of ECA model assumptions, limitations and tests are found in Appendix H.

Indicator 3–Sediment Yield

Sediment yield is defined as the movement of sediment past a point in the stream system over a period of time. The Cottonwood Field Office relies on the Nez Perce National Forest for modeling sediment in this area. On the Nez Perce National Forest, sediment yield is generally modeled using NEZSED, which is the Forest Service's adaptation of the R1R4 Sediment Yield Guidelines (Cline et al., 1981). For the Eastside Project, the Nez Perce National Forest modeled the BLM project using project input data supplied by the BLM. The model accounts for natural background sediment and activity sediment generated from roads, timber harvest, and fire. The activity sediment is estimated from surface erosion processes and small mass failures (less than 10 yd3). Sediment yield is commonly expressed as tons/year or percentage over baseline.

The proposed timber harvest, road activities and watershed improvement activities could affect sediment yield over time. Harvest and road related activities have the potential to increase sediment production and delivery into streams. Certain watershed improvement projects have the potential to produce sediment in the short-term (e.g., road decommissioning) but most are designed to result in long-term reductions in sediment yield. Sediment yield modeling is used as one indicator to determined trends in water quality and fish habitat conditions. Effects of activities on sediment yield are further analyzed by applying accumulated scientific knowledge and field observations of erosion, delivery, transport and storage processes.

NEZSED has been tested using locally collected sediment yield data (Gerhardt and King, 1987; Gloss, 1995; USDA-FS, 1998a; USDA-FS, 2001; Thomas and King, 2000; Gerhardt, 2005). Results of the individual tests varied, with predictions being over, under and close to observed values. The model has a general tendency to under predict but has been determined to be a reasonably realistic tool for alternative assessment (Gloss, 1995; Gerhardt, 2005). The model has limitations, including that it does not incorporate certain processes related to activity-generated sediment yield, such as streambank erosion and mass failures greater than 10 yds3 in size. Further disclosures of NEZSED model assumptions, limitations and field tests are found in Appendix H.

Sediment yield is of concern to water quality and fisheries in terms of suspended sediment and turbidity. Bedload sediment is closely associated with deposition in the stream substrate. Deposition of fine sediment (less than 6 mm) can affect spawning success, winter carrying capacity and macro invertebrate production. Deposition of coarse sediment can affect channel morphology and fish habitat. Sediment yield is a key parameter in the South Fork Clearwater River TMDL.

The MFP and supplement guidance (USDI-BLM, 1985, 1989a, and 1989b) identifies fisheries/water quality objectives by prescription watersheds for the Cottonwood Field Office management area. Sediment is a key parameter in the fisheries/water quality objectives. See the Fisheries Section (Section 3.6) and Appendix H for additional details.

Indicator 4–Channel Morphology

Water and sediment yield can interact to change channel morphology conditions through erosion of stream channels or deposition of sediment. Channel morphology can also be affected directly through activities such as road encroachment, stream crossings and in-channel improvements. Sediment delivery and routing processes vary by upland settings, stream types and disturbance level and type.

Sediment routing considers the disposition of sediment within the watershed system, including processes of erosion, deposition, storage and transport. It includes upslope and instream components. The upslope component includes initial detachment, erosion and delivery efficiency. The instream component includes suspended and bedload sediment yields, as well as substrate deposition and composition. The instream component also includes consideration of streamflow and channel morphology, both of which influence the capability of the stream to transport or deposit sediment. A further discussion of sediment routing in relation to streams in the project area is found in Appendix H.

Indicator 5–Water Quality

Water quality includes physical and chemical characteristics of water. Parameters commonly measured include pH, alkalinity, hardness, specific conductance, nutrients, metals, sediment and water temperature. Many of these parameters are affected only to a slight degree, or not at all, by forest practices. Water temperature controls the rate of biologic processes, is of critical concern for fish populations and is a primary indicator of habitat conditions. It is also a key parameter in the South Fork Clearwater River TMDL.

3.4.2 American River

3.4.2.1 Introduction

The American River watershed is about 91.6 square miles in area, with about 15 percent private land, 13 percent managed by the BLM and the remainder Forest Service. Major tributaries of American River include East Fork American River, Kirks Fork and Elk Creek. American and Red Rivers join to form the South Fork Clearwater River. From there, it is 62.5 miles to the confluence with the Middle Fork Clearwater River where they combine to form the Clearwater River.

The geology, soils and landforms of the watershed are described in Section 3.5 (Soils). The stream channels in the American River watershed are predominately low to moderate gradient, with higher gradient channels in the mountain uplands. Much of the mainstem has been dredged and the natural vegetation community has been lost, but it was probably predominately a grass/sedge and shrub meadow, interspersed with conifers. Elevations in the American River watershed range from 3,880 feet at the confluence with Red River to 6,847 feet at Anderson Butte. Precipitation ranges from 30 to 50 inches (University of Idaho, 1993). Much of the precipitation falls as snow from November through March. Snowmelt is the predominate factor leading to a spring peak in the hydrograph, which typically occurs from mid to late May. Springtime flows are often augmented by rains. Winter peak flows are rare, with only about three percent of flood peaks occurring during the period of November through March (USDA-FS, 1998a). Lowest flows typically occur during the late summer and early fall. An annual hydrograph showing median, minimum, and maximum flows for the USGS stream gage on the upper South Fork Clearwater River is found in Appendix H (Figure H.2). American River, though ungauged, exhibits a similar flow regime.

Beneficial Uses
Under the Idaho Water Quality Standards, designated beneficial uses in American River are cold-water communities, salmonid spawning, primary contact recreation, domestic water supply and special resource water (IDAPA 58.01.02). No tributaries in the project area have designated beneficial uses but existing uses generally include cold-water communities, salmonid spawning and secondary contact recreation.

A search of non-federal water rights applications, permits, decrees, licenses, claims and transfers was made for areas affected by project activities. The selected areas included all lands east of American River and downslope of the project area, as well as the mainstem of American River from the project area to its confluence with Red River. Using these criteria, 38 private water uses were located. Since de minimus domestic claims do not require a water right, there are likely to be more uses than identified. A summary of identified water uses follows.

Table 3.4.1 Number of Potentially Affected Water Uses–American River

Source Name	Domestic Irrigation	Domestic Stock	Irrigation Stock	Domestic	Irrigation	Stock	Mining	Industrial
American River	1		1	2	4	1	1	1
Whitaker Creek					2			
Queen Creek							1	
Kirks Fork							1	
Unnamed Stream	1							
Spring		3		6				
Groundwater	1			12				

A number of consumptive use claims have been filed in American River by the Nez Perce Tribe, Bureau of Land Management, and the Forest Service. In addition, instream flow claims are being pursued for the mainstem of American River by the Nez Perce Tribe and the Forest Service. Tribal consumptive and instream flow claims accrue from treaty rights that were recently negotiated in a settlement under the Snake River Basin Adjudication.

3.4.2.2 Existing Condition and Environmental Effects

This section discusses the environmental effects of implementing the no action and action alternatives. Existing conditions are described under the “no action” alternative, but future effects of implementing no actions are also discussed. Long term trends in aquatic conditions are discussed in Section 3.6 (Fisheries), with supporting information in Appendix H. The affected area for cumulative effects analysis on all

watershed indicators is the American River and the mainstem South Fork Clearwater River to immediately downstream of the confluence with Crooked River.

Indicator 1–Watershed Condition

Existing watershed condition indicators were compiled for American River using Nez Perce National Forest Service corporate databases and GIS overlays. The subwatersheds affected by the project and the American River watershed conditions are summarized in Table 3.4.2.

Table 3.4.2 Watershed Condition Indicators by subwatershed affected by the Eastside Project area

Watershed Name	Area (mi^2)	Road Density (mi/mi^2)	RHCA[2] Road Density (mi/mi^2)	LSP[3] Roads (miles)	Timber Harvest (% wsd area)	RHCA Harvest (%RHCA area)	LSP Harvest (acres)
Middle American River	5.1	3.0	2.7	0	13	5	0
East Fork American R.	8.6	1.0	0.7	0	6	3	0
Whitaker Creek	1.4	3.9	2.6	0	27	23	0
Queen Creek	1.7	4.3	3.7	0	33	22	0
Box Sing Creek	1.4	3.3	3.1	0	16	8	0
Kirks Fork	9.8	0.6	0.5	0	4	3	0
Lower American River	6.8	2.0	3.5	0	NA	NA	NA
Little Elk Creek[1]	8.0						
Lower Elk Creek[1]	25.5						
Entire American River	91.6	2.3	1.9	0.4	NA	NA	NA

[1]Data for existing condition is lacking for these subwatersheds at this time. They are very minor components of the Eastside Project
[2] RHCA = Riparian Habitat Conservation Area
[3] LSP = Landslide Prone Terrain

Post-project road density is shown in Table 3.4.3. The changes in road density include decommissioning and new construction of permanent roads.

Table 3.4.3 Post-Project Road Density by Alternative

Watershed Name	Area (mi^2)	Alt A (existing)	Alt B	Alt C	Alt D*
Middle American River	5.1	3.0	3.0	2.8	2.8
East Fork American River[1]	8.6	1.0	1.0	1.0	1.0
Whitaker Creek	1.4	3.9	3.9	3.9	3.9
Queen Creek	1.7	4.3	4.1	4.1	4.1
Box Sing Creek	1.4	3.3	3.3	3.3	3.3
Kirks Fork	9.8	0.6	0.6	0.6	0.6
Lower American River	6.8	2.0	1.7	1.7	1.7
Little Elk Creek[1]	8.0	>3	>3	>3	>3
Lower Elk Creek[1]	25.5	>5	>5	>5	>5
Entire American River	91.6	2.3	2.3	2.3	2.3

[1] Specific data for existing condition is lacking for these subwatersheds at this time. They are very minor components of the Eastside Project.

Alternative A (No Action Alternative)

Various watershed road density criteria have been used to assess watershed condition. Local guidelines have been developed that suggest less than one mi/mi^2 is one indicator of good watershed condition, 1–3 mi/mi^2 is moderate and greater than 3 mi/mi^2 is low (NOAA-NMFS, 1998). Table 3.4.3 displays that, with regard to road density, of the nine project prescription watersheds within the Eastside Project, six are in the low condition category, two are moderate, and one is good.

The density and distribution of roads within most of the subwatersheds indicate there is a high probability that the hydrologic regime (i.e., timing, magnitude, duration, and spatial distribution of runoff) is substantially altered. Road surfaces limit infiltration, which causes surface runoff during storm events and snowmelt with insloped roads with ditches having the greatest effect. Native surface roads with traffic can often develop ruts, which cause runoff to be concentrated on the road surface. Roads are also subject to surface and mass erosion. Surface erosion is the dominant erosion process on roads in American River. Most of the roads within these watersheds are on private or National Forest lands.

Timber harvest on Nez Perce Forest and private land has affected a relatively high proportion of Queen and Whitaker Creeks. This has affected water yield and timing through reductions in forest canopy and soil compaction from skid trails and landings. Estimated reductions in canopy, as equivalent clearcut acres (ECA), are displayed in Table 3.4.5. A relatively high proportion of RHCAs have been harvested in Whitaker and Queen Creeks on Nez Perce Forest land. A considerable amount of timber harvest and road construction has occurred in Lower American River on private land. Mass erosion is a relatively minor process in American River. There is a minimal amount of past roading and timber harvest on high landslide risk (i.e., landslide prone) terrain.

Alternatives B, C, and D

Direct and Indirect Effects
Referring to Table 3.4.3 above, five of the watersheds will have no change in road density between any of the action alternatives. Post-project prescription watershed condition categories (NOAA-NMFS, 1998), based on road density, would not change from six in low condition, two in moderate and one in good condition.

The lowest road densities result from Alternatives C and D, which have the most aggressive road decommissioning package. Of the action alternatives, B decommissions the least amount of road and results in the highest remaining road density.

Cumulative Effects
Road construction history in American River watershed was summarized from the NPNF Watershed Database. The earliest road construction recorded in the database was dated 1890. The total length of roads in American River recorded in the Watershed Database was 269.3 miles. Road construction history by decade is shown in Table 3.0.3. Timber harvest and road construction history for American River are displayed on Map 14a of the American and Crooked FEIS (USDA-FS, 2005a).

The changes in overall road density from past, present, and reasonably foreseeable actions at the scale of the American River watershed are very slight. Table 3.4.4 illustrates the cumulative effects of the Eastside Project and the NPNF American-Crooked Project. Approximately 80 percent of the BLM roads proposed for decommissioning occur in RHCAs.

Table 3.4.4 Cumulative Road Density by Alternative

Watershed Name	Area (mi^2)	Alt A (existing)	Alt B	Alt C	Alt D
Middle American River	5.1	3.0	2.5	2.3	2.3
East Fork American River	8.6	1.0	.9	.9	.9

Watershed Name	Area (mi^2)	Alt A (existing)	Alt B	Alt C	Alt D
Whitaker Creek	1.4	3.9	3.2	3.2	3.2
Queen Creek	1.7	4.3	2.6	2.6	2.6
Box Sing Creek	1.4	3.3	2.9	2.9	2.9
Kirks Fork	9.8	0.6	0.6	0.6	0.6
Lower American River	6.8	2.0	1.6	1.6	1.6
Little Elk Creek	8.0	>3	>3	>3	>3
Lower Elk Creek	25.5	>5	>5	>5	>5
Entire American River	91.6	2.3	2.2	2.2	2.2

Indicator 2–Water Yield

ECA was calculated by prescription watershed for each alternative. The calculations take into consideration effects of harvest and temporary road construction. Road decommissioning was not modeled as decreasing ECA even though the roads would recover vegetation over time. The ECA analysis does not include the effects of insect and disease agents. Within the American River watershed, lodgepole pine comprises 15% of stand cover dominance. Dead and dying lodgepole pine will continue to contribute to ECA over the next two decades.

Table 3.4.5 shows the estimated peak year watershed ECA for each alternative. Existing condition is represented by Alternative A. Year 2006 represents the modeled peak activity year. ECA recovery begins the following year and occurs gradually from then on.

Table 3.4.5 Percent (%) ECA by Alternative for 2006 (Eastside Project only)

Watershed Name	Area (mi^2)	Alt A (existing)	Alt B	Alt C	Alt D
Middle American River	23.8	3	5	4	4
East Fork American River	18.4	6	6	6	6
Whitaker Creek	1.4	10	17	16	16
Queen Creek	1.7	13	18	18	18
Box Sing Creek	1.4	6	11	11	11
Kirks Fork	9.8	2	2	2	2
Little Elk Creek	8.0	11	11	11	11
Lower Elk Creek	25.5	14	14	14	14
Lower American River	91.6	9	10	10	10

Alternative A (No Action Alternative)

Under this alternative, no management actions, including vegetation treatments, road reconditioning, or temporary road construction would occur. Associated restoration activities, such as road decommissioning, soil restoration, riparian restoration projects, and road to ATV trail conversion projects would not occur.

There would be no change in flow timing and quantity associated with roads because no road decommissioning would occur. Soil compaction would continue to reduce water infiltration, so effects to water yield would remain the same.

Watershed Name	Area (mi^2)	Alt A (existing)	Alt B	Alt C	Alt D
Whitaker Creek	1.4	3.9	3.2	3.2	3.2
Queen Creek	1.7	4.3	2.6	2.6	2.6
Box Sing Creek	1.4	3.3	2.9	2.9	2.9
Kirks Fork	9.8	0.6	0.6	0.6	0.6
Lower American River	6.8	2.0	1.6	1.6	1.6
Little Elk Creek	8.0	>3	>3	>3	>3
Lower Elk Creek	25.5	>5	>5	>5	>5
Entire American River	91.6	2.3	2.2	2.2	2.2

Indicator 2–Water Yield

ECA was calculated by prescription watershed for each alternative. The calculations take into consideration effects of harvest and temporary road construction. Road decommissioning was not modeled as decreasing ECA even though the roads would recover vegetation over time. The ECA analysis does not include the effects of insect and disease agents. Within the American River watershed, lodgepole pine comprises 15% of stand cover dominance. Dead and dying lodgepole pine will continue to contribute to ECA over the next two decades.

Table 3.4.5 shows the estimated peak year watershed ECA for each alternative. Existing condition is represented by Alternative A. Year 2006 represents the modeled peak activity year. ECA recovery begins the following year and occurs gradually from then on.

Table 3.4.5 Percent (%) ECA by Alternative for 2006 (Eastside Project only)

Watershed Name	Area (mi^2)	Alt A (existing)	Alt B	Alt C	Alt D
Middle American River	23.8	3	5	4	4
East Fork American River	18.4	6	6	6	6
Whitaker Creek	1.4	10	17	16	16
Queen Creek	1.7	13	18	18	18
Box Sing Creek	1.4	6	11	11	11
Kirks Fork	9.8	2	2	2	2
Little Elk Creek	8.0	11	11	11	11
Lower Elk Creek	25.5	14	14	14	14
Lower American River	91.6	9	10	10	10

Alternative A (No Action Alternative)

Under this alternative, no management actions, including vegetation treatments, road reconditioning, or temporary road construction would occur. Associated restoration activities, such as road decommissioning, soil restoration, riparian restoration projects, and road to ATV trail conversion projects would not occur.

There would be no change in flow timing and quantity associated with roads because no road decommissioning would occur. Soil compaction would continue to reduce water infiltration, so effects to water yield would remain the same.

Watershed recovery would continue at the current rate, in the absence of a large disturbance such as wildfire or flood. Dead or dying lodgepole pine and additional insect infestations would have varying affects on water yield in some watersheds over the next two decades. Effects to water yield from a potential fire are highly variable depending on timing, location, size, weather, and suppression activities.

Runoff timing and quantity would reflect the magnitude of the disturbances. The risk of peak flows would depend on the extent of the vegetation change, conditions of the soil, floodplain and channel conditions, and weather following natural events.

Alternatives B, C, D– action alternatives

Direct and Indirect Effects
With the exception of two watersheds, all of the other prescription watersheds will be below 15 percent ECA. The highest levels are found in Queen, Box Sing and Whitaker Creeks, respectively. These are small prescription watersheds with channels that would be considered relatively sensitive to changes in watershed conditions. Overall, Alternative B shows only a slight increase over Alternative C for Whitaker Creek, followed by Alternative D. Box Sing Creek has the same ECA for all action alternatives.

Cumulative Effects
Historic analysis of ECA conditions in American River since 1870 was conducted in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a) and updated for the American and Crooked River project (USDA-FS, 2005a). Figure 3.4.1 below shows the results of those analyses.

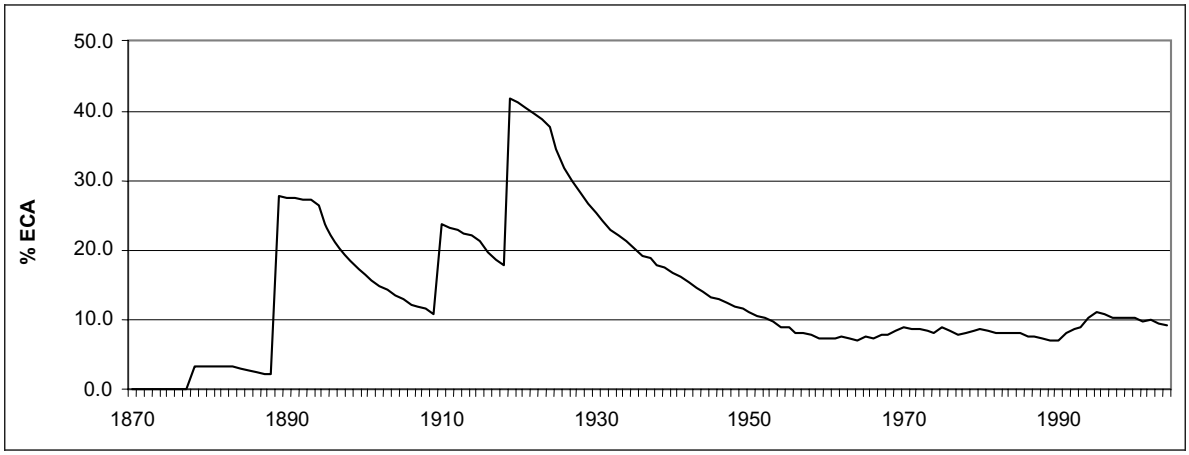

Figure 3.4.1 American River ECA 1870–2004

The peaks in ECA prior to 1950 were caused by wildfires totaling about 59,200 acres. Recorded large fires occurred in 1878 (2,743 ac); 1889 (21,281 ac); 1910 (10,793 ac); and 1919 (24, 266 ac). Roads recorded as being constructed prior to 1950 also contributed to a small extent. Timber harvest related to mining and homesteading also occurred prior to 1950, but is not quantified in the ECA analysis. The ECA starts at zero in 1870, but this is an artifact created by the beginning of the fire history records. Fire history prior to 1870 is unquantified, though residual ECA from earlier fires likely existed. ECA increases after 1950 are associated with road construction and timber harvest on federal, state and private lands.

Figure 3.4.1 indicates that ECA levels resulting from wildfires prior to 1950 were considerably larger than those resulting from timber harvest. This is understandable, given the large extent of these fires, which tended to be stand-replacing.

Forest Service and BLM records were queried to determine historic timber harvest in American River. Most of the larger timber sales also included road construction. From the NPNF Watershed Database, the total recorded timber harvest in the 1950s was 142 acres; 1960s was 2,687 acres; 1970s was 2,591 acres; 1980s was 1,977 acres; 1990s was 5,168 acres; and 2000s to date has been 809 acres. The watershed

database includes activities on BLM and private lands. Timber harvest occurred prior to the 1950s, associated with mining and homesteading activities. This is undocumented.

Foreseeable actions include known projects, including those listed in Table 3.0.1, which were considered for cumulative effects, as reflected in Table 3.4.6. Although it cannot be quantified, it is anticipated that timber harvest on private lands within the project area watersheds will continue, but the estimated quantity and silvicultural prescription cannot be predicted.

Table 3.4.6 Percent (%) ECA by Alternative for 2006, Cumulative Effects

Watershed Name	Area (mi^2)	Alt A	Alt B	Alt C	Alt D
Middle American River	23.8	3	5	4	4
East Fork American River	18.4	6	7	7	7
Whitaker Creek	1.4	10	20	20	20
Queen Creek	1.7	13	23	23	23
Box Sing Creek	1.4	6	15	15	15
Kirks Fork	9.8	2	3	3	3
Little Elk Creek	8.0	11	11	11	11
Lower Elk Creek	25.5	14	14	14	14
Lower American River	91.6	9	11	11	11

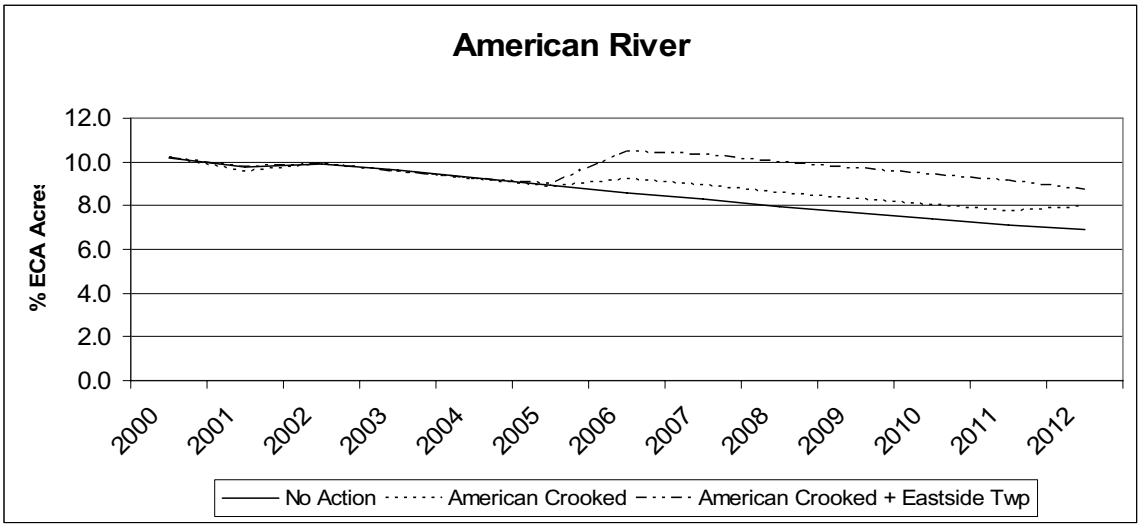

Figure 3.4.2 American River ECA 2000–2012

With the addition of the American and Crooked Project, the larger watersheds show ECA increases of 2–3% over the existing condition. Kirks Fork, Middle American, East Fork American, Little Elk, Lower Elk and Lower American all remain below 15 percent ECA under all alternatives. More substantial increases in ECA (5 to 13 percent) are seen in Whitaker, Queen and Box Sing Creeks. This is a reflection of the relative size of the treatments in these small watersheds. The ECA is highest in Queen, at 23 percent, when the American and Crooked Project is combined with the Eastside Project.

Indicator 3–Sediment Yield

This section compares the existing condition to the action alternatives for effects on sediment yield. The indicator used for sediment yield is tons per year, expressed as a percent over natural baseline sediment yield. Base or natural yield represents the tons of sediment that are produced and subsequently transported

out of the subwatershed each year under natural conditions. The existing sediment yield over base represents annual activity generated tons of sediment produced by previous activities or disturbances such as roads, timber harvest and fire.

Sediment yield was modeled for each prescription watershed. The primary sediment producing activities modeled include road construction, road reconstruction, road decommissioning and timber harvest. Effects were modeled for a 10-year period (2003–2012 assuming project activities will begin in 2006). Activities occurring throughout the life of the project are modeled as occurring all in 2006. Modeling was done on a peak year basis in order to meet the assumptions under which fishery and water quality objectives were established for the BLM MFP (Appendix H).

Table 3.4.7 shows the estimated sediment yield over base by alternative for each prescription watershed in American River. Year 2003 represents the existing condition, 2006 and 2007 represents the modeled peak activity year and 2012 represents the conditions at the end of the modeled period, when sediment yield from new activities is assumed to have ceased or stabilized.

Table 3.4.7 Percent (%) Over Base Sediment Yield by Alternative, Eastside Project Only

Watershed Name	Area (mi^2)	Year	Alt A	Alt B	Alt C	Alt D
Middle American River[1]	23.8	2003	13	13	13	13
		2006	12	17	15	15
		2012	12	12	11	11
East Fork American River[1]	18.4	2003	12	12	12	12
		2006	12	12	12	12
		2012	12	12	12	12
Whitaker Creek	1.4	2003	66	66	66	66
		2007*	31	57	34	57
		2012	31	31	31	31
Queen Creek	1.7	2003	37	37	37	37
		2007*	37	59	38	40
		2012	37	37	37	37
Box Sing Creek	1.4	2003	21	21	21	21
		2006	21	47	47	47
		2012	21	21	21	21
Kirks Fork	9.8	2003	5	5	5	5
		2006	5	7	6	6
		2012	5	5	5	5
Little Elk Creek	8.0	2003	24	24	24	24
		2006	24	24	24	24
		2012	24	24	24	24

Watershed Name	Area (mi^2)	Year	Alt A	Alt B	Alt C	Alt D
Lower Elk Creek[1]	25.5	2003	16	16	16	16
		2006	16	18	18	18
		2012	16	16	16	16
Lower American River[1]	91.6	2003	16	16	16	16
		2006	15	22	20	18
		2007	15	17	16	16
		2012	15	14	14	14

*Note: Queen and Whitaker creeks are modeled for harvest and roading in 2007
[1] Composite watersheds were combined with upstream watersheds for sediment yield analysis.

Figure 3.4.3 is a time trend graph of sediment yield over base for Lower American River.

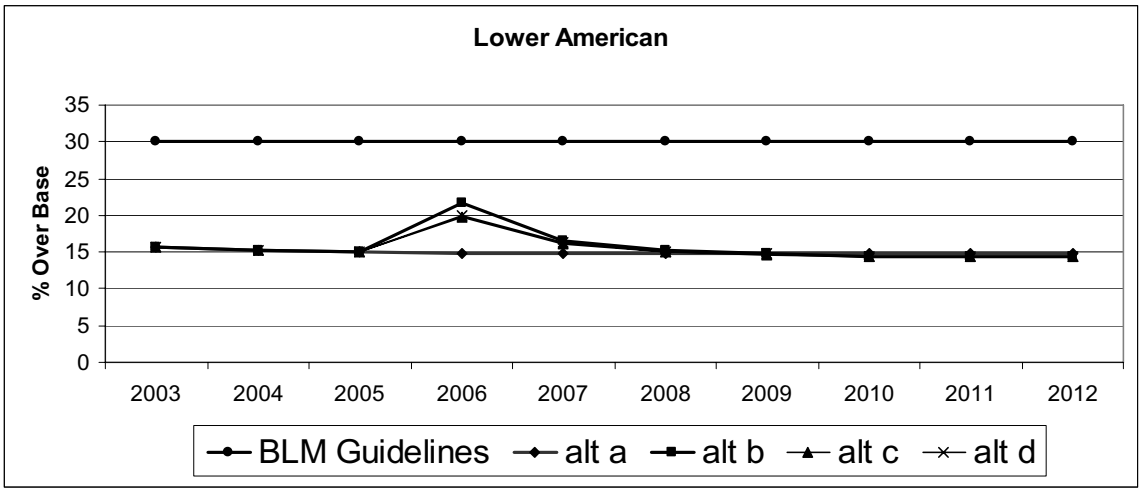

Figure 3.4.3 Lower American River Sediment Yield

Alternative A (No Action Alternative)

Existing sediment yields in 2006 are all 15 percent over base or less, with the exception of Whitaker, Queen, Little Elk, and Box Sing Creeks. Activity on private land resulted in a significant modeled sediment yield peak in Whitaker Creek in 2003.

Under this alternative, no timber harvest, road construction, or prescribed burning would occur. As predicted by NEZSED model, sediment yield would be stable or have very low levels of decrease (see Table 3.4.7 above). Proposed restoration actions, such as riparian restoration within dredge mined areas, road decommissioning, and soil restoration would not occur. In the absence of fuel treatments, fuels loads would increase. If a fire occurred within the analysis area and the area was large and the burn was severe, increased sediment yields would result.

Alternatives B, C, and D

Direct and Indirect Effects
Sediment yield from the action alternatives that is modeled results from road construction, road reconstruction, road decommissioning, road to trail conversion and timber harvest. Activities that yield

sediment that are not modeled by NEZSED include road maintenance, elevated road use, stream crossing improvements, instream improvement, and riparian restoration. Some sediment yield increase could occur from the channel system related to increased water yields. This is also not modeled.

Sediment yields in the peak activity year of 2006 and 2007 all stay below BLM sediment yield guidelines. The Sediment yields for Whitaker and Queen do approach threshold levels (i.e., 60 percent). Entry frequency guidelines are also met with this action. Peak year sediment yield in most watersheds is highest under Alternative B. Peak year sediment yield is lowest in most watersheds in either Alternative C or D depending on the watershed. Alternative C has the most restoration actions identified for reduction of chronic sediment, and is followed by Alternative B and C (see Appendix H, Table H.3). Restoration actions for reduction of chronic sediment yield would occur in Middle and Lower American River watersheds.

No adjustment was made in modeled sediment yield for increased traffic associated with project activities. Of the 43 miles of designated log haul routes in American River, about 6 miles are located in streamside areas. It is acknowledged that some additional sediment yield will likely occur due to traffic increases (Bonn and Graves, 2005). This will be reduced through road maintenance where needed and contract provisions to minimize resource damage during wet periods.

Riparian restoration actions will also result in sediment yield increases that are not modeled. In American River, this is associated with re-contouring of streambanks, ford restoration, and a channel re-connect. Modeled sediment is primarily "pulse" source. The primary exception is the permanent road constructed for the American River subdivision and a vehicle bridge (Alternatives C and D) that would be a "chronic" source. The Eastside Project restoration actions will reduce chronic sediment sources in the long term, and support achievement of the South Fork Clearwater River TMDL for sediment and reduction of chronic sediment sources occurring on BLM lands. Refer to Appendix H, Table H.3 for a summary of project related short term and long term effects.

Cumulative Effects

Historic analysis of sediment yield in American River since 1870 was conducted in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a) and updated for this analysis. Figure 3.3.4 below shows the results of those analyses.

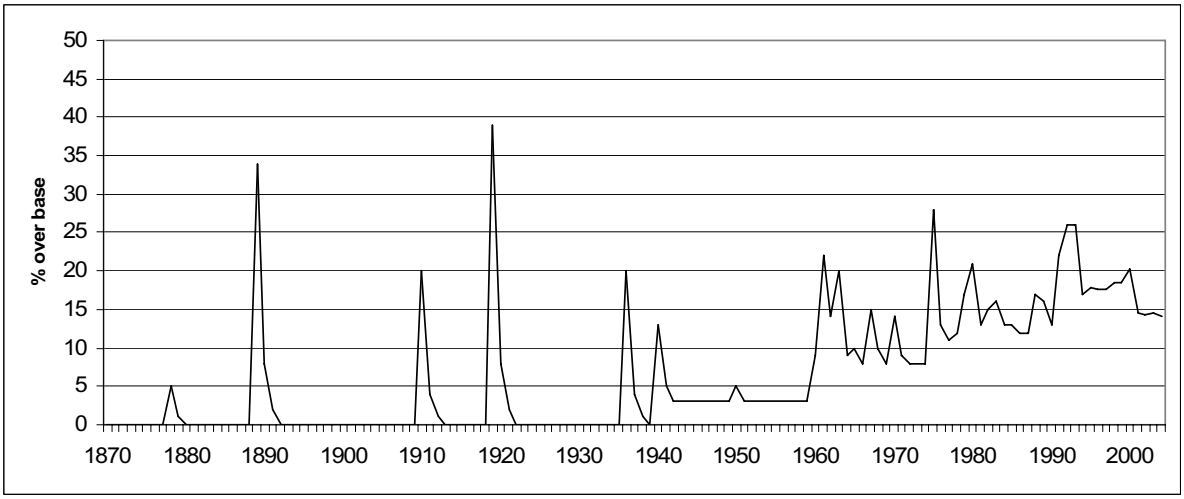

Figure 3.4.4 American River Sediment Yield 1870–2004

The peaks in sediment yield prior to 1950 are the result of the same wildfires discussed above under ECA cumulative effects. The fire peaks associated with the 1889 and 1919 wildfires appear to be somewhat

larger than peaks associated with later roads and timber harvest. Sediment yield associated with fire is assumed to recover relatively quickly, whereas roads tend to produce a level of long term, chronic sediment yield.

The sediment yield peaks associated with road construction prior to 1980 are likely underestimated, since the road sediment mitigation values reflect current conditions, rather than practices which were in effect at the time of construction. Although roads were built in the watershed prior to 1940, the sediment yield effects of these roads are not displayed until 1940. Sediment yield peaks associated with historic mining activities are not reflected in Figure 3.3.4 and likely exceeded those associated with other activities.

Table 3.4.8 shows the percent over base sediment yield by alternative. Figure 3.3.5 shows the percent over base sediment yield for Lower American River. These include effects of past activities and foreseeable future on BLM and NPNF lands.

Table 3.4.8 Percent (%) Over Base Sediment Yield, Cumulative Effects

Watershed Name	Area (mi^2)	Year	Alt A (existing)	Alt B	Alt C	Alt D
Middle American River[1]	23.8	2003	13	13	13	13
		2006	12	17	16	17
		2012	12	11	11	11
East Fork American River[1]	18.4	2003	12	12	12	12
		2006	12	17	17	17
		2012	12	9	9	9
Whitaker Creek	1.4	2003	66	66	66	66
		2006	31	57	57	57
		2007*	31	59	36	58
		2012	31	30	30	30
Queen Creek	1.7	2003	37	37	37	37
		2006	37	56	56	56
		2007*	37	60	40	41
		2012	37	33	30	33
Box Sing Creek	1.4	2003	21	21	21	21
		2006	21	60	60	60
		2012	21	19	19	19
Kirks Fork	9.8	2003	5	5	5	5
		2006	5	8	8	8
		2012	5	5	5	5
Little Elk Creek	8.0	2003	24	24	24	24
		2006	24	24	24	24

Watershed Name	Area (mi^2)	Year	Alt A (existing)	Alt B	Alt C	Alt D
		2012	24	24	24	24
Lower Elk Creek	25.5	2003	16	16	16	16
		2006	16	18	18	18
		2012	16	16	16	16
Lower American River[1]	91.6	2003	16	16	16	16
		2006	15	23	22	22
		2007	15	17	17	17
		2012	15	14	14	14

*Note: Queen and Whitaker creeks are modeled for harvest and roading in 2007
[1] Composite watersheds were combined with upstream watersheds for sediment yield analysis.

When the Eastside and American and Crooked Projects are combined, the larger watersheds of Middle American, East Fork American and Lower American all remain below 30 percent over base (the threshold level for these watersheds) in the peak year under all alternatives. The smaller subwatersheds of Whitaker, Queen, and Box Sing are near or at the threshold levels (i.e., 60 percent) identified in The MFP and supplement guidance (USDI-BLM, 1985, 1989a, and 1989b).

Middle and Lower American River will primarily show a reduction in long term chronic sediment yield, resulting from the watershed improvement projects.

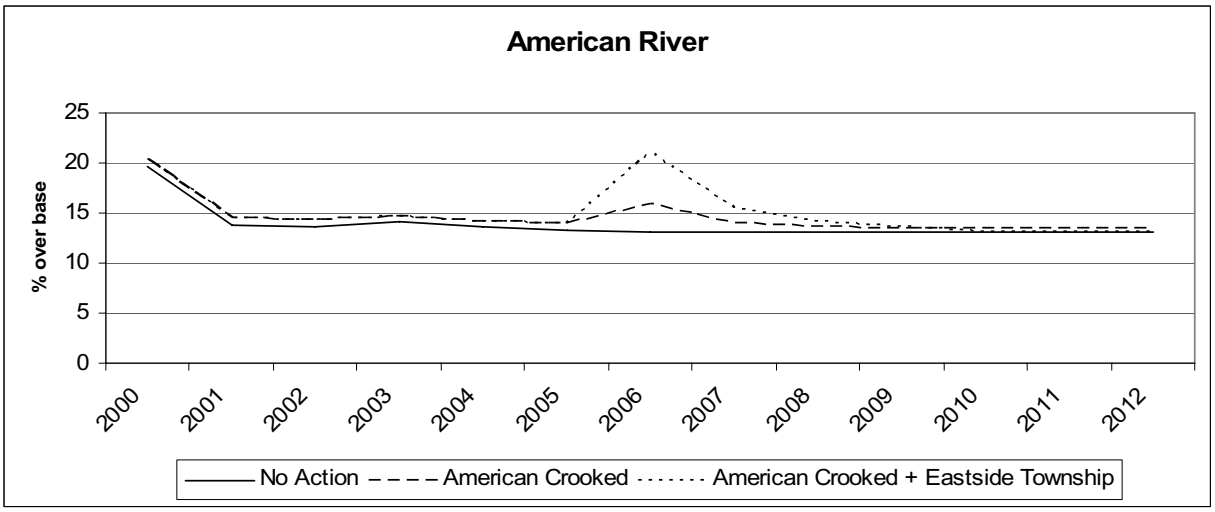

Figure 3.4.5 American River Sediment Yield 2000–2012

Figure 3.4.5 shows the trend of sediment yield for Lower American River of Alternative D from the American and Crooked Project and the Proposed Action of the Eastside Project. The effects of harvest on private lands can be seen in 2000, followed by the modeled project peaks in 2006. A slight long term reduction in sediment yield is indicated as a result of watershed improvements, this reduction is also routed to the Upper South Fork of the Clearwater River, which supports reduction of the sediment TMDL attributed to BLM lands.

Historic and current sediment yield have also occurred from activities not modeled in NEZSED. In American River, these include grazing, mining, and residential and commercial development.

Grazing by domestic stock probably preceded European settlement but increased with the onset of the mining era. This has mostly affected the lower elevation meadows in American River and Elk Creek. The primary influence on sediment yield has probably been through streambank disturbance, resulting in greater bank erosion.

Mining occurred in both upland and riparian areas. Sediment yield from upland placer mining has recovered to a large extent. Instream dredge mining caused large amounts of sediment yield during the active mining period. Some residual sediment yield from dredge mining is likely still occurring due to destabilized streambank and lack of vegetation. Residential and commercial development has occurred within the Elk City township. Most of the roads associated with this development have been modeled, but the excavations for building pads, driveways, etc., have not.

There have also been watershed and riparian improvement projects in American River that have served to reduce sediment yield. These have included erosion control on existing roads, riparian fencing, stream stabilization and mine site stabilization projects.

Indicator 4–Channel Morphology

Alternative A (No Action Alternative)

Stream surveys conducted during the past 10 years, and verification assessment surveys and reconnaissance fish habitat surveys were conducted in project area watersheds in 2004 and 2005. The results of these surveys are found in the BLM Eastside Project file.

Channel gradients for subwatersheds in American River are found in Appendix H, Table H.2. Following those tables is a general discussion of erosion, sediment transport and sediment deposition processes. Channel morphology in project subwatersheds has been altered through three primary processes: sediment deposition, channel encroachment and dredge mining.

Legacy elevated sediment deposition has occurred in analysis area stream, which is summarized in Section 3.6 (Fisheries). Elevated cobble embeddeness levels and adverse impacts to winter rearing habitat has been documented and summarized in Section 3.6 (Fisheries). Some of the elevated levels appear to be attributed to natural conditions, channel type, and a variety of land uses. High levels of deposited sediment have been documented in both watersheds that have had low levels and high levels of human development (e.g., roading, timber harvest, etc.).

Channel encroachment has occurred where roads and other activities have taken place adjacent to streams and their floodplains. The highest road densities in riparian areas are found in the Middle American, Whitaker, Queen, Box Sing and Lower American subwatersheds (see Table 3.4.3).

Dredge mining has occurred primarily along American River and in the lower ends of its tributaries. Dredge mining has severely altered stream channel morphology, reduced stream complexity, and impacted riparian/streambank habitats (USDA-FS, 1998a; USDA-FS, 1999a). Dredge mined stream reaches are often lacking or devoid of LWD, which is a primary component for creating pools and providing instream cover, refer to Section 3.6 (Fisheries) for additional information.

Implementation of Alternative A would leave these conditions unchanged. Some slight natural improvements to stream channels is occurring; however, because of legacy effects existing currently from dredge mining and slow rate of recovery (50+ years), full recovery is not expected to occur without active restoration measures. Some past and ongoing restoration measures have taken place in the watershed, which has improved instream channel habitats (e.g., pool creation, LWD).

Alternatives B, C, D

Direct and Indirect Effects
The action alternatives are expected to have relatively little effect on channel morphology. Generally, the ECA and sediment yield estimates are at levels where little channel erosion or deposition is anticipated. The highest estimated sediment yields are in Queen Creek in Alternatives C and D. The FISHSED analysis found in Section 3.6 (Fisheries) elaborates further on these effects.

Several stream ford obliterations and restoration improvements should improve channel morphology conditions in their immediate vicinity. These improvements are site-specific. In the case of culvert replacements, the improvements often result from less backwatering upstream of the site and less scour downstream. Similar improvements occur where culverts are removed, with the additional benefit of enhanced floodplain function through the crossing site. Some of the road decommissioning and road to trail conversion projects involve crossings and riparian areas. Channel morphology should be improved in those areas.

Cumulative Effects
Historically, the greatest impact to channel morphology in American River, Little Elk Creek, and Buffalo Gulch was caused by dredge mining. Encroachment of roads in riparian areas and floodplains also had a direct effect on channel morphology.

There are a number of past, present, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project and analysis area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of Chapter 3 that could affect channel morphology include NPNF American and Crooked River Project, proposed BLM restoration actions, private land restoration actions, private land timber harvest and road construction.

The American River Restoration Projects (USDI-BLM, 2006) will result in beneficial effects to channel morphology. The proposal identifies instream restoration for 3.5 miles of American River, a road to trail and channel re-connect project for Telephone Creek, and construction of a culvert that will improve fish access to 13 miles of stream. Refer to the Section 3.6 (Fisheries) for additional cumulative effects information. All of these projects involve direct and indirect long term beneficial effects to instream channel conditions.

Indicator 5–Water quality

Alternative A (No Action Alternative)

Water temperature was recorded at several locations in the American River watershed during the summer of 2003. These sites were American River at the Forest boundary, East Fork American River, Queen Creek, Kirks Fork and American River at the mouth. These data are shown in Appendix I. The data show a considerable variation across the watershed. Exceedance of the Idaho salmonid spawning criterion of not-to-exceed 13°C were noted at all sites at certain times. Exceedance of the Idaho cold water communities of not-to-exceed 22°C were noted at American River at the Forest Boundary and at the mouth. Exceedance of the EPA bull trout criterion of not-to-exceed 10°C (as a 7-day average of daily maximums) were noted at all sites. Some basic metrics from the 2003 data are shown in Table 3.4.9 below. As evidenced in the 1993–2004 South Fork Clearwater River water temperature data (see Table 3.4.10), 2003 was one of the warmest years since 1993.

Table 3.4.9 Summary of 2003 Water Temperature Data

Stream Name/Site	Number of Days > 20°C	Maximum Instantaneous (°C)
American River at Forest Boundary	31	22.9
East Fork American River	0	17.5
Queen Creek	0	17.0
Kirks Fork	7	20.6
American River near mouth	46	25.6

Under the "no action" alternative, insect and disease agents may tend to reduce shade over time in some riparian stands. In the absences of fuel treatments, and increased levels of dead and dying lodgepole, the potential to have severe fires in riparian areas exists. Shade in dredge-mined reaches would tend to increase very slowly over time as these areas are naturally re-vegetated by riparian vegetation and stream shading improves. Some dredge mined areas still are devoid of adequate riparian vegetation after fifty years (USDA-FS, 1999a).

A number of water quality parameters were sampled at stream sites in American River during the period 1977–1981 by the NPNF. Summaries of data for pH, conductivity and hardness for Upper American River and Lower American River are found in Appendix F for the American and Crooked River FEIS (USDA-FS 2005). These data show that pH is near neutral to slightly acidic, which is considered normal for area streams. Conductivity and alkalinity are both relatively low, indicating relatively low amounts of dissolved constituents and also relatively low biological productivity.

Alternatives B, C, and D

Direct and Indirect Effects

All alternatives are designed to minimize effects on streamside shade. Timber harvest would not occur in Riparian Habitat Conservation Areas (RHCAs). No direct ignition of prescribed burning would be conducted within RHCAs. Action alternative prescribed burn objectives would target reduction of fuel loads within treatment units. Potential does exist for direct or indirect effects occurring to RHCAs from incidental burning or erosion. Such potential effects would be expected to have discountable effects to stream shading or water quality (e.g., temperature). Within riparian areas, one new permanent road and a vehicle bridge will be constructed in Alternative C and D; and a temporary road for timber harvest would be constructed in Alternative D. These projects would have negligible effects on water temperature.

Under all action alternatives, insect and disease agents may tend to reduce shade over time in some riparian stands. Fire could also reduce shade, but the threat would be reduced through fuel reduction efforts. This approach is expected to be in compliance with and support long term achievement of the South Fork Clearwater River water temperature TMDL. Beyond sediment yield described above, there would be little change in most water quality parameters. Beneficial uses would be protected in all alternatives. Riparian restoration actions, relocating a road out of the riparian area, ford restoration actions, and decommissioning of roads within riparian areas would restore riparian conditions and stream shading in the long term (see Appendix I, Table I.1) and Section 3.6 (Fisheries).

Cumulative Effects

Historically, the greatest impact to water quality in the American River watershed was caused by the impact of dredge mining and the encroachment of roads on the stream channels. Dredge mining has resulted in a loss of riparian vegetation and shade along the mainstem of American River, Little Elk Creek, Buffalo Gulch, and the South Fork of the Clearwater River, with a presumed increase in water temperature as a result. Heavy metals present in the valley bottom materials were also mobilized. There

was likely some introduction of mercury, since it was often used as an amalgam in the gold mining process.

Grazing has also altered streamside shade and stream bank stability. Domestic livestock grazing continues to occur within the watershed on private, NPNF, and BLM lands. Private land grazing is prevalent in the large meadows associated with Elk Creek, Big Elk Creek, and Little Elk Creek. With improved grazing management as a result of federal listing of fish, grazing management has improved along stream reaches crossing BLM and NPNF lands within the watershed (USDA-FS, 2005a; USDA-FS, 1999a). Sediment yield was increased as a result of road construction, timber harvest, fire and residential and commercial development.

Effects from implementation of Alternatives B, C, and D are not expected to adversely affect water temperature within the analysis area, when considered cumulatively with past contributors to the degraded condition. No tree harvest would occur within any RHCAs. Implementation of restoration actions, specifically streamside road decommissioning and riparian restoration is expected to contribute to improved riparian conditions, stream shading, and improvements to water temperature in the long term (see Appendix I, Table I.1).

Sediment yield effects from the Eastside Project and NPNF American and Crooked River Project are disclosed above. Residential and commercial development can be expected to continue in the Elk City township, with some effect to water quality, primarily through increased sediment yields.

Irreversible or Irretrievable Effects (All Indicators)

There are no effects to watershed resources in American River from this project that are considered to be fully irreversible or irretrievable. Construction and obliteration of temporary roads will leave some residual effects in terms of soil conditions and interruption of groundwater flow paths. Sediment delivered to low gradient stream reaches tends to have a long residence time, but eventually will be transported or reorganized by high stream flows. No long term geomorphic changes in stream channels are predicted from project activities.

3.4.3 Mainstem South Fork Clearwater River

Beneficial Uses
Under the Idaho Water Quality Standards, designated beneficial uses in the South Fork Clearwater River and are cold-water communities, salmonid spawning, primary contact recreation and special resource water (IDAPA 58.01.02).

3.4.3.1 Existing Condition

The South Fork Clearwater River subbasin is about 1,175 square miles in area. Of this, about 864 square miles, or 74 percent of the area, is part of the Nez Perce National Forest. The majority of the remaining land ownership is private, with lesser amounts of BLM, State of Idaho and Nez Perce Tribal ownership (USDA-FS, 1998a). The American River where the Eastside Project occurs is one component of this larger watershed. Map 17 displays subwatersheds within the American River watershed and also identifies the main stem South Fork Clearwater River assessment area, mouth of Crooked River upriver to confluence of American and Red River.

The South Fork Clearwater River forms at the confluence of American and Red Rivers. Crooked River enters the South Fork about three miles below that point. The South Fork joins with the Middle Fork Clearwater River at Kooskia to form the Clearwater River. The main stem length of the South Fork is about 62.5 miles. In that distance, it falls about 2,700 feet, for an average stream gradient of 0.8 percent.

The South Fork main stem can be broken into several major reaches. From its origin to about Tenmile Creek, it is a relatively low gradient riffle/pool channel dominated by gravel and cobble substrate. Below

Tenmile Creek, the river enters a confined canyon characterized by steeper stream gradient and large substrate dominated by boulders and cobbles. Downstream of Mill Creek, the river alternates between confined and less confined reaches. Near Threemile Creek, the river enters a less confined, flat valley floor and is characterized by low gradient, a riffle/pool channel and dominated by gravel and cobble substrate (USDA-FS, 1998a).

The South Fork has been highly altered by encroachment from State Highway 14 along much of its length. This has resulted in loss of floodplain function, simplification of the channel, loss of riparian vegetation and loss of large woody debris. The upper reaches were also dredge mined. The lower few miles were diked after a flood in 1964, especially near Stites and Kooskia. Water temperature and suspended and deposited sediment conditions have all been determined to be elevated above natural conditions in the South Fork (IDEQ et al., 2004).

3.4.3.2 Environmental Effects

With the exception of transportation, direct effects to the South Fork Clearwater River would not occur since none of the project activities take place along the river. Use of State Highways 13 and 14 would occur for log and aggregate haul, equipment mobilization and personnel transport. This use is subject to State and federal regulations.

Indirect effects to the South Fork Clearwater River would need to translate downstream via the main stem of American River. Given the nature, magnitude and location of activities proposed in American River, it is considered highly unlikely that indirect effects would be detectable in the South Fork Clearwater River with the exception of the Eastside Project restoration activities. A portion of the restoration work would be conducted in lower American River. It is likely that some turbidity associated with suspended sediment could reach the South Fork Clearwater River during certain phases of the instream restoration work. This work would be done in accordance with Idaho State Water Quality Standards, Section 404 Permit requirements and Stream Alteration Permit requirements.

3.4.3.3 Cumulative Effects

Indicator 1–Watershed Condition

Watershed condition indicators for the South Fork subbasin were described in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a). The primary watershed indicators affecting watershed condition, which are applicable to the Eastside Project and cumulative effects include fire, timber harvest, roading, and restoration actions in the American River watershed and the Upper South Fork Clearwater River which reduce sediment yield and enhance riparian/streambank shading and riparian conditions.

Fire was the primary vegetation disturbance prior to 1950, burning an average of about 45,100 acres per decade. Although some timber harvest occurred prior to 1950, it has not been quantified. Since 1950, fires have burned about 3,400 acres per decade, whereas timber harvest has averaged about 17,900 acres per decade. Timber harvest records indicate 3,090 acres cut in the 1950s, 23,154 acres in the 1960s, 32,559 acres in the 1970s, 20,155 acres in the 1980s and 10,701 acres in the 1990s.

In the general area above the Forest boundary, there are approximately 2,150 miles of roads for an average road density of 2.5 miles per square mile. Peak road construction occurred in the 1960s, when about 600 miles of road were built. In the 1970s and 1980s, about 400 miles of road were built per decade. At the time of landscape assessment (1998), about 100 miles of road had been built in the 1990s.

Indicator 2–Water Yield

Historic analysis of ECA conditions in the South Fork Clearwater River since 1870 was conducted in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a) and updated for the American and Crooked River project (USDA-FS, 2005a). It includes ECA effects of historic activities, including the

following recently completed timber sales: 806, Honker II, Lucky Marble Mackey Day, Middle Face, Mill Helo, Otter Wing, Prospector Bunny, Ridge Running, Silver Quartz, Silver West, and 2021. Figure 3.11 below shows the results of those analyses.

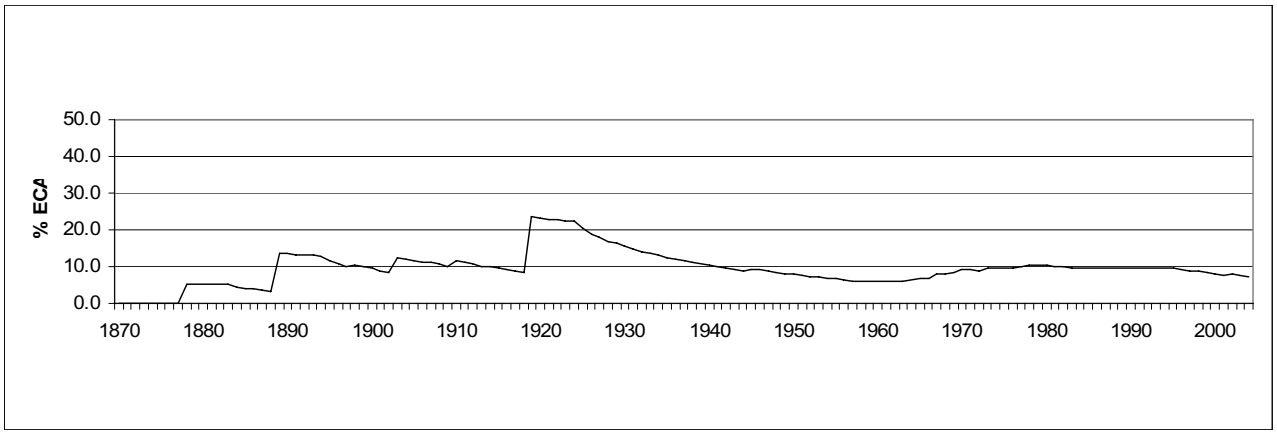

Figure 3.4.6 South Fork Clearwater River ECA 1870–2004

Figure 3.4.6 indicates that ECA for the South Fork Clearwater River subbasin peaked at about 20 percent in the decade of 1910, associated with the large wildfires of the era. ECA associated with timber harvest and road construction after 1950 has not exceeded about 10 percent and has been gradually recovering in recent years. There are no ECA guidelines applicable at the level of a 4th code subbasin, but the general ECA trends and levels are a useful indicator of overall subbasin conditions, relative to vegetation changes and water yield increases.

The American and Crooked River project FEIS (USDA-FS, 2005a) contains analysis of the effects on South Fork Clearwater River ECA of historic, ongoing and foreseeable projects. Figure 3.4.7 illustrates the effects of this analysis.

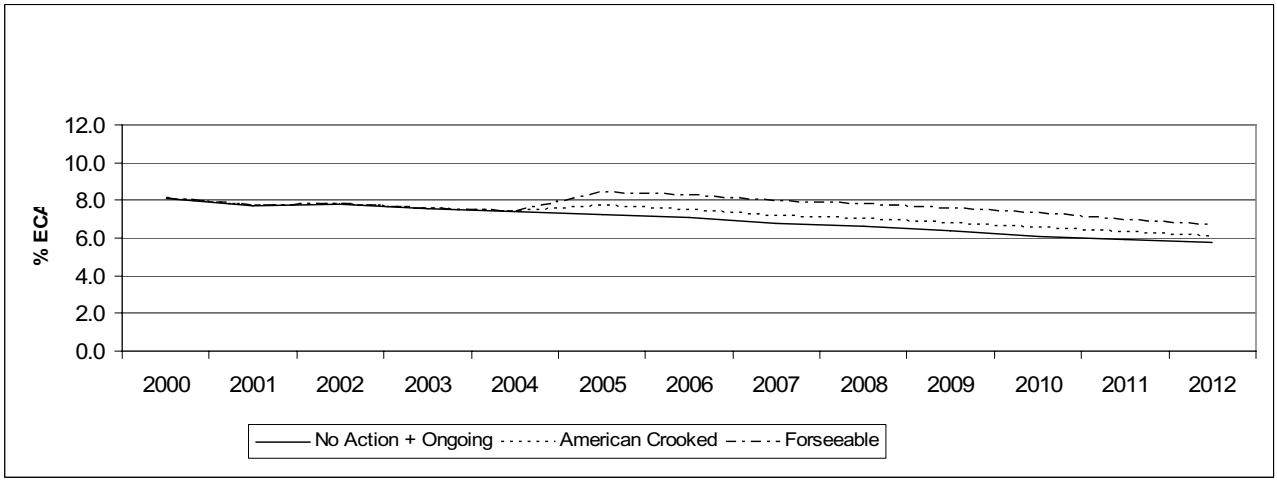

Figure 3.4.7 South Fork Clearwater River ECA 2000–2012

Figure 3.4.7 indicates a slight increase to just over 8 percent ECA, followed by a gradual recovery to pre-project conditions. The NPNF Blacktail project was not modeled for ECA and sediment yield since data were not yet available. The project proposes fuel treatments on approximately 3,500 acres and prescribed burning on approximately 10,000 acres.

Indicator 3–Sediment Yield

Historic analysis of sediment yield in South Fork Clearwater River since 1870 was conducted in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a) and updated for the American and Crooked River project (USDA-FS, 2005a). It includes sediment yield effects of historic activities, including the following recently completed timber sales: 806, Honker II, Lucky Marble Mackey Day, Middle Face, Mill Helo, Otter Wing, Prospector Bunny, Ridge Running, Silver Quartz, Silver West, and 2021. Figure 3.4.8 below shows the results of those analyses.

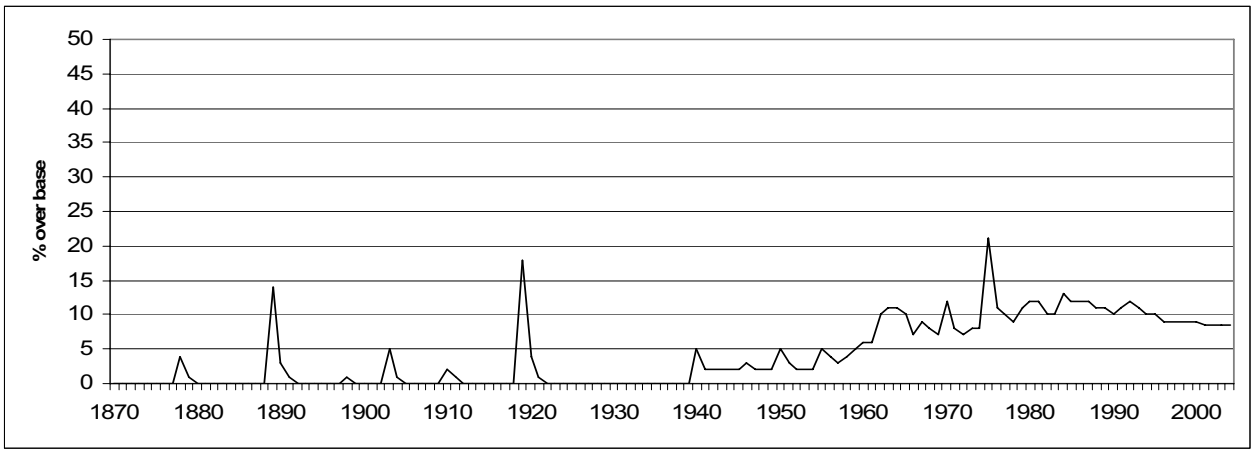

Figure 3.4.8 South Fork Clearwater River Sediment Yield 1870–2004

The peaks in sediment yield prior to 1950 are the result of the same wildfires discussed above under ECA cumulative effects. After 1950, peaks of sediment yield occurred largely in response to road construction. Timber harvest affects sediment yield to a lesser degree. It can also be seen that chronic sediment yield gradually accumulated as a result of road construction.

The sediment yield peaks associated with road construction prior to 1980 are likely underestimated, since the road sediment mitigation values reflect current conditions rather than practices which were in effect at the time of construction. Although roads were built in the subbasin prior to 1940, the sediment yield effects of these roads are not displayed until 1940. Sediment yield peaks associated with historic mining activities are not reflected in Figure 3.4.8 and likely exceeded those associated with other activities.

Figure 3.4.9 shows the effect on South Fork Clearwater River sediment yield of historic, ongoing and foreseeable projects, in addition to Alternative B of the Eastside Project. Ongoing actions reflected above include Meadow Face, Starbucky and Whiskey South. Foreseeable actions reflected below include American and Crooked River Project, Red Pines, and the Newsome Creek Restoration projects.

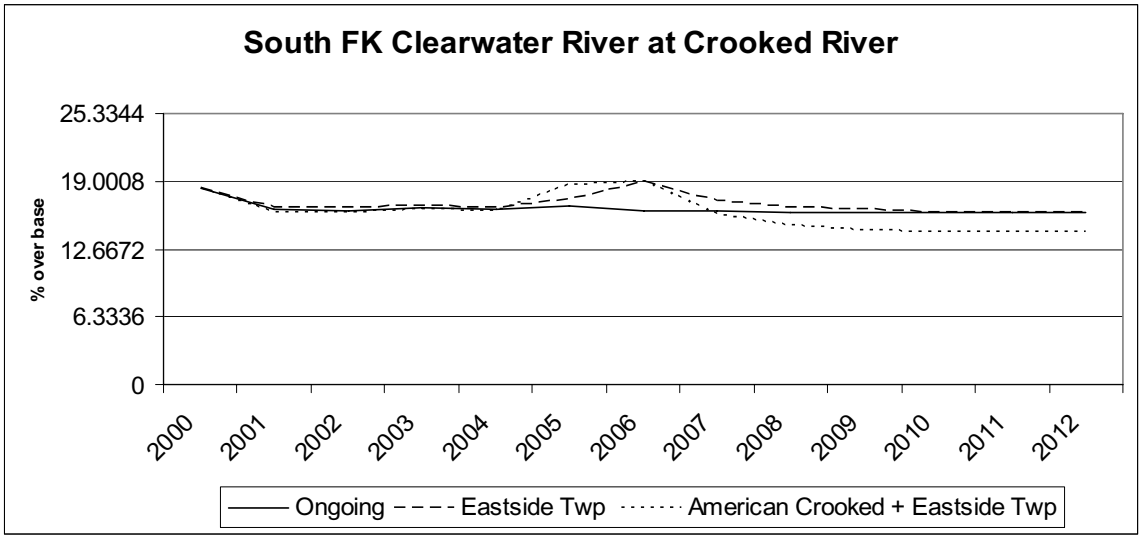

Figure 3.4.9 South Fork Clearwater River Sediment Yield 2000–2012

Figure 3.4.9 indicates a slight increase to 20 percent over base, followed by a slight reduction in long term chronic sediment yield as a result of implementing watershed improvement projects.

Actions associated with the proposed projects may contribute to and/or reduce cumulative sediment yield in the South Fork Clearwater River downstream of project area, dependent on the analysis timeframe. The NEZSED model was used to calculate the predicted cumulative effects sediment yield based on the proposed timber harvest, road construction, road maintenance, and road reconstruction. As discussed in Section 3.4.5.2 (Project Effects), these effects are expected to be short-term, and improvements in watershed condition over time would contribute to improved conditions in the river, assuming concurrent negative impacts do not occur off BLM-managed lands.

Indicator 4–Channel Morphology

Historically, the greatest impact to channel morphology in South Fork Clearwater River was caused by dredge mining and encroachment of Highways 13 and 14. Channel alterations from residential and agricultural development have affected the river below the Forest boundary. Dikes constructed after the June 1964 flood have affected the channel morphology from Stites to the mouth. Aggradation of the channel is also noticeable, particularly in the lower reaches from Butcher Creek to the mouth. The source of the material causing the aggradation appears to be the bed and banks of tributary streams, bank erosion along the mainstem; and landslides in the breaklands of the lower parts of the subbasin.

Substrate data in the South Fork Clearwater River have been collected by the IDEQ, BLM and NPNF. In 2002, the IDEQ contracted data collection for surface fines and cobble embeddedness. Data were collected in four reaches, from Threemile Creek to Crooked River, with 32 cross-sections sampled in each reach. Reach mean percent fines (less than 6mm) ranged from 2.2 percent to 6.0 percent and cobble embeddedness ranged from 46.6 percent to 48.2 percent. In 2002, the BLM collected surface fines and cobble embeddedness data at a site just above Crooked River. Surface fines (less than 6mm) was 5.3 percent and cobble embeddedness was 29.6 percent. In 1989, the NPNF collected surface fines at four cross-sections at a site just above Crooked River. Composite surface fines (less than 6mm) was 5 percent.

The levels of surface fines are considered to be quite low. This is probably due to the relatively high transport capacity of the river. The cobble embeddedness levels are moderate to high, perhaps indicating that higher levels of fine material are residing below an armor surface layer of coarse particles.

The Eastside and the American and Crooked River projects are expected to have negligible effects on channel morphology of the South Fork Clearwater River. The pathway for such an effect would be transport of coarse sediment that could lead to aggradation. Coarse sediments that could be liberated during instream activities should be attenuated within the tributary channels rather than transported to the South Fork. The risk of delivery of coarse sediment from landslides caused by project activities is considered to be low. If such an event were to occur, the delivery would be to a tributary, and similarly subject to attenuation prior to reaching the South Fork.

Indicator 5–Water Quality

Water temperature in the mainstem South Fork Clearwater River commonly exceeds Idaho State Water Quality Standards during the warm months (IDEQ, 2004). Daytime summer water temperatures are warmest in the lower reaches (River Miles 0 to 20), below the Forest boundary. This is largely because the river is wider, shallower and more exposed to solar radiation in the lower reaches. The river is coolest where it runs east to west in a narrow, confined canyon (RM 35 to 50). It is somewhat warmer in its upper reaches where it is once again wider and shallower, with less effective topographic shading (River Miles 50 to 65). Nighttime water temperatures follow a somewhat different profile, generally increasing downstream, but with little change below RM 25.

Table 3.4.10 displays data since 1993 for three sites on the South Fork Clearwater River. It reflects some of the trends discussed above. It is also noticeable that, with the exception of 1994, the years since 1998 have shown longer durations of warm temperatures.

Table 3.4.10 Summary of Water Temperature Data for South Fork Clearwater River (1993–2004)

Year	# of Days >20°C			Max Instantaneous Temp		
	Upper	Mt. Idaho	Stites	Upper	Mt. Idaho	Stites
1993	2	0	32	25.0	19.0	22.7
1994	34	24	50	24.5	23.3	28.4
1995	0	2[1]	37[1]	16.5	20.7[1]	24.9[1]
1996	2	7	52	20.0	21.6	26.2
1997	1	3	48	20.5	21.0	24.7
1998	24	14	31	22.2	21.6	22.0
1999	26	10	47	22.5	21.2	25.6
2000	35	26	61	24.7	22.9	27.9
2001	25	16	57	24.2	21.7	26.7
2002	31	16	52	25.1	22.5	26.7
2003	39	33	56	24.7	26.0	27.5
2004	NA	28	43	NA	23.2	27.5

[1] Data started August 1

The Eastside Project, when combined with other ongoing and foreseeable projects is not expected to have a noticeable effect on water temperature in the South Fork Clearwater River. This is because shade is not being reduced and channel morphology changes resulting in a wider, shallower channel are not anticipated. Over time, shade and channel morphology in the project area should improve with implementation of the riparian and instream improvements. The effect on water temperature from these improvements will be subtle and occur over a long period of time.

The BLM South Fork Clearwater River Riparian Project is planned to occur in the foreseeable future (2006–2007). This project includes riparian plantings, tributary stream channel restoration, stream side

road decommissioning, restoration of stream bank at a dispersed camp site, and implementation of ATV trail erosion control measures (USDI-BLM, 2005b). Long term improvement to riparian condition, stream shading, and improved fish habitat condition is expected to occur along localized areas adjacent to the South Fork Clearwater River (USDI-BLM 2005b). Implementation of these actions supports BLM commitment to achieving the sediment and temperature TMDL for the South Fork Clearwater River (USDI-BLM, 2005b).

The South Fork Clearwater River was analyzed for cumulative effects, including an effort to quantify sediment yield increases. In general, sediment yield conditions have probably improved in recent years. This is partly because the level of activity, particularly road building on federal lands has been substantially less than during decades of the 1950s through the 1980s. Additionally, dredge and placer mining has been substantially reduced since the 1950s. In addition, a number of watershed and fisheries restoration projects have occurred within the South Fork Clearwater subbasin. Future timber sales in prescription watersheds on federal lands are subject to similar design and upward trend requirements as the proposed American/Crooked and Eastside Projects.

As the BLM MFP and Forest Service LRMP guidance of upward trend in aquatic conditions for below objective watersheds is followed, and the South Fork Clearwater River TMDLs for sediment and water temperature is implemented, aquatic conditions should continue to improve in the South Fork Clearwater River, when considered at the Forest Boundary near Mt. Idaho Bridge. General warming of the climate (Mote et al., 2003) may ultimately preclude reductions in water temperature over the next several decades, even though streamside shade should improve over time.

3.5 Soils

3.5.1 Introduction

The NPNF recently completed the American and Crooked River FEIS. That analysis includes the American River watershed in which the Eastside Project is located. Much of the information and analysis methods in this section are incorporated from that analysis.

3.5.1.1 Scope of the Analysis

The scope of the analysis for soils, including landslide risk, includes the American River watershed. Soil productivity is the inherent capacity of a soil to support the growth of specified plants, plant communities, and soil biota. Soil also performs an important role in hydrologic function: the ability of the soil to absorb, store, and transmit water both vertically and horizontally.

Soil erosion may decline to negligible levels within five years on burned and harvested areas; however soil recovery following hot slash pile burns are not known, but effects are evident 30 years after burning.

Mass wasting is considered to affect soil productivity for 20 years or more, until soil organic matter accumulates and colluvium fills in channels scoured by debris torrents.

Temporal bounds for road-related effects are indefinite, because roads may continue to erode and produce sediment throughout their life, although peak erosion is typically at construction.

3.5.1.2 Soil Physical Properties

Indicators include:

Soil Compaction and Displacement:

- Acres of ground based logging on soils highly susceptible to compaction and displacement (USDA-FS, 1987c; Page-Dumroese, 1993)
- Acres of road construction

Surface and Substratum Erosion:

- Acres of harvest on soils rated as high for surface erosion (USDA-FS, 1987b)
- Acres of road construction on soil substrata (parent materials) rated as high hazard for erosion (USDA-FS, 1987b)
- Acres of road decommissioning

Mass Erosion: Acres of road construction or timber harvest on areas mapped as high landslide hazard.

3.5.1.3 Analysis Methods

Baseline conditions and ecosystem processes are derived from ecological land unit mapping and field reconnaissance. Soil susceptibility to compaction, displacement, and erosion was inferred from soil survey map units (USDA-FS, 1987c).

Past soil compaction and displacement were inferred from areas that have been tractor logged or dozer piled, and through photo interpretation or field reconnaissance. The linkage between tractor operation and machine piling, and their effects on soil compaction, displacement, and reduced soil productivity, is established through scientific research (Cullen et al., 1991; Froelich et al., 1983) and monitoring (USDA-FS, 1988, 1990, 1992, 1999c, 2003b, and 2003c).

The management strategy for landslide prone terrain is to minimize risk of slope failure in response to management activities. For the Eastside Project, field reconnaissance surveys were conducted by BLM on

areas of questionable stability. Roads and past harvest units were inspected for instances of instability; none were evident either on harvest units or roads (Stevenson, field notes, 7/2005). No harvest or road construction will occur in areas identified as having a high landslide hazard.

3.5.2 Existing Condition

Introduction

The South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a) recommended as a high priority, "Restore aquatic processes" as the area theme for the American River watershed. Restoration should include both restoration of aquatic conditions and processes in the watershed and adjustments to the road and trail system to support aquatic restoration and maintain wildlife security while providing for administrative and public uses. The South Fork Clearwater Landscape Assessment (SFCLA) is not a decision document but provides an important synthesis of existing condition and resource potential in the watershed.

Soil resource management affects aquatic processes primarily through erosion, mass wasting, and soil compaction or disturbance that affects subsurface slope hydrology.

Geology, Soil Development, and Landforms
Rocks weather to form soil parent material. Soil texture, chemistry, and resistance to erosion are highly conditioned by geology.

Metamorphic rocks or their derivatives comprise 97 percent of the rock types in the watershed. Belt-age metamorphic rocks: gneiss, schist, and quartzite, weather to sandy loam, loamy sand, or sand parent materials and develop into soil parent materials that are rated moderate to high for substratum erosion hazard (USDA-FS, 1987c). Tertiary sediments and other alluvium are important in the American River Township, and are stratified sediments derived from the same geologic materials. They typically weather into soil parent materials that are rated moderate to high for substratum erosion hazard.

These materials typically have low levels of inherent nutrients, and moderate to poor ability to retain nutrients (Garrison and Moore, 1998). Potassium deficiencies noted in these rock types can affect tree growth and susceptibility to root disease.

Granitics comprise about 3 percent of the project area. They are higher in certain nutrients, including potassium, but weather to sandy soils with low ability to retain nutrients. They typically weather into soil parent materials that are rated high to very high for substratum erosion hazard (USDA-FS, 1987c).

Most soils in the project area have surface layers formed in volcanic ash-influenced loess derived from the eruption of Mt. Mazama about 6,700 years ago. This material is physically highly favorable to root growth, being very permeable and with a high ability to hold moisture and nutrients. This material is very easy to compact or displace at any moisture content (Page-Dumroese, 1993), Soil response to disturbance depends not only on soil type, but topographic setting and slope hydrology. Landforms have characteristic slope shape, steepness, and stream dissection, which affect erosion and sediment delivery to streams.

- Rolling hills of low to moderate relief dominate the watershed at lower and mid elevations (80 percent of the watershed). The volcanic ash influenced soil surface layers buffer against erosion except where soil substrata are exposed, as in roads or mines. Substratum erosion hazard is moderate to high. Slopes are gentle to moderate and sediment is delivered to streams with moderate efficiency. Unstable slopes are uncommon, and typically occur as small areas on lower slopes or near stream headlands. West and south facing slopes at low elevation may have thin or mixed ash surface layers. These soils do not hold moisture as well as ash-influenced soils and are more susceptible to surface erosion.
- Stream breaklands and steep mountain slopes are of limited extent in the watershed (8 percent). In comparison to rolling hills, breaklands have steep slopes, shallower soils, thin or mixed loess

surface layers, higher surface erosion risk, higher risk of mass failure, and more rapid delivery of sediment to streams. Debris torrents can occur in headwater channels after intense rainstorms or rain-on-snow events.

- Convex slopes are found at upper elevations (5 percent of the area). In comparison to rolling hills, convex slopes have broader ridges, lower drainage density, and bedrock is usually deeply fractured. Volcanic ash surface layers are typically present and buffer against surface erosion. Underlying these ash surface layers, the substratum erosion hazard is high, Slopes are gentle to moderate and sediment is delivered to streams with low efficiency. Unstable slopes are uncommon, and typically occur as small areas on lower slopes or near stream headlands.
- Alluvial valleys form along low gradient stream channels (3 percent of the watershed). Soils are often poorly drained and subject to water transport most of the year. Substrata are coarse sands with gravel and cobble. Some have been dredge mined and only coarse mine spoils remain. Sediment delivery efficiency is very high (USDA-FS, 1987c); most of this landform is a riparian area.

The balance of the watershed (4 percent) consists of relatively small percentages of various other landforms.

Soil Compaction and Displacement
Road building, development, mining, tractor logging, machine piling, and grazing have impacted soils in American River. Displacement reduces plant growth where topsoil and organic matter are removed.

Within the American River watershed, mining effects have been localized but severe: soils in dredge and placer-mined areas have been removed, and sterile tailing piles remain. Soil recovery has been very slow and some of these areas still act as sediment sources. About 11,314 acres (19 percent of the watershed) have been tractor logged, machine piled or displaced by mining or development, resulting in soil compaction and displacement over some of that area. This estimate is derived from Forest Service timber stand record systems, photo interpretation, and field reconnaissance. Where the volcanic ash surface layer is compacted, displaced or mixed, soil moisture holding capacity is significantly impaired (USDA-FS, 1999b). Excavator piling has been documented on 250 acres in American River. This is usually less impactive than dozer piling, but can sometimes result in more than 20 percent detrimental disturbance. An estimate of total soil damage from past ground-based logging is 35 percent of the total area tractor logged, or 3,960 acres. About 778 acres of cable yarding have occurred in American River. Soil damage is usually confined to yarding corridors and landings, and accounts for about 4 percent of the activity area, based on monitoring in other areas (USDA-FS, 2003b).

Road construction also displaces soil, with long-term to permanent impairment of soil productivity. About 860 acres of documented system roads occur where topsoil has been displaced, mixed, or lost to erosion. This represents about 1.5 percent of the watershed. Additional undocumented non-system roads occur in the Elk City township.

Motorized and non-motorized trails account for an estimated 65 acres of soil disturbance. Soils are both compacted and displaced. Numerous undocumented user-created ATV trails exist, which add to the amount of detrimental disturbance in the project area.

The larger privately owned meadows near Elk City have been grazed since the mining era, and about 700 acres are likely to have been most compacted. Although no documentation exists, grazing after the fires of 1889, 1910, and 1919 was probably widespread in the burned areas of the watershed.

Surface and Substratum Erosion
Road building is the primary current source of erosion and sediment production in the watershed. Excavated skid trails and temporary roads are prone to erosion because the surface soil is removed. Road

erosion and sediment yield usually decline over time but continue at a chronic (i.e., continual) level indefinitely (Cline et al., 1981). Periodic large pulses of erosion may occur during intense or prolonged rainstorms or rain-on-snow events, or after burning or harvest that increases water yield and overland flow in interaction with road drainage systems (Wemple, 1994).

Past mining has caused locally severe erosion of both surface soil and substrata, often concentrated in valleys where eroded material can reach streams. American River, Little and Big Elk Creeks, and Buffalo Gulch have been most affected (USDA-FS, 1998a). A minimum of 307 acres has been affected by dredge mining. Past fires have resulted in locally severe surface erosion, but post-fire erosion typically declines to negligible levels with vegetation recovery in about 4 years (Megahan, cited in Cline et al., 1981; Elliot, Robichaud, and Brown, 1999, as shown in Elliot and Robichaud, 2001). The most recent large fire occurred in 1919. This fire burned about 24,000 acres or 41 percent of the watershed. This was also the largest documented fire in American River. Other large fires burned in 1878, 1889, and 1910.

Surface erosion from timber harvest has been slight. The volcanic ash-influenced surface soil is rated as low surface erosion hazard (USDA-FS, 1987c) and occurs over more than 75 percent of the project area. Excavated skid trails and temporary roads are prone to erosion because the surface soil is removed. About 507 acres have been harvested in the past on soils with high surface erosion potential. These are on steep slopes, usually on south aspects, or in riparian areas where soil is readily detached and transported by water. Harvest has occurred on 510 acres on soils with moderate surface erosion hazard. They are usually on steep slopes on north aspects. Surface erosion on harvest units typically declines to negligible levels over time, except for some landings and excavated skid trails that remain on the landscape (Cline et al., 1981).

Motorized and non-motorized trails account for 65 acres of soil disturbance which is susceptible to surface and subsurface erosion. Thirty-five acres are on soil substrata rated high for erosion hazard. Numerous undocumented user-created ATV trails exist in addition to the system trails. They add disproportionately to potential surface erosion because they are often gullied or rutted and may go straight up slopes or across creeks and have no erosion controls.

Mass Erosion

Landslide hazard is low in most of the analysis area, and few instances of mass erosion have occurred in harvest units or along roads. Mass erosion is the movement of large bodies of soil under the effect of gravity. Movement may be accelerated by high moisture levels, undercutting of toe slopes, or loss of tree rooting strength, among other factors (Chatwin et al., 1991). Landslides here include slumps, creep, debris avalanches or flows, debris torrents, and bedrock slides. Landslides can result in on-site loss of soil productivity, as surface soils are translocated down slope. Sediment delivered to streams may comprise fine sediments, which could have negative impacts, or larger rock and large organic debris, which could enhance stream habitat complexity.

About 362 acres (less than 0.6 percent of the watershed) are mapped as high hazard for landslides and no project activities will occur on these. These are steep slopes, especially in concave headwalls, and have features that show evidence of past mass wasting. Debris avalanche, debris torrent, and shallow slumps are the most likely kinds of mass failures in the area, but field reconnaissance indicates past mass wasting has been generally restricted to small scale-events with modest impacts. Field reconnaissance for this project found few instances of mass wasting from roads and old harvest units.

Cable logging typically produces relatively little soil damage (research cited in Alexander and Poff, 1985).

About 8,820 acres, or about 15 percent of the American River watershed, has been clearcut harvested with dozer piling or broadcast burning. Most of this harvest was prior to 1990, when the first large woody debris prescriptions might have been implemented. Nitrogen losses have probably been substantial on

these sites. Because slash disposal burns logs on the ground rather than standing trees, soil temperatures can be hotter and nitrogen loss by volatilization may therefore be greater than with a wildfire.

Highly decayed wood provides sites for ectomycorrhizal colonization, which contributes to plant growth and plays a role in the food chains of many small rodents and their predators.

Coarse woody debris in natural systems fluctuates with forest growth, mortality, fire, and decay. Harvest and slash burning can remove large wood to a degree that its soil function is impaired, since both standing boles and down wood may be much reduced.

3.5.3 Soil Compaction and Displacement

3.5.3.1 Direct Effects

Table 3.5.1 Indicators of Soil Compaction and Displacement: Eastside Project

Activity	Alt A	Alt B	Alt C	Alt D
Acres of ground-based timber harvest on soils rated high for compaction or displacement hazard plus new temporary road construction	0	840	819	779
Acres of soil restoration through decommissioning of old roads	0	8	12	6

Alternative A (No Action Alternative)

Under the "no action" alternative**,** no soil compaction or displacement would occur as a consequence of road construction, timber harvest, or fuel reduction activities. Existing soil compaction and displacement would persist with very slight natural recovery of surface layers of compacted soils. No soil restoration or watershed improvement activities would occur, so the long-term upward trend would be slow.

If wildfire occurred, mechanized suppression activities and subsequent salvage logging could create severe soil impacts, depending on fire characteristics and administrative decisions. Although it is not possible to predict an ignition or the size and severity of a wildland fire, it is well documented that the risk is rapidly increasing (see Section 3.1 Fire and Fuels). Given the increasing risk of severe wildland fire the continued accumulation of dead and down fuel loads could contribute to increased potential for locally severe fire effects on soil, including physical alteration of soil structure and development of hydrophobic layers, but compaction and displacement from a potential natural wildfire are not likely.

The scope of such impacts is not foreseeable, given the uncertainties of fire ignition and burning weather. Because the location, intensity, and size of future fire, or agency actions in response to fire, are uncertain, with or without implementing any action alternative, the evaluation of alternatives by fire hazard is most appropriately addressed in Section 3.1 (Fire and Fuels).

Action Alternatives B, C, and D

Alternative B would result in the greatest potential for direct soil compaction and displacement, Alternative D is the least, and alternative C intermediate. There is only an approximately eight percent difference in acres of compaction and displacement between Alternatives B and D. The amount of compaction and displacement are largely driven by the tractor yarded and piled acres by alternative. The area impacted by road construction and recovery through decommissioning, and mine site rehabilitation is miniscule by comparison. Short-term changes to the livestock grazing will result on areas with prescribed burning and reforestation, but the long-term pattern will be unchanged (see Section 3.12 Grazing).

3.5.3.2 Indirect Effects

Action Alternatives B, C, and D
Indirect effects of soil compaction and displacement include effects to vegetation and hydrologic processes. Compaction and displacement can result in reduced moisture holding capacity, greater drought stress, and susceptibility to pathogens or fire. Certain species have a greater competitive advantage in disturbed soils, like weeds or lodgepole pine, so that shifts in plant community composition have been noted in field inventories of harvest units (USDA-FS, 2003c). Altered soil porosity and moisture holding capacity (USDA-FS, 1999b) could contribute to higher drought stress, lower ground cover, and shifts in disturbance regimes like erosion or fire. The relative ranking of likely persistent indirect effects by alternative is (least effect to greatest): D, C, and B.

3.5.3.3 Irreversible or Irretrievable Effects–All Alternatives

Soil compaction effects can last 70 years (Froelich et al., 1983). Effects are irretrievable for that time period, but not irreversible. Decompaction can at least partly restore soil porosity and productivity. Soil displacement that mixes or removes the volcanic ash surface layer reduces soil moisture holding capacity, which may be irreversible and irretrievable. The relative ranking of likely persistent soil compaction and displacement by alternative is (least effect to greatest): A, D, C, and B.

3.5.3.4 Cumulative Effects–All Alternatives

The affected area for cumulative effects analysis is the American River watershed.

Table 3.5.2 Indicators of Cumulative Compaction and Displacement: American River

Activity	Existing Condition Plus Proposed and Foreseeable Actions[1]				
	Alt A	Alt B	Alt C	Alt D	Existing Condition[2]
Acres of ground-based timber harvest on soils rated high for compaction or displacement hazard, plus road construction or mining	12,814	13,386	13,365	13,325	12,546
Acres of soil restoration through road decommissioning.	34	42	46	40	0

[1] The primary foreseeable action includes 251 acres of tractor logging or temporary road construction and 30 miles of road decommissioning in the American and Crooked River Project (in American River) and 17 acres of tractor logging in the Elk City school timber sale.

Project design features and restoration can reduce the likelihood of effects to productivity, diversity, and weed susceptibility. Additional soil restoration associated with decommissioning of old roads would also reduce the extent of cumulative effects within the project area. Cumulative effects are directly related to the scope of timber harvest and mechanical fuel reduction activities, road construction, and soil restoration, including road decommissioning. The relative ranking of likely cumulative effects by alternative is (least to greatest effect) A, D, C, and B.

Activities that cause soil compaction and displacement may have cumulative effects on soil porosity, water holding capacity, aeration, and long-term productivity, with repeated entries. Cumulative effects may also occur at the landscape level, where large areas of compacted and displaced soil affect vegetation dynamics, runoff, and water yield regimes in a subwatershed. About 4,849 acres are currently estimated to have sustained detrimental compaction or displacement in the American River watershed due to logging, mining, or road construction. (see the description of historic activities in American River at the

head of this chapter). About 50 percent of the documented ground-based logging occurred in the years 1972–1981, and about 14 percent from 1993 through 1996. Undocumented logging was extensive for land clearing and construction during the earlier mining eras. Major locations and timing of harvest included the late 1950s in Little Elk Creek subwatershed, 1961 in Middle American River, middle 1960s as part of the Little Elk Creek project, 1970s in Lower American, Upper American and Flint Creek, 1980s in Flint Creek and Kirks Fork, 1990s as part of multiple BLM sales in the Township in Big Elk Creek and Lower American River, 2000 and 2002 in Lower American River throughout the private lands in the Township. Impacts tended to change by time period because different equipment, constraints, and silvicultural prescriptions were used.

Early logging in the mining era was sometimes selective and slash disposal negligible, so that effects were variable and sometimes slight. From the mid 1950s through 1980s impacts were severe due to both uncontrolled skidding and heavy scarification for fuels and site preparation. Broadcast burning occurred in some areas in the 1960s and 1980s and usually resulted in reduced compaction and displacement. During the late 1980s and 1990s some restrictions on timing of operations and skid trail spacing may have been employed. Recent use of forwarders and fuels concerns have prompted extensive grapple piling, both of which result in more widely spread compaction, but often less displacement (USDA-FS, 2003c).

The Eastside Project alternatives will add from 779 to 840 acres of compacted or displaced soils, depending on alternative but will not impact areas already affected by harvest or mining, so cumulative effects considered on an activity area basis would be negligible. Considered across the watershed, cumulative effects of this project and the e American and Crooked River project and foreseeable Elk City school harvest, which could add an estimated 1,560 to 1,621 acres of compacted or displaced soils due to harvest and road construction, would comprise about 3 percent of the American River watershed.

Mining activity has contributed to cumulative effects on soil displacement primarily through ditching in the late 1800s, which interrupted local slope hydrology and displaced surface soils, hydraulic mines which washed away both topsoil and subsoils, hard rock mining which excavated pits and adits, and dredging in the 1930s, which removed valley alluvium and left sterile mine spoils. Dredging has particularly displaced valley soils in the American, Lower American River and Little Elk Creek subwatersheds. No harvest is proposed in areas affected by past mining.

Grazing has probably occurred along the privately owned valley meadows since the discovery of gold in 1861 until the present. Lower forested slopes around the meadows have been converted to pasture and also grazed for many years. Livestock grazing probably compacted the moist soils of these low-lying meadows and slopes. No harvest is proposed in these areas.

3.5.4 Surface and Substratum Erosion

3.5.4.1 Direct Effects

Table 3.5.3 Indicators of Surface and Substratum Erosion

Activity	Alt A	Alt B	Alt C	Alt D
Acres of timber harvest on soils rated high for surface erosion hazard	0	0	0	0
Acres of road construction on soil substrata (parent materials) rated high for erosion hazard	0	5	4	4
Acres of road decommissioning or soil restoration	0	8	12	6

Alternative A (No Action Alternative)

Under the “no action” alternative, surface and substratum erosion processes would continue on roads, skid trails, and landings with slight abatement as slow natural vegetation recovery occurs. Erosion from

harvest units would continue to decline to negligible. No new management sources of surface or substratum erosion would occur, so the net trend would be reduced management-derived erosion. However, no soil or watershed improvement activities would occur, so the long-term upward trend would be slow.

If a wildfire were to occur, consequent surface soil erosion would range from negligible to severe, depending on location, size and severity of burn, soil disturbance associated with suppression, salvage logging, or burn rehabilitation activities, and interaction of watershed response with the existing transportation system. Although the scope of such impacts is not foreseeable, given the uncertainties of fire ignition and burning weather, data displayed in the Section 3.1 (Fire and Fuels) displays an increasing risk of stand replacing fire. The continued accumulation of dead and down fuel loads could contribute to increased potential for locally severe burning behavior, which can increase the likelihood of surface erosion, but this may be similar to risks associated with logging and broadcast burning on areas proposed for treatment.

Action Alternatives B, C, and D

Alternative D would result in little surface erosion and the least substratum erosion, Alternatives B the most, with Alternative C intermediate, considering both harvest, road construction and restoration effects. Road construction is more likely to result in erosion than harvest.

3.5.4.2 Indirect Effects

Alternatives B, C, and D

The relative ranking of likely indirect effects by alternative is (least to greatest effects): D, C, and B. All alternatives would implement design criteria and mitigation measures to minimize rill erosion and sloughing on road cut slopes, and develop burn prescriptions to minimize erosion on harvest units.

Indirect effects of soil surface and substratum erosion include effects to vegetation and hydrologic processes. Surface erosion removes the soil materials with the greatest ability to hold moisture and nutrients, potentially resulting in greater drought stress, poorer growth, and susceptibility to pathogens or fire. Since volcanic ash is not easily replaced, these effects may be very long lasting. Certain species have a greater competitive advantage in eroded soils, like knapweed or lodgepole pine, so that shifts in plant community composition and consequent disturbance regimes like erosion or fire, could occur. Eroded surface and substratum material may be delivered to streams and have consequences to water quality, stream temperature, quality of fish habitat, and channel morphology. See the discussions in Sections 3.4 (Watershed) and 3.6 (Fisheries).

3.5.4.3 Irreversible or Irretrievable Effect

Alternatives B, C, and D

The relative ranking of likely soil erosion by alternative is (least to greatest effects):, D,C,B. Effects of eroded substratum material are not irretrievable or irreversible, although effects as delivered sediment may be long lasting.

Eroded surface soil, where it is derived from volcanic ash influenced loess, is irretrievable and irreversible. Residual soil materials would develop into topsoil over several decades to hundreds of years, but this material may lack the moisture holding properties of volcanic ash.

3.5.4.4 Cumulative Effects–All Alternatives

Table 3.5.4 Indicators of Cumulative Soil Erosion: American River

Activity	Alt A	Alt B	Alt C	Alt D	Existing Condition
Acres of timber harvest or burn on soils rated high for surface erosion hazard	507	507	507	507	507
Acres of road or trail construction on soil substrata rated high for erosion hazard	298	303	302	302	286
Acres of road decommissioning or soil restoration	44	52	56	50	0

The affected area for cumulative effects analysis is the American River watershed.

Cumulative effects are directly related to the scope of timber harvest and road construction on susceptible soils, and the degree of compensation offered by road decommissioning, road to trail conversion, and soil restoration. The relative ranking of likely cumulative effects by alternative is (least to greatest effects): C, B, D.

Activities that result in soil surface and substratum erosion may have cumulative effects on water holding capacity, nutrient pools and retention, and long-term productivity, with repeated entries. Past activities considered in cumulative effects are mining, timber harvest and road construction on soils susceptible to erosion. No repeated entries into previously harvested areas are proposed for this project so cumulative effects at the harvest unit scale should be negligible.

Cumulative effects may also occur at the landscape level, where large areas of soil exposed to erosion may affect vegetation dynamics, invasive species, runoff, and sediment regimes in a subwatershed. Erosion of surface soils on most old harvest units is expected to have declined to zero, but substratum erosion from roads continues on about 843 acres in the watershed. The alternatives would add from 4 to 5 acres of temporary road construction on soil substrata highly susceptible to erosion, and the American Crooked Project about 7 acres of road construction on highly erodible substrata. Although it cannot be quantified, it is anticipated that road construction, development and timber harvest on private lands within the watershed will continue. As private landowners are not required to file for permits prior to activity, the estimated quantity cannot be predicted. These source areas contribute to loss of soil productivity.

Required mitigation and restoration should maintain current or slightly improved soil erosion levels, because of the road decommissioning and soil restoration. Control of erosion is generally easier to attain than restoration of compacted or displaced topsoil.

Existing roads have been constructed on highly erodible substrata throughout the settlement history of the watershed. Some of the most impactive were those constructed along valley bottoms during the mining eras: in 1935 in American River and Lower American River subwatersheds, 1895 and 1930 in Buffalo Gulch, and of undocumented age up Little Elk Creek. These roads generally were located and constructed with little regard for erosion control. Jammer roads built around 1967 for logging on steep slopes are concentrated in Big Elk Creek. These are stacked above one another and may interact to concentrate erosion. Other roads were built in the 1960s and 1970s on highly erodible substrata in the Kirks Fork, Upper American River, Lick Creek, West Fork American, and Little Elk Creek subwatersheds. These had low levels of design controls for erosion control. In the 1980s and early 1990s more roads were built in East Fork American River and Flint Creek, but better road location and design measures for erosion control were implemented during these decades. The temporary roads proposed for the Eastside Project on highly erodible substrata are located in the Lower American River subwatershed. Temporary roads

would contribute most to cumulative erosion in this subwatershed, per acre of ground disturbance, but erosion would decline to negligible levels after decommissioning. The proposed permanent roads for the Eastside Project are located in the Upper and Lower American subwatersheds. These roads are not on lands mapped as having highly erodible substrata.

Past mining impacts on at least 307 acres are likely to have resulted in localized severe erosion. This activity was concentrated in Lower and Main American River, Buffalo Gulch, and Little Elk Creek. Proposed harvest and road construction are most extensive in Main American River, but are not on highly erodible materials, and cumulative erosion due to the Eastside Project would be constrained by design and mitigation applied to harvest units, new roads, and decommissioning of temporary and old roads.

Motorized and non-motorized trails account for an estimated 72 acres. Soils are both compacted and displaced. Numerous undocumented ATV trails exist, which add to the amount of detrimental disturbance in the project area.

3.5.5 Mass Erosion

3.5.5.1 Direct Effects

Table 3.5.5 Indicator of Mass Erosion: American River

Activity	Alt A	Alt B	Alt C	Alt D
Acres of road construction or timber harvest on lands preliminarily mapped as high landslide hazard	0	0	0	0

Alternative A (No Action Alternative)

Under the “no action” alternative, mass erosion processes would remain a slight factor in soil processes in the watershed. Mass erosion from natural causes would continue at small scales and infrequent rates. Mass erosion from past management activities would continue at a much localized scale and declining rate as old roads stabilized and harvest units revegetated. If a wildfire occurred, consequent mass erosion could range from negligible to modest, depending on location, size, and severity of burn, soil disturbance associated with suppression, salvage logging, or burn rehabilitation activities, and interaction of watershed response with the existing transportation system. The scope of such impacts is not foreseeable, given the uncertainties of fire ignition and burning weather.

The continued accumulation of dead and down fuel loads could contribute to increased potential for locally severe burning behavior, which can increase the likelihood of mass erosion in steep draws, drainage headlands, and on steep, wet lower slopes, because rooting strength would be lost, and more moisture available.

Action Alternatives B, C, and D

Mass erosion would change little from natural rates under Alternatives B, C, or D. No harvest or road construction would occur under any alternative on lands mapped as high risk for landslides. No roads proposed for decommissioning under any alternative are on land mapped as high landslide hazard, but local road and slope failures would be identified and treated as roads are decommissioned.

3.5.5.2 Indirect Effects–All Alternatives

Indirect effects of mass erosion include effects to vegetation and hydrologic processes. Mass erosion may affect surface or substratum materials. Indirect effects are likely to be minimal, and differences among alternatives slight, because of the low landslide hazard in American River and because mass erosion potential would change little from natural rates under any of the action alternatives.

3.5.5.3 Irreversible or Irretrievable Effects–All Alternatives

There are no irreversible or irretrievable direct effects from the action alternatives which would impact mass erosion potential, except for potential loss of volcanic ash-influenced topsoil. Anticipated mass erosion processes under action or "no action" alternatives are of slight probability, size, or effects, and are unlikely to exceed natural rates.

3.5.5.4 Cumulative Effects–All Alternatives

The affected area for cumulative effects analysis is the American River watershed.

There are no management activities planned within any of the action alternatives on areas identified as high risk of mass failure (i.e., landslide prone). Consequently, no cumulative effects resulting in increased mass erosion potential are anticipated.

Past road construction in the watershed almost never crossed areas of high landslide hazard (less than 0.04 miles). Small road cut failures, especially associated with areas of Tertiary sediments, occur in this moist climatic zone. They are not documented during routine road maintenance, but can contribute to cumulative erosional losses. Only 34 acres on high hazard areas have been harvested in the past and no mass wasting response has occurred, even during the flood years of 1996–1997. No road decommissioning is proposed for areas of high landslide hazard.

The thinning and pruning that have occurred around administrative structures as part of defensible space projects in the analysis area will not increase mass wasting risk, because these are in areas of low risk and large, deep rooted trees that contribute to slope stability, are retained.

3.5.6 Soil Chemical and Biological Properties

3.5.6.1 Direct Effects

Alternative A (No Action Alternative)

If a wildfire occurred, consequent soil nutrient loss could range from negligible to severe, depending on location, size, and severity of the burn, loss through salvage logging, and loss of nutrients through erosion or leaching. Fire could also make more nutrients readily available for plant uptake and benefit post-fire plant growth. The scope of such impacts is not foreseeable, given the uncertainties of fire ignition and burning weather.

The continued accumulation of dead and down fuel loads could contribute to increased potential for locally severe burning behavior, which can increase the likelihood of nutrient loss to volatilization, erosion, or leaching.

Alternatives B, C, and D

Potential for potassium and nitrogen loss has been constrained by design measures under Alternatives B, C, and D. Design features specify that burn piles would be small and well distributed throughout the unit so that burn intensity would be reduced and redistribution of nutrients would be minimized. Piling would have adequate oversight and monitoring during implementation to ensure that adequate tops and limbs are left well distributed.

3.5.6.2 Indirect Effects–All Alternatives

The design and mitigation measures reduce differences among action alternatives to slight. Indirect effects of loss of soil nutrients include reduced growth and yield, increased susceptibility to pathogens (like root infection), and shifting species composition as species with the ability to sequester nutrients (like grand fir) out compete species less able (like larch) (Garrison and Moore, 1998). The "no action"

alternative would result in less immediate nutrient loss, but wildfire could affect any alternative by resulting in volatilization, leaching or erosion loss of nutrients, but also by making more nutrients readily available for plant uptake.

3.5.6.3 Irreversible or Irretrievable Effects–All Alternatives

Irreversible or irretrievable direct effects of nutrient loss will be reduced, because of the design measures adopted to protect tops and limbs from severe burning in large slash piles.

3.5.6.4 Cumulative Effects–All Alternatives

Activities that cause soil potassium and nitrogen loss may have cumulative effects on soil productivity, plant growth and yield, susceptibility to pathogens, and successional processes, with repeated entries. Past effects to potassium and nitrogen reserves due to management are not thought to be significant for the proposed activities, on a site-specific basis, because no entry into areas with prior timber harvest is proposed.

Some thinning and pruning have occurred around administrative structures as part of defensible space projects in the analysis area. This work is accomplished by hand. Lower branches and small trees were generally removed, and either hand piled or burned. Localized potential for cumulative soil nutrient loss is possible, if treatment is continuously sustained.

Differences among alternatives are only due to the scope of harvesting and the relative ranking is (least to greatest effect): A, D, C, and B. Cumulative effects are in proportion to the scope of past, proposed and foreseeable regeneration timber harvest, particularly whole tree yarding, and likelihood for piling and burning slash that may result in extensive nutrient redistribution and volatilization.

Activities that cause soil potassium and nitrogen loss may have cumulative effects on soil productivity, plant susceptibility to pathogens, and successional processes. Geologic materials potentially susceptible to potassium loss are dominant in American River.

Design measures are required that will ensure that machine piling, where required, results in small well-distributed piles that would less likely to result in loss through volatilization than large piles.

3.6 Fisheries

3.6.1 Introduction

This section will address the aquatic species and habitats found in areas potentially affected by the project and the associated potential direct and indirect affects of the project on aquatic species and their habitats. Refer to previous sections and chapters for a complete list of projects by alternatives which would be considered for this analysis.

3.6.1.1 Scope of the Analysis

The fisheries analysis area includes the American River watershed and the mainstem South Fork of the Clearwater River to the mouth of Crooked River. Within the American River watershed a total of 15 subwatersheds occur (see Figure 3.6.1); the following nine subwatersheds may be potentially affected by the Eastside Project: Middle American River, Lower American River, East Fork American River, Whitaker Creek, Queen Creek, Box Sing Creek, Kirks Fork, Elk Creek, and Little Elk Creek. Appendix A, Map 17 displays subwatersheds within the American River watershed.

The upper and middle South Fork Clearwater River subbasin is primarily under Forest Service management, BLM lands only occur within the Elk City township in the upper portion of the subbasin, which has mixed ownership and a long history of development. The lower portion of the South Fork Clearwater River subbasin consists of mixed ownership, and private lands are dominant. BLM lands within the lower subbasin consist of scattered tracts of lands, which are intermingled with private lands.

Direct, indirect, and cumulative effects have been analyzed for streams and subwatersheds within the analysis area.

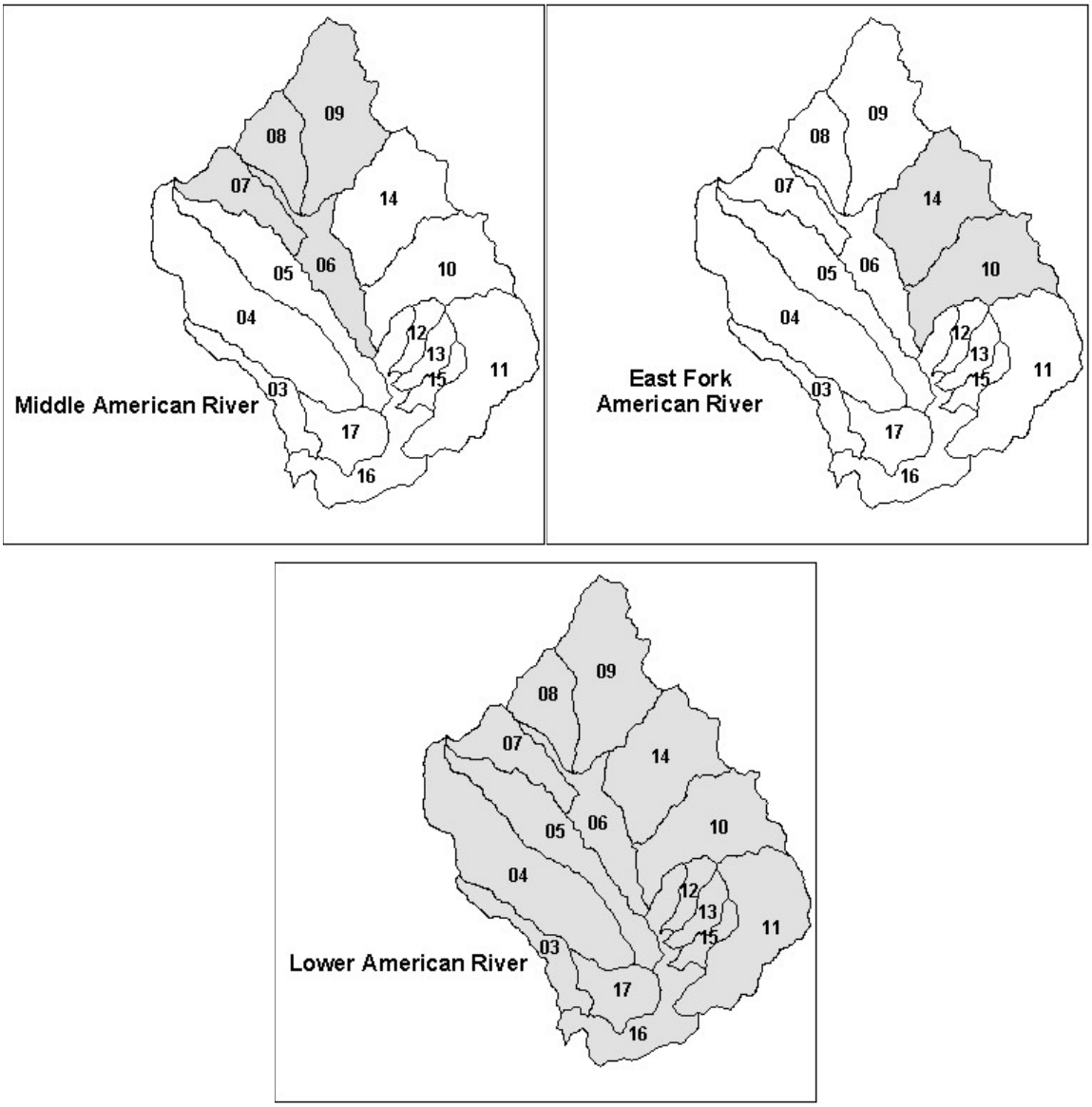

Figure 3.6.1 Composite v. Pure Watersheds–American River

3.6.1.2 Regulatory Framework

Analysis and evaluation of fisheries and aquatic threatened, endangered, and sensitive (TES) species data in this environmental impact statement (EIS) is based on direction contained in Federal Land Policy and Management Act of 1976, National Environmental Policy Act of 1969, and Endangered Species Act of 1973, as amended.

In accordance with national policy (BLM Manual 6840), a Memorandum of Understanding (MOU) has been signed by the State Director and Idaho Department of Fish and Game Director that designates BLM sensitive species. Consistent with national policy, all BLM offices are to use this list to help them "…ensure, to the best of their abilities, that critical habits and populations of sensitive species occurring on lands administered by the BLM will be managed and/or conserved to minimize the need for listing these animals as threatened or endangered by either Federal or State governments in the future."

The Chief Joseph Management Framework Plan (MFP) (USDI-BLM, 1981a) sets direction for management of the Cottonwood Field Office. The MFP includes goals and objectives, and where appropriate, applicable management emphasis areas for fisheries and water quality. The MFP and supplement guidance (USDI-BLM, 1985, 1989a, and 1989b) identifies fisheries/water quality objectives by prescription watersheds for the Cottonwood Field Office management area. Figure 3.6.1 above and Table 3.6.1 below identify eight prescription watersheds that would be affected by the proposed actions. The Elk Creek subwatershed (17060305-05-17) is primarily private lands and does not meet the criteria for a BLM prescription watershed (USDI-BLM, 1989a); however, it does occur in the composite watershed for Lower American River (see Figure 1), which will be assessed for cumulative affects.

Table 3.6.1 Fisheries and Water Quality Objectives

Prescription Watershed	Prescription Watershed Name	Current Fishery Habitat Condition (%)	Fishery/Water Quality Objective (% Habitat Potential)	Sediment Yield Guideline (% Over Baseline)	Entry Frequency Guideline (Per Decade)
17060305-05-06	Middle American R.	65%	80%	30%	1
17060305-05-16	Lower American R.	60%	80%	30%	1
17060305-05-10	E. Fk. American R.	80%	90%	30%	1
17060305-05-12	Whitaker Creek	70%	70%	60%	3
17060305-05-13	Queen Creek	70%	70%	60%	3
17060305-05-15	Box Sing Creek	65%	70%	60%	3
17060305-05-11	Kirks Fork	75%	80%	30%	1
17060305-05-05	Little Elk Creek	60%	80%	30%	1

Desired Future Condition

To estimate natural fish habitat potential and quantify existing stream conditions as required by the MFP, the Cottonwood Field Office is using Desired Future Condition (DFC) tables (USDI-BLM, 1989a) which have been further adapted from a model, developed on the Clearwater National Forest (Espinosa, 1992). The DFC tables identify specific fish habitat parameters by channel types using a habitat quality index. Values for the habitat parameters are quantified in a set of DFC tables. The DFC tables list the specific fish habitat parameter and a value or range that a stream should have in order to be at a given percentage of the streams potential and to meet the objectives for that watershed. The DFC values, habitat parameter data and their relationships are stratified by channel types and fish species. The values for the fish habitat parameters listed in the DFC tables are considered achievable for streams under natural conditions in the absence of major disturbances or are reflective of what good fish habitat should be. Most of the habitat parameters are consistent for each species, but they vary slightly by channel type. Using updated monitoring, surveys, and evaluations will permit adjustment of aquatic habitat parameters to better fit natural conditions and what is achievable.

Upward Trend

Eastside Project activities may potentially affect nine subwatersheds, of which eight are designated BLM prescription watersheds in the American River watershed (see Table 3.6.1).

The MFP Addendums/Refinement (USDI-BLM, 1985, 1989a, and 1989b) provides direction that timber harvest or other land uses can occur in prescription watersheds that do not meet their Fish/Water Quality objectives when such is concurrent with watershed improvement efforts that result in a positive upward trend in habitat condition.

PACFISH
The *Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho and Portions of California*, commonly referred to as PACFISH (USDI-USDA, 1995) supplemented the MFP in 1995. PACFISH established riparian goals, riparian management objectives (RMOs), and defines riparian habitat conservation areas (RHCAs). It includes specific direction for land management activities within RHCAs for streams, lakes, wetlands, and landslide-prone terrain. The intent of PACFISH is to protect habitat and populations of anadromous fish through the use of RMOs and standards and guidelines for specific land use activities and through monitoring requirements.

RMOs for stream channel condition provide the criteria against which attainment, or progress toward attainment, of the riparian goals is measured. They include habitat attributes such as number of pools, amount of large wood in the channel, stability of the stream banks, and width-to-depth ratio. The RHCAs were established to maintain the integrity of aquatic ecosystems. Healthy riparian areas are essential to maintaining or improving the quality of fish habitat. This analysis will use a combination of DFC, watershed condition indicators, and RMO values to identify conditions in watersheds where activities are proposed.

Riparian Habitat Conservation Areas
As per PACFISH direction, RHCA widths to be used would be:

- 300 feet either side of fish bearing streams;
- 150 feet either side of non-fish bearing perennial streams;
- 100 feet either side of non-fish bearing intermittent stream channels, wetlands, landslides, or landslide-prone area.

No timber harvest would occur in RHCAs. In conjunction with the preparation of a BA,(USDI-BLM 2006a) a site specific watershed analysis would be completed to address any road or landing construction which would be proposed for construction within an RHCA. Currently, a draft BA has been prepared for the Eastside Project. Ongoing review, conferencing, and consultation for the Eastside Project will be taking place with NMFS, USFWS, and BLM staff. Finalization of consultation and submittal of BA to NMFS and USFWS would take place prior to completion of the Final EIS.

Endangered Species Act and Biological Opinions from NMFS and USFWS
The American River watershed is designated as a priority watershed, as directed by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). These regulatory agencies issued Biological Opinions (BO) for Land and Resource Management Plans (NOAA-NMFS et al., 1998) with the following relevant guidelines for priority watersheds:

- Watershed analysis must be conducted prior to harvest, salvage, or thinning activities in RHCAs, and demonstrate that the action would not retard/prevent attainment of RMOs or adversely affect listed fish.
- Watershed analysis must be conducted if a watershed's ECA exceeds 15 percent and harvest activities would increase ECA.
- The 1998 steelhead BO added a sediment RMO incorporated by reference from the 1995 BO for chinook salmon. This RMO includes standards of less than 20 percent surface fines in spawning habitat or less than 30 percent cobble embeddedness in rearing habitat.

The Endangered Species Act also provides direction that federal agencies consult on all activities that may affect listed species and/or their habitat.

It is the policy of Congress that all Federal departments seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of this purpose (ESA 1979 as amended, *1531.2b).

Pursuant to section 305(b) of the Magnuson-Stevens Act and its implementing regulations, 50 CFR Part 600.920, Federal agencies must consult with NOAA-NMFS regarding any of their actions authorized,

funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect Essential Fish Habitat (EFH). The Magnuson-Steven Act, Section 3, defines EFH as "those waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity." Federal agencies may incorporate an EFH assessment into Endangered Species Act Biological Assessments.

EFH for coho salmon (*Oncorhynchus kisutch*) is not in the analysis area, but does occur in the lower Clearwater River subbasin, over 60 miles downstream from the mouth of American River.

Fall chinook salmon (*Oncorhynchus tschawytscha*) do not occur in the American River watershed, but they do occur in the lower reaches of the South Fork Clearwater River and in the mainstem Clearwater River. The mouth of American River is approximately 40 miles upriver from documented fall chinook salmon use in the lower South Fork of the Clearwater River.

Chinook salmon (*Oncorhynchus tschawytscha*) EFH includes all historically accessible reaches of the Clearwater River basin (except the North Fork Clearwater River above Dworshak Dam). EFH is present in American River and the South Fork Clearwater River for spring chinook salmon.

Threatened and Endangered Species

Steelhead Trout

Steelhead trout (*Oncorhynchus mykiss gairdneri*) is under the jurisdiction of NOAA Fisheries which is listed under the Endangered Species Act (ESA) and occurs within the analysis area. The Snake River steelhead Distinct Population Segment (DPS) was listed as threatened in a final rule on January 5, 2006 (71 FR 834, effective date February 6, 2006); the Snake River steelhead was previously listed as threatened August 18, 1997 (62 FR 43937, effective date October 17, 1997). Critical habitat for Snake River Basin *O. mykiss* was designated on September 2, 2005, and became effective January 2, 2006 (Federal Register, Vol. 70, 52630). Steelhead trout are distributed throughout the South Fork Clearwater subbasin and the American River watershed (USDA-FS, 1999a).

Steelhead trout in Idaho are the anadromous form of rainbow trout which have been further classified as redband trout of the Columbia River basin (Behnke, 2002). "Anadromous" refers to a life history whereby fish spawn and rear in freshwater but migrate to the ocean before maturing and returning to fresh water to spawn. Steelhead trout and most species of salmon follow an anadromous life history, and adults of both may attain large size as a result of time spent in the ocean. Populations of redband trout in the Columbia River basin, including those in Idaho, generally follow either an anadromous or resident life history. Some stream systems may support both types of individuals.

Steelhead trout spawning in the upper South Fork Clearwater River and American River watershed generally enter fresh water in late summer and fall, spend the winter in the lower Columbia, Snake, and Clearwater Rivers, and migrate up the South Fork Clearwater River in early spring. Spawning usually occurs in the South Fork Clearwater River and tributaries during April and May. Juveniles may spend one to four years in streams and rivers, generally two, before migrating downstream to the ocean during the spring runoff period in May and June (Behnke, 2002).

Steelhead trout are present in the South Fork Clearwater River and all accessible tributaries, including American River. All accessible American River tributaries have documented occurrences of steelhead trout. The smaller tributaries may only be used by steelhead trout for juvenile rearing.

Bull Trout

On July 10, 1998, the FWS listed the Klamath and the Columbia River population segment of the bull trout (*Salvelinus confluentus*) as threatened (Federal Register, June 10, 1998, Vol. 63, 31647). The FWS designated critical habitat on September 26, 2005; however, this designation did not include any streams or rivers in the South Fork Clearwater River subbasin (70 FR 56212, effective October 26 2005).

Bull trout are actually a char and are included in the genus *Salvelinus*, with brook trout, lake trout, Dolly Varden, and Arctic char. The bull trout and Dolly Varden were long considered the same species, and are

generally similar in appearance, but skeletal and genetic analyses have shown they are separate species (Behnke, 2002). Large bull trout are known as voracious predators of other fish, although small bull trout typically feed on invertebrates. Bull trout spawn in the fall, typically in the coldest reaches of smaller tributaries. Clean substrate (rocks), cold water temperatures, and the presence of cover are important attributes of preferred bull trout habitat.

Bull trout are especially vulnerable to human-induced factors that increase water temperature and sediment loads, change flow regimes, block migration routes, and established non-native trout, particularly brook trout (Behnke, 2002).

A threat to bull trout is hybridization with, or competitive displacement by, brook trout. The effects of hybridization on the genetic integrity of bull trout is a relatively small concern because hybrid offspring are almost always sterile. However, when a brook trout breeds with a bull trout, the fecundity of that bull trout will be zero for that year–there will be no bull trout from that mating. Also, because brook trout can spawn at much younger ages, they can presumably competitively displace bull trout simply by having the capacity for higher population growth rates.

Bull trout are present in the South Fork Clearwater River and many of its tributaries, including American River. Bull trout have been documented in Lower, Middle, and Upper American River, East Fork American River, and Kirks Fork.

Bureau of Land Management Sensitive Species

Spring Chinook Salmon

Spring chinook salmon (*Oncorhynchus tschawytscha*) are not listed as a threatened species under the ESA in the South Fork Clearwater subbasin because indigenous populations were likely eliminated from the Clearwater River by construction of Lewiston Dam in the early 20th century (Schoen et al., 1999; Murphy and Metsker, 1962). Naturalized populations of spring chinook salmon have been re-established in the South Fork Clearwater River subbasin, including American River, as a result of reintroduction efforts by federal and state agencies and the Nez Perce Tribe (Schoen et al., 1999).

The American River watershed has a high inherent capacity to support spring chinook salmon (USDA-FS, 1998a), based on features such as climate, relief, and geology. This river system is comprised of significant lengths of low gradient, meadow reaches that provide optimal spawning and rearing habitat for this species, offering large areas of appropriately-sized spawning gravels as well as preferred low gradient rearing habitat juveniles with a high inherent capability to support spring chinook salmon (USDA FS 1998a). Spring chinook salmon have been documented in Upper, Middle and Lower American River, Elk Creek, Big Elk Creek, Little Elk Creek, East Fork American River, Kirks Fork, and Box Sing Creek.

Historically, significant numbers of spring chinook salmon spawned and reared in these systems as well as other tributaries of the South Fork Clearwater River. Currently, adult returns vary but are generally low. In 2003, the weir at the mouth of Crooked River counted 1360 returning adult spring chinook. The 1990 fish habitat survey conducted by Clearwater BioStudies, Inc. (1990) identified 9,810 square meters of spawning gravel available in the mainstem river from the mouth to Orogrande. If this habitat were fully seeded, even in the existing condition, there is potential to produce over 500,000 spring chinook smolts annually in Crooked River. The American River is a very similar system. Both rivers have been dredge mined using large floating bucket line dredges which resulted in a loss of pool habitat, removal of acting and potential woody debris and wider, shallower streams.

Adult spring chinook salmon destined for the Snake River and tributaries enter the Columbia River in early spring, pass Bonneville Dam and reach the Snake River by late April, arrive at staging areas from late May to early July, and spawn from August to mid-September (IDFG, 1992). Adult ages range from three to six, with ages four and five dominating. Fry emerge from February to April, rear through the summer in the natal stream, and then migrate downstream to a mainstem river or large tributary to

overwinter, depending on habitat conditions in the natal stream. Smolts pass Lower Granite Dam from late April through June on their seaward migration (Chapman et al., 1991).

Redband Trout

Redband trout (*Oncorhynchus mykiss gairdneri*) have been designated a sensitive species by the BLM and includes both anadromous steelhead and native resident rainbow trout that do not migrate to the ocean (Behnke, 2002). They are classified as the same species, except fish included in this category spend their entire lives in a stream or river, often at or near their natal area.

In most anadromous steelhead populations, a portion of the juveniles do not migrate to the ocean and remain as resident redbands throughout their lives (Behnke, 2002). This would be expected to occur in the American River watershed. There are no known populations isolated above barriers within the American River watershed. Isolated populations exist elsewhere in the South Fork Clearwater River sub-basin (USDA-FS, 2005a).

Westslope Cutthroat Trout

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) have been designated a sensitive species by the BLM, and the Northern Region, U.S. Forest Service and a species of special concern by the State of Idaho. Currently, they are not listed or proposed for listing under ESA. In a letter dated June 10, 1998, the FWS "determined that a petition to list the westslope cutthroat trout…presented substantial information indicating that the requested action may be warranted." Cutthroat trout are widely distributed across the Clearwater basin, although the current abundance is probably less than historic abundance (USDA-FS, 1998a).

Westslope cutthroat trout are widespread in the analysis area, and have been found in virtually every tributary where surveys have been conducted. Populations may also be present in additional areas where surveys have not been conducted or where existing information is insufficient to define species presence or absence.

Historic dredge mining of the American River floodplain has altered the lower reaches of Queen, Whitaker, Telephone, and Maggie Creeks, and resulted in no connecting stream channel to American River, consequently isolating their fish populations. However, during high flow flood events, and when American River flows over its banks and floods the stream bottoms, fish passage and access to these small watersheds may be provided for a limited period. These isolated populations offer unique opportunities to study genetic differences between isolated fish and those subject to hybridization with rainbow trout/steelhead trout or non-native cutthroat trout. It also recognized that human-caused barriers also have the potential to impair life history patterns and population viability.

Although population status of resident westslope cutthroat trout is thought to be strong in some streams, the larger fluvial fish, those moving out of the tributaries and rearing in the mainstem are showing very low densities, making this species at risk (USDA-FS, 1998a).

Primary existing threats to westslope cutthroat trout in the analysis area include habitat degradation, hybridization with rainbow/steelhead trout or non-native cutthroat trout, loss of connectivity among populations, competition with non-native brook trout, and harvest of adults by anglers.

A potential impact to cutthroat trout exists from introduced species and the loss of genetic integrity from hybridization with introduced species such as non-native cutthroat trout and hatchery rainbow trout. In the South Fork Clearwater River subbasin, cutthroat trout evolved in the presence of steelhead. Stream surveys show that there is hybridization between rainbow trout in the lower to mid reaches (USDA-FS, 1999a). Although hybridization is occurring, the two species are often reproductively isolated with cutthroat in the upper reaches and rainbow/steelhead in the lower reaches (USDA-FS, 1999a).

Brook trout have been introduced into many streams in the Upper Columbia River basin and are believed to have replaced many westslope cutthroat trout populations, particularly in headwater streams (Behnke,

1992). Where the two species co-exist, westlsope cutthroat trout predominate in higher gradient reaches with brook trout prevailing in lower gradient reaches (Griffith, 1988). Brook trout outcompete juvenile cutthroat trout for food (Novinger and Rahel, 1999). When brook trout dominate the stream, cutthroat trout cannot compete and regain it.

Pacific Lamprey
Pacific lamprey adults enter freshwater (Columbia River) between July and September and migrate several hundred miles to Idaho. They spawn in sandy gravel immediately upstream from riffles between April and July and die soon after. Eggs hatch in two to three weeks and the ammocoetes (larval lamprey) spend up to six years in soft substrate as filter-feeders before emigrating to the ocean. They remain in the ocean for 12 to 20 months before returning to freshwater to spawn. Diatoms appear to be a primary food supply for ammocoetes.

Cochnauer and Claire (2003) documented habitat utilization for Pacific lamprey ammocoetes and macrothalmia in the South Fork Clearwater River watershed. Individuals were mostly found inhabiting sand and silt substrates in calm water sites adjacent to overhanging riparian canopy cover or in low velocity pockets behind boulders.

Recent sampling in the South Fork Clearwater River and Red River documented the presence of juvenile lamprey in the mainstem South Fork Clearwater River and some of the tributaries (Cochnauer and Claire-2003). Similar sampling conducted in American River in 2001 did not identify any lamprey (Cochnauer and Claire, 2001 and 2002). Much of American River was likely historic habitat for lamprey (Claire, 2004).

Hydropower development, habitat degradation in spawning and rearing streams, and urban development are the major factors contributing to declines. Similar to salmon and steelhead trout outmigrants, the slackwater pools resulting from construction of hydroelectric projects in the lower Snake River impede lamprey downstream migrations by increasing migration time and susceptibility to aquatic predators both native and introduced.

Other Fish Species of Interest

In addition to the above special status species, the American River watershed is also known to support other fish species which are listed as follows: mountain whitefish (*Prosopium williamsoni*), bridgelip sucker (*Catostomus columbianus*), shorthead sculpin (*Cottus confusus*), longnose dace (*Rhinichthys cataractae*), speckled dace (*Rhinichthys osculus*), and brook trout (*Salvelinus fontinalis*).

Brook trout are present throughout the American River watershed and the upper South Fork Clearwater River subbasin, including most streams in the analysis area. Brook trout are not native to streams west of the Continental Divide. Brook trout can occupy a wide range of habitats and have the ability to compete with trout, salmon, and char that are native to streams in Idaho. In degraded habitats, brook trout will often out-compete native bull trout (Clearwater Basin Bull Trout Technical Advisory Team, 1998). Where the species co-exist, brook trout are likely to displace native westslope cutthroat, particularly in low gradient streams.

Brook trout are a fall-spawning species, and interbreeding with bull trout is common in areas where the species coexist. Brook trout are usually much more abundant than bull trout where they occur together, and this distorted ratio of abundance can lead to mass hybridization (Behnke, 1992).

3.6.1.3 Analysis Methods

Introduction

This section will describe in general, how existing conditions for fish and fish habitat were determined. The analysis will focus on seven indicators of fish habitat. This general discussion will be followed by a description of American River, fish bearing tributaries in the project area, and the South Fork Clearwater River and how indicators may potentially change as a result of project implementation. This will be followed with a discussion of cumulative effects. Included in the existing condition narratives for the American River and tributaries is a mix of both old and new data. Field investigations conducted during 2004 and 2005 validated previous survey and monitoring data.

The major improvements to the dredged mine reaches in American River involved the installation of instream structures to create pools and the placement of large woody debris. Most of this work occurred during the 1980s, with extensive efforts taking place by the BLM during 1992. These actions were coupled with riparian planting and seeding in an effort to increase shade and improve stream bank stability. The data used to reflect existing conditions reflects some of these improvements. The mining impacts were so extensive that even with the instream work, habitat elements remain below objective along some stream reaches.

Comparison of past and current surveys and monitoring and field observations have noted overall improving conditions in riparian areas and streams flowing across BLM lands from improved management efforts, past and ongoing restoration efforts, and the federal listing of fish and associated changes to management in the American River watershed (Craig Johnson, 2005). It has also been noted that some legacy dredge mined areas have altered stream channels and riparian habitats and recovery is taking place at much slower rates and active restoration is needed in these areas for achievement of specific aquatic or riparian desired future conditions (Craig Johnson, 2005).

Indicator 1–Sediment/Substrate Condition

Short term increases in turbidity and sediment would result from project implementation for most actions; however, restoration efforts would focus on long term reductions in chronic or “press disturbance” sediment. “Pulse disturbance” like most fires, floods, and some droughts are within the range of natural disturbances to which an ecosystem is adapted, are temporary in time and often patchy in space, and natural recovery is usually possible without assistance. “Press disturbance” alters the long term resilience of an ecosystem, like sediment from permanent roads or channel alteration from mining or grazing. The “press disturbance” described in this assessment are generally chronic, often widespread (i.e., roads, dredge mining), and may exceed the capacity for recovery without assistance. Surface erosion and sediment delivery to streams would be expected to be near pre-project conditions within one to two years after project implementation, with gradual improving reductions occurring in the long term.

Salmonids are typically negatively affected by increasing amounts of sediment (Bjornn and Reiser, 1991). A review of studies related to the effects of fine sediment on salmonids by Chapman and McLeod (1987) concluded that survival to emergence decreases as fine sediment increases in the spawning gravels, the loss of pool volume due to sediment deposition reduces the suitability of a stream for adults, macroinvetebrates decrease in biomass and diversity, and winter carrying capacity decreases. Sedimentation of deep pools and coarse substrate limits the physical space available to juvenile fish for rearing and overwintering. The summer or winter carrying capacity of a stream for fish declines when sediment fills the interstitial spaces of the substrate (Bjornn and Reiser, 1991).

Fine sediment (less than 6.33 mm) deposited in spawning areas can trap or smother eggs and embryos, reducing reproductive success of spawning adults. In spawning areas, egg deposition, development, and survival become limited when sediment fills the spaces between gravel, preventing the flow of oxygen and the flushing of metabolic wastes.

Concern has been identified that laboratory studies have not duplicated the structure and composition of egg pockets in the redds of large salmonids, and have not accurately modeled survival of embryos and alevins in natural egg pockets (Chapman, 1988). Consequently, modeled emergence from data from fines by depth may not portray actual emergence. One criterium suggested by Chapman (1988) was to use the intergravel dissolved oxygen concentration. Fine sediments interfere with the flow of water through spawning gravel and therefore the transport of oxygen to incubating fish eggs. To assess the impact of fine sediments on salmonid spawning in the natural setting a protocol (Burton et al., 1990) was used that evaluated dissolved oxygen, fine sediment, and salmonid embryo survival in artificial redds in American River and Big Elk Creek. In 1992 the BLM conducted an artificial redd monitoring study at river mile 1.1 in American River. In 1993 a similar study was conducted in Big Elk Creek at stream mile 3.55. The study (Johnson, 1993) included the creation of artificial redds, monitoring of dissolved oxygen and fine sediment in the redds, and documenting embryo survival and steelhead fry emergence. Tables 3.6.2 and 3.6.3 provide a summary of the findings.

Table 3.6.2 Assessment of Dissolved Oxygen (DO), Fine Sediment, and Salmonid Embryo Survival in 1992 American River Artificial Redds–C Channel Type (Stream Mile 1.1)

Artificial Redd #	Eyed Steelhead Eggs Total	Steelhead Emergence		% Fines by Depth < 6.3 mm	Redd DO	Comments
		Fry Emergence #	%			
1	100	20	20	29.3	10.7–12.4	
2	100	39	39	19.5	ND	
3	100	Cap Off Basket	ND	31.4	ND	Emergence Data Invalid
4	100	6-Cap Loose, escapement	ND	32.5	10.6–11.7	Emergence Data Invalid
5	100	54	54	30.0	ND	
6	100	17	17	32.4	ND	
7	100	Cap off Basket	ND	29.1	11.1–11.7	Emergence Data Invalid
Average		**32.5**	**32.5%**	**29.2%**	**10.6–12.4**	

Table 3.6.3 Assessment of Dissolved Oxygen (DO), Fine Sediment, and Salmonid Embryo Survival in 1993 Big Elk Creek Artificial Redds–B Channel Type (Stream Mile 3.55)

Artificial Redd #	Eyed Steelhead Eggs Total	Steelhead Emergence		% Fines by Depth < 6.3 mm	Redd DO	Comments
		Fry Emergence #	%			
1	100	34	34	25.7	ND	
2	100	63	63	25.4	ND	
3	100	83	83	25.0	ND	
4	100	8-Cap Loose, escapement	ND	26.1	ND	Emergence Data Invalid
5	100	91	91	23.8	ND	
6	100	65	65	24.5	ND	
7	100	72	72	24.9	ND	
Average		**68**	**68%**	**24.9**	**ND**	

It is acknowledged that the above study was not a controlled research study; however, based on past and recent monitoring efforts in the watershed, it may be concluded that steelhead embryo survival may be approximately 30% in American River (range 17–54%) when percent fines by depth were approximately 30% in a C channel. The Big Elk Creek study found 68% (range 34–91%) emergence when percent fines by depth were approximately 25% in a B channel. It should be noted that even with excellent quality spawning gravels along with suitable redd water temperatures and dissolved oxygen that 100% emergence may not be expected to occur.

Substrate conditions are an important component of fish habitat and fish survival. Cobble embeddedness is a measure of fine-grained sand that has filled in around the cobble substrate. The more embedded the substrate is the more reduction will occur to summer and winter rearing habitat and food production.

Cobble embeddedness and percent surface fines were used as measures of the amount of deposited sediment present in the streambed. Existing measured or estimated cobble embeddedness and percent surface fines have been compared to optimal and desired stream conditions. "Desired future condition" standards are presented in Table 3.6.6, along with the existing condition.

The BLM has collected substrate cobble embeddedness and fines by depth (core data) within the analysis area since the 1980s. Existing measured or estimated cobble embeddedness in analysis area streams was also used to estimate summer and winter rearing capacities for trout and salmon, using the FISHSED model (Stowell et al., 1983). The FISHSED model was then used to compare action alternatives using both existing cobble embeddedness measurements and sediment increase predictions of NEZSED. These elements were used to roughly predict potential changes in summer and winter rearing capacity among action alternatives using mathematical relationships in the FISHSED model. These changes were modeled for each alternative and are an indication of the amount of sediment expected and corresponding changes to cobble embeddedness. The limitations of both the NEZSED and FISHSED models are described in Appendix H, Support Information for the Watershed and Fisheries Analysis. Sediment from sources other than surface sediment erosion, including bank erosion and mass movement (landslides) are not included in model estimates.

The FISHSED model includes predictions for impacts to fish embryo survival, summer rearing capacity and winter rearing capacity. Summer and winter rearing capacity reflect how the degree of fine sediment in the stream bottom affects the stream's ability to support fish during these seasons. This analysis will focus on summer and winter rearing and how these elements are changed as a result of this project. Because of the previous concerns identified above for using modeled results to predict fish embryo survival in spawning gravels (Chapman, 1988), no FISHSED modeled predictions for fish embryo survival will be made. This analysis will utilize BLM pre- and post- monitoring of spawning gravels conducted for other projects in the American River watershed and monitoring data from artificial redd monitoring discussed above.

Model results, as displayed below in Tables 3.6.11 and 3.6.12 (Section 3.6.3.2 Indicator 1–Sediment/Substrate Condition Analysis), are reasonable estimates of potential impacts and not absolute numbers with high statistical precision. The capability of the FISHSED model in analyzing and displaying change at the levels shown in these tables is somewhat limited. In this case, data from FISHSED are most useful in comparing the relative effects among alternatives. The model also reflects short-term changes only and does not show the long-term sediment reductions projected in NEZSED.

Relation of Embeddedness to Management Activities

The ability of embeddedness to detect changes due to land management activities is unclear and results have rarely been published in peer reviewed literature (Sylte and Fischenich, 2003). Burns (1984) sampled embeddedness in 19 tributaries of the South Fork of the Salmon River with varying levels of development. He found that streams with more development had statistically significant higher mean embeddedness than undeveloped or partially developed streams. Partially developed and undeveloped streams were not significantly different from each other. Munther and Frank (1986) quantified conditions

in Montana streams and found significant differences in only four of eight pairings of habitat units between developed and undeveloped streams. Potyondy (1993) in one of the most rigorous of all embeddedness studies summarized the results of cobble embeddedness analyses conducted on 120 streams in the Idaho Batholith on the Boise National Forest (Potyondy, 1988) using the Burns (1984) measurement methodology. Potyondy found no statistical differences among streams in watersheds with various degrees of land-disturbing impacts from timber harvest, road construction, grazing, and mining. Stream embeddedness levels appeared to be more closely related to estimated natural sediment yields related to geology rather than to management activities occurring in the watersheds.

Nelson et al. (1997) documented that some cobble embeddedness in undeveloped watersheds failed to meet specific cobble embeddedness objectives identified in the planning guidance for the Payette National Forest. These results have previously been reported and suggest that sediment conditions, even in the absence of development, are highly variable.

Indicator 2–Large Woody Debris

Large woody debris (LWD) is one of the most important sources of habitat and cover for fish populations in streams (MacDonald et al., 1991:129). LWD increases fish habitat complexity, which helps ensure that cover and suitable habitat can be found over a wide range of flow and climatic conditions (MacDonald et al., 1991:128). Large wood has a major impact on channel forming in smaller streams (Sullivan et al., 1987). The location and orientation of LWD can influence channel meandering and bank stability (Swanson and Lienkaemper, 1978; Cherry and Beschta, 1989). LWD is often the most important structural agent forming pools in small streams (MacDonald et al., 1991). Bilby (1984), and Rainville et al. (1985) found that 80 percent of pools in small streams in Washington and the Idaho Panhandle respectively, were wood associated. LWD also influences sediment transport in streams by forming depositional sites (MacDonald et al., 1991). Wood was responsible for storing half the sediment in several small stream in Idaho (Megahan and Nowlin, 1976). LWD can also provide storage sites for leaves, twigs, and other organic material (MacDonald et al., 1991). In small streams in forested areas, this fine organic material can provide the bulk of the energy and materials entering into aquatic food web (MacDonald et al., 1991).

LWD is a component of habitat quality and complexity and is also an important contributor to stream productivity, cover, and food production for fish and other aquatic organisms. Large wood in the streams also contributes to channel stability in small, low order streams, and is thus an important element even in streams where fish are not present. Under natural conditions, large wood is contributed to streams from the surrounding riparian areas as trees fall over and may be recruited slowly over time or in large numbers over a short period of time. The latter often occurs in response to a significant disturbance event, such as wildfire or an extreme weather event where floods or debris torrents wash large amounts of material into the stream. Stream restoration for LWD deficient streams often includes felling trees into streams, hauling LWD to the stream, and selective placement in the stream.

The amount of LWD in a stream is usually measured in the field during stream surveys by counting the number of large woody pieces present in the stream. Future woody debris recruitment is estimated by counting the number of trees in the riparian area that could fall into the stream.

Field surveys found some stream reaches in the analysis area to be debris-deficient. Most of these reaches occur in the streams that have been dredge mined like mainstem American River and Little Elk Creek (USDI-BLM. 1992. BLM Subbasin Stream Surveys. Bureau of Land Management, Cottonwood Resource Area, Cottonwood, ID., Craig Johnson, 2004/2005 field notes). Most of the tributary streams to American River have altered stream channels at the mouths or lower stream reaches from dredge mining and are also deficient in LWD (Craig Johnson, 2004/2005 field notes).

Increases in water yield and high flood flows have the potential to scour stream channels and streambanks. These increased stream flows also may potentially move and flush embedded or anchored

LWD from a stream reach. LWD may be moved downstream to a larger stream or river reaches where LWD may not have the same important function for instream cover.

Most woody debris recruitment in this landscape comes from the streamside zone. Landslides and debris torrents are uncommon in the American River watershed.

Robison and Beschta (1990) found that when the distance from a tree to a stream was more than one effective tree height, the probability of the tree contributing LWD approached zero. The effectiveness of riparian forests along stream channels to deliver LWD is low at distances greater than one tree height away from the channel (McDade et al., 1990).

Indicator 3–Pool Habitat

Pool:riffle ratio is an indicator of habitat quality and complexity, both of which are important elements for salmonid fishes in streams. In addition, the quality of pools is an important consideration. Pool quality is generally indicated by pool volume and pool depth, with larger, deeper pools offering greater quality. Longitudinal spacing of pools along a stream course is also important.

Stream survey data have provided estimates of the number and quality of pools for streams in the analysis area. Table 3.6.6 displays the summarized data and presents pool information as pool:riffle ratio. A ratio of 40 to 50 percent pools is generally desirable for B and C channel types.

The number of pools in a stream and the quality of those pools can be affected by:

- Long-term increases in sediment yield, a phenomenon that can result in pool-filling and eventual loss of the pool;
- Increased bedload accumulation that also results in pool-filling;
- Lack of large woody debris and other pool-forming structures, which can significantly affect streams that are dependent on large wood as the primary pool-forming mechanism;
- Altered channel structure from dredging or road encroachment; and
- Increased water yield or other high flow scouring events may scour stream channels, resulting in the wash-out or degradation of pool habitats.

Therefore, changes in sediment yield and the amount of large wood available to fall in the stream are indicators for predicting changes in the number and quality of pools over time. In addition, pools may be artificially created during stream channel restoration projects, such as the construction of upstream rock "v" check dams.

Indicator 4–Water Quality

Toxics

A spill hazard exists wherever roads are near streams or road drainage enters streams (Furniss et al., 1991). Fuel spills may negatively affect a fish-bearing stream biologically through direct poisoning of fish and invertebrates, a food source. Fuels and fuel oils are moderately to highly toxic to salmonids, depending on the concentration and exposure time (Gutsell, 1921). Free oil and emulsions may adhere to gills and interfere with respiration and heavy concentration of oil can suffocate fish. The fate of oil in water includes spreading, movement, evaporation, solution, emulsification, photo-chemical oxidation, microbial degradation, sedimentation, and hydrocarbons deposited in sediments which may persist for long periods (Saha and Konar, 1986).

Water quality analysis includes potential risks for introduction of toxic materials. This assessment does not include predictions of the amount of toxic materials entering streams. The project proposal identifies measures that minimize potential risks of toxic materials entering streams.

Historic dredge mining resulted in some accumulation of heavy metals and introduction of mercury, since it was often used as an amalgam in the gold mining process. This assessment includes an evaluation of

project implementation and associated potential to liberate mercury during the implementation of restoration projects that involve disturbance of historic mined areas, stream channels, substrate materials, and streambanks.

Water Temperature

Stream temperatures are the net result of a variety of transfer processes, including radiation inputs, evaporation, convection, conduction, and advection (Brown, 1983). Removal of vegetation along streams may result in instream temperature increases during summer months, and in the loss of insulating vegetation that can contribute to colder winter stream temperatures. Water temperature influences the metabolism, behavior, and mortality of fish and other organisms in their environment (Mihurksy and Kennedy, 1967).

Unsuitable temperatures can lead to disease outbreaks in migrating and spawning fish, altered timing of migration, and accelerated or retarded maturation. Unsuitable temperatures can also force adult and rearing juvenile fish to find thermal refuge in tributaries where there may be increased risk of predation and/or competition for food, potentially affecting a fish's fitness, thus its survival going into winter. Fish can often survive short durations of temperatures above or below their preferred range, growth is reduced at low temperatures because all metabolic processes are slowed, and at high temperatures, because most or all food must be used for maintenance (Bjornn and Reiser, 1991).

Measured buffer strip shading shows that a buffer strip 85 feet wide shades a stream as well as an average undisturbed canopy in late successional old growth forests in the Western Cascades (Steinblums, 1977). In a study of small streams, Brazier and Brown (1973) found the maximum shading ability of the average buffer strip was reached with a width of 80 feet.

Colder water temperatures due to loss of insulating vegetation can lead to the formation of frazil or anchor ice on stream bottoms. Incubating embryos can be killed when frazil or anchor ice forms in streams and reduces water interchange between stream and redd (Bjornn and Reiser, 1991).

Generally spawning temperature is not as high of a concern for steelhead and redband/rainbow trout, which spawn in the spring, or bull trout, which spawn in the in the fall when stream temperatures are typically cooler. High summer temperatures can affect summer rearing habitat for all federally listed or BLM sensitive fish species, and the spawning success for spring/summer chinook that spawn in August to mid-September.

Potential increases in stream temperature are addressed by assessing the degree of activities in riparian areas that may result in increased or decreased solar radiation to streams. No timber harvest is proposed in RHCAs. Within RHCAs, under the action alternatives a limited amount of temporary roads, permanent roads, one new vehicle bridge, and replacement of two existing ATV bridges are proposed. Riparian restoration activities include road decommissioning, relocating roads out of riparian areas, conversion of roads to ATV trails, streambank recontouring and riparian planting designed to increase stream canopy and bank stability. See Section 3.4 (Watershed) for additional discussion of this element.

Indicator 5, Water Yield

The existing condition and a detailed analysis of this indicator are found in Section 3.4 (Watershed). Increased water yield is one indicator used to assess potential effects among the alternatives, and it is a rough predictor of potential changes in channel condition and instream habitat. Increases in water yield may indirectly affect fish habitat through increased bank erosion, channel down cutting, increased accumulation of larger streambed materials, reduction in number of pools, overall reduction of habitat complexity, and changes in number, size, or frequency of LWD. ECA is a term used to describe the total area within a watershed that does or would exist in a clearcut condition. Refer to Appendix H for additional information in regards to ECA protocol and use. The results of the water yield analysis included in Section 3.4 (Watershed) are used for analysis of potential impacts to fish habitat.

The National Marine Fisheries Service (NOAA-NMFS, 1995) suggests that an ECA of 15 percent is cause for concern in priority watersheds. The Matrix of Pathways and Indicators of Watershed Condition (NOAA-NMFS et al., 1998) identifies less than 15 percent ECA as a high quality habitat condition; 15–20 percent ECA as moderate quality habitat condition; and greater than 20 percent as low quality habitat condition. These thresholds were identified to provide a conservative approach to water yield that would avoid the following undesirable effects on stream habitat condition: accumulation of streambed materials (aggradation), channel braiding, channel down cutting, and increased bank erosion. The above may collectively or singularly contribute to increased width/depth ratio, decreased number of pools, decreased pool quality, and overall simplification of instream habitat (Chamberlin et al., 1991).

Increases in water yield are highly variable in time and space because they are dependant on climate, topography, soils, vegetation, and other environmental factors. This high degree of variability makes it difficult to quantifiably determine an outcome as a result of timber harvest activities. Stream channel types and stability rating were used in conjunction with percent increases in ECA to assess the risk that project associated water yield increases may cause channel changes.

Stream channel stability is determined through an inventory procedure developed by Pfankuch (1978:1). He developed a procedure to assess entire channel systems within a watershed, and to use the results in conjunction with other hydrologic analyses. Stream channels are rated based on their ability to withstand increase in stream discharge associated with decreases in the density and areal extent of vegetation, such as the removal of mid-aged to mature trees. A stream with a "poor" rating has a higher risk of sustaining damage from increased peak discharge than a stream rated "good" or "excellent." Scores are the sum total of stability indicator classes for streambanks and stream bottoms (Pfankuch, 1978). Stability ratings are the result of a scoring system where:

Excellent: less than 38
Good: 39–76
Fair: 77–114
Poor: greater than or equal to 115

The fish bearing streams and several representative first order watersheds within the analysis area had channel stability evaluations (Pfankuch, 1978) completed during 2004 and 2005. Stream reach inventory and channel stability evaluations had a high fair to good rating. No severe stream channel or streambank scouring was noted. The potential impact from water yield changes to stream channel conditions, pools and LWD are discussed under those indicators.

Indicator 6–Habitat Connectivity/Fish Passage

The ability for fish to move between habitats as conditions change, and for individuals to move between fish populations, is an important component for short-term survival and long-term population genetic diversity.

Human constructed physical barriers within the stream channel, such as culverts or other stream channel blockage (i.e., dredge tailings), can impair sediment and debris transport, life history patterns, and population viability. Decoupling the stream network (through physical barriers) can result in the disruption and loss of functions and processes necessary for creating and maintaining fish habitat. Physical barriers prevent the movement of fish in their fulfillment of life history functions. Human-caused barriers, for instance, prevent juvenile fish from reaching rearing habitats (Furniss et al., 1991) and have blocked significant amounts of historical anadromous salmonid habitat (Roni et al., 2002). Even more, barriers restrict the expression of various life history forms within a species. Strong populations rely on unimpeded access between watershed reserves, those areas of high quality habitat occupied by viable subpopulations, for dispersion and genetic interchange (Noss et al., 1997).

Overall, the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian systems. Research shows the importance of removal or restoration of existing roads to benefit both terrestrial and aquatic biota (Trombulak and Frissell, 2000). Roads can alter the landscape distributions of the starting and stopping points of debris flows and they can alter the balance between the intensity of flood peaks and the stream network's resistance to change (Jones et al., 2000). Road crossings can prevent or interfere with upstream migration of adult and juvenile salmonids, aquatic macro invertebrates, and larval amphibians (Furniss et al., 1991).

Roads, culverts, and sometimes bridges act like dams, constricting stream flow through a single narrow outlet. This can prevent the transportation of habitat-forming gravel and woody material down the channel. These constriction points also cause deposition and channel widening at the culvert inlet. The channels below culvert outlets are typically down cutting and scoured by the high velocity water caused by constriction.

Roads and stream crossings have also been shown to function as barriers to the upstream movement and dispersal for many fish and wildlife species (Furniss et al., 1991). Culvert outlets not in contact with stream bottoms do not allow access for aquatic species. Undersized culverts constrict flows creating high velocity barriers and eliminating substrate from culvert bottoms. These barriers can isolate small aquatic populations, limiting or preventing genetic exchange between populations, and preventing the recolonization of historic or recovering habitats.

Stream crossing structures also limit or prevent seasonal upstream movement by fish and other aquatic biota. Juvenile salmonids living in rivers often seek refuge in tributary streams during high flow events. Additionally, some culverts in fish bearing and non-fish bearing streams within the analysis area are in need of repair or replacement to reduce risk of failure. Historically, most culverts were sized to pass 50-year storm events. In many cases, this sizing is not adequate to handle large flood events or debris torrents. Culverts sized for a 100-year or greater event are more likely to pass the water and debris associated with a large event.

Dredge mining of stream bottom areas has altered the stream channels and in some instances has created blockage for fish passage and no stream channel exists which would connect the tributary stream with the mainstem river in these areas. These blockages typically occur near the mouth areas of small tributary streams to American River.

Indicator 7–Riparian Areas/Stream Channels

The most common biological features establishing or affecting the relationships of channel and valley slope have been native pioneer species of riparian vegetation (Smith and Prichard, 1992). High energy runoff and its associated transported sediment have been moderated by dissipation, through spreading across floodplains, vegetative entrapment, development of sinuous meander patterns, and seasonal recharge of ground-water aquifers and riparian bank storage. Healthy riparian areas are noted for having adequate vegetation, landform, or large woody debris to dissipated energy during high-flow events, limit erosion, and improve water quality. Healthy riparian and wetland areas also filter sediment and capture bedload, which aids floodplain development and enhances flood-water retention and ground-water recharge. In addition, healthy riparian–wetland areas also produce diverse ponding and channel characteristics that provide habitat necessary for fish production, waterbird breeding, wildlife habitat, and other uses (Prichard et al., 1996).

Erman et al. (1977) reported that the composition of benthic invertebrate communities in streams with buffers greater than 100 feet were indistinguishable from those in streams flowing through unlogged watersheds.

Historic dredge mining and road construction have been the most significant land use influences on riparian habitats and stream channels within the analysis area, and is followed by livestock grazing within some subwatersheds. Roads have encroached on riparian areas and stream channels. Road fords, bridges, and culverts exist at stream crossings, and these stream crossings alter stream channels and may be a chronic erosion and sediment source.

3.6.2 Existing Conditions

3.6.2.1 Threatened, Endangered, and Sensitive (TES) Fish Species

TES fish species present in the American River watershed include spring chinook salmon, steelhead trout, bull trout, redband trout, westslope cutthroat trout, and Pacific lamprey. Changes in habitat could affect these species directly, indirectly, and/or cumulatively and are collectively considered indicators of effect. A Biological Assessment (BA) would be completed for threatened, endangered, and sensitive fish species for the selected alternative. Indicators used in the BA are based on accepted indicators developed by the Central Idaho Level 1 Team. Any terms and conditions associated with consultation would be included in the Record of Decision**.**

3.6.2.2 Summary of Fish Species Distribution

Appendix A, Map 17 displays fish distribution within the analysis area. Table 3.6.4 identifies known and suspected occurrences of trout, salmon, and char in the American River watershed and South Fork Clearwater River.

Table 3.6.4 Known and Suspected Occurrence of Trout, Salmon, and Char in American River

Stream Name	Steelhead	Bull Trout	Spring Chinook	Westslope Cutthroat	Brook Trout
Middle American River	Present	Present	Present	Present	Present
Maggie Creek	Absent	Absent	Absent	Present	Absent
Lower American River	Present	Present	Present	Present	Present
Telephone Creek	Absent	Absent	Absent	Present	Absent
Baboon Creek	Absent	Absent	Absent	Present	Present
East Fork American River	Present	Present	Present	Present	Present
Whitaker Creek	Absent	Absent	Absent	Present	Present
Queen Creek	Absent	Absent	Absent	Present	Absent
Box Sing Creek	Present	Absent	Present	Present	Present
Kirks Fork	Present	Present	Present	Present	Present
Elk Creek	Present	Probably Absent	Present	Present	Present
Little Elk Creek	Present	Probably Absent	Present	Present	Present
South Fork Clearwater River	Present	Present	Present	Present	Present

3.6.2.3 Existing Condition of Habitat Characteristics: American River Watershed and South Fork Clearwater River

During the 2004 and 2005 field season, the BLM Fisheries Biologist conducted field investigations of all fish bearing stream reaches within the project area. Stream reach surveys and monitoring included one or more of the following: reconnaissance fish habitat and riparian survey; water quality monitoring; substrate monitoring; and fish population monitoring. These field investigations supplemented existing survey and monitoring data, or verified current conditions in reference to previously collected data.

Within the past twenty years, there's been improved livestock management within riparian areas, some natural recovery of riparian vegetation, increases in LWD, and stream reaches with implemented fish habitat improvement projects that supported achievement of desired aquatic conditions.

American River (Middle and Lower)–Prescription Watersheds #17060305-06 and 16

Overview: American River is a large watershed (58,612 acres) with important aquatic values and a high priority for restoration of aquatic processes. NPNF lands comprise 72% of the watershed, followed by 15% private lands, and 13% (7,825 acres) BLM lands. The American River watershed has 16 prescription watersheds (see Figure 1 and Appendix A, Map 14). The mainstem American River flows through two composite watersheds which may be affected by the Eastside Project and include: (1) Middle American River, which includes NPNF, BLM, and private lands, the watershed originates on NPNF lands and extends into the township and has experienced extensive amounts of historic placer and dredge mining and fish habitat degradation; and (2) Lower American River is within the township and has experienced similar impacts as Middle American River.

Fisheries: Steelhead trout, bull trout, spring chinook salmon, redband trout, westslope cutthroat trout, mountain whitefish, bridgelip sucker, sculpin, dace, and brook trout are present in the American River watershed. Their distribution is widespread, with the exception of bull trout for which distribution is limited and abundance is low. Suitable habitat exists for Pacific lamprey; however, recent surveys have not documented occurrence. Spring chinook salmon and steelhead trout abundance may vary on an annual basis from low to moderate, because of fluctuations of returning adults. Westslope cutthroat trout populations vary; some areas are devoid of cutthroat trout while others have relatively high densities. Although population status of resident westslope cutthroat trout is thought to be strong in some streams, the larger fluvial fish, those moving out of the tributaries and rearing in the mainstem rivers, are showing very low densities.

Migratory bull trout are present in American River, although at low levels. The extent of resident bull trout in American River is not well known. The *Draft Recovery Plan–Clearwater River Recovery Unit* (USFWS 2002) identifies American River as a potential local population. Currently, it appears that the East Fork American River may provide the best potential habitat to be utilized for spawning and early rearing areas by bull trout in the watershed. Surveys conducted by the NPNF in 1998 did not document occurrences of bull trout in upper American River. Recent fish surveys conducted by BLM, NPNF, and IDFG (1996–2003) documented bull trout in mainstem American River, East Fork American River, and lower Kirks Fork.

Fish Habitat: The BLM surveyed Lower American River in 1992 using a modified Hankin and Reeves (1988) survey methodology. The dominant channel types are B and C, average gradient is 1–2%, and unstable stream banks averaged 2%. BLM monitoring (2000) at river mile 1.11 found that cobble embeddedness was 31%, spawning gravel composition by depth had 28% less than 6.3 mm, and surface fines were 8%. A rating of fair was given for rearing and spawning habitat conditions.

The NPNF last did an extensive survey of American River (upstream from BLM boundary) in 1993 using the Nez Perce National Forest basinwide methodology. During the survey approximately 69% of its length was classified as a B type stream channel. The remaining portion was classified as C and A channel types, 24% and 7%, respectively.

Water Quality, Water Yield, and Flow Regimes: Current percent over base sediment yield for the watershed is 16%. From 1995–2004 the BLM has monitored water temperature at stream mile 0.1, and the annual 7-day running average of high water temperature has ranged from 21.4°C to 27.6°C. Historic dredge mining along the stream bottom areas resulted in some accumulation of heavy metals and introduction of mercury, since it was often used as an amalgam in the gold mining process. The potential for adverse amounts of mercury to occur in the stream is considered slight because of the depth of

leaching. Current ECA for the American River watershed is 9%. Mean low summer flows at the mouth average 15–30 cfs and high flow average 500–600 cfs.

Riparian Habitats: Overall, riparian habitats are in an early to mid-seral condition, with some reaches rated as "functional at risk" along the mainstem river. Dredge mining of the stream bottom areas has significantly altered riparian habitat and stream channel morphology. Roads and human development have encroached on riparian habitats and stream channels. The stream channel does not have its natural channel morphology and sinuosity (stream channel meanders).

Land Uses: Timber harvest, livestock grazing, home construction, road construction, and mining have had varying levels of impact in the watershed. Dredge mining has impacted and altered the majority of the stream bottom areas along stream reaches in the lower and middle American River. Private land development is prevalent along some stream reaches, such as the American River subdivision. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries Water Quality Objectives, Trends, and Limiting Factors: The established fisheries/water quality objective for this watershed is 80% habitat potential. The existing condition is 60% habitat potential for Lower American River, and 65% habitat potential for Middle American River, making these stream segments below objective. Current trends are slightly upward in the watershed. The majority of the stream bottom area along Lower and Middle American River has been dredge mined. Yearlong and seasonal residences occur along some stream reaches. Dredge mining has altered the stream channel and reduced the quantity and quality of pools and active large woody debris is lacking. Dredge mining activity has reduced large woody debris recruitment along some reaches. High summer water temperatures and deposited sediment also reduce fish habitat quality. Because of the lack of LWD and reduced quantity of pools, various stream improvement projects have been constructed by the BLM, which include installation of upstream "v" rock check dams, log check dams, large woody debris, and habitat rock placement.

The primary limiting factors include elevated levels of deposited sediment, high summer water temperatures, lack of LWD, and limited number of good quality pools (BLM 1992 Stream Surveys, BLM 2004 Substrate and Water Quality Monitoring, BLM 2005 Riparian/Greenline Monitoring, Craig Johnson, 2004/2005 field notes).

Maggie Creek

The mouth of Maggie Creek occurs at approximately river mile 12.6 of American River, which is approximately two miles upriver from the mouth of the East Fork American River. The watershed is 263 acres in size. Dredge mining and a road has altered the mouth area of the stream and the stream has no connecting channel to American River. The stream flows into a dredge pond and flows subsurface through dredge tailings at the mouth area. During high flow flood events, American River flows may flow over its banks and floods the river bottom, which may allow periodic limited or unknown fish passage into the lower reach of Maggie Creek.

Westslope cutthroat trout are present in Maggie Creek, but population levels are very low (Craig Johnson 2005 field notes). The dominant channel types are B5 and B5c, dominant substrate was sand and subdominant was small gravel, with a stream gradient of 2 to 3%. Estimated cobble embeddedness was 60% and surface fines were 60%. With the exception of mining at the mouth area, overall, human impacts in the drainage are minimal and elevated deposited sediment exist under natural conditions for this small drainage. Summer high water temperatures ranged from 16°C to 18°C. Mean low summer flows for the lower reach were less than 0.1 cfs, and mean high flows estimated to be 5 cfs. Estimated ECA for the drainage is 5%. Riparian habitats are in mid-seral condition, and are rated as being in "proper functioning condition." With the exception of the mouth area, where dredge mining and a road have encroached on the stream bottom area, the riparian areas are in good ecological condition and bank stability is 99% (Craig Johnson, 2005 field notes). The primary limiting factors for fish production are low flows, lack of

good quality pools, limited spawning gravels, and fish passage barrier at the mouth. Because of the small size of the watershed and low base flows this stream does not have high fish production capability (Craig Johnson, 2005 field notes).

Telephone Creek
Telephone Creek flows into American River at river mile 10.5. The watershed area is 428 acres in size. Because of alteration of the mouth by dredge mining, no stream channel connects with American River. A full passage fish barrier occurs at the mouth area and lowest reach segment of the stream. During high flow flood events, American River may flow over its banks and flood the river bottom, which may allow periodic limited or unknown fish passage into the lower reach of Telephone Creek. The stream flows subsurface during low flow periods into dredge tailings. A primitive road parallels the stream and fords the stream at two locations. During high flow events the stream floods across the American River road and into American River.

Westslope cutthroat trout are present in Telephone Creek and population levels are low (Craig Johnson 2004 field notes). The dominant channel type is B3 in the lower reach and A3 channel type in the middle and upper portions with a stream gradient of 4 to 20%, the dominant substrate was sand and subdominant was small gravel. BLM monitoring (2004) at stream mile 0.1 found that cobble embeddedness was 77%, spawning gravel composition by depth had 68% less than 6.3 mm, and surface fines were 67%. The 2004 seven-day running average maximum temperature was 17.5°C and the maximum temperature recorded was 19.3°C. Mean low summer flows were less than 0.05 cfs, and mean high flows estimated at 6–9 cfs. Estimated ECA for the drainage is approximately 47%. Riparian habitats are in mid-seral condition, and are rated as being "functional at risk." The majority of the private land headwater area has been logged. The private lands in the headwaters are grazed by cattle during the summer. The primitive road is used by recreationists, primarily as an ATV trail. The stream has experienced flood scouring events and the road has encroached on riparian habitats and the stream channel. During spring run-off, the road erodes and rutting is common. The Telephone Creek watershed has an estimated 0.7 mile of fish bearing stream within the watershed. The primary limiting factors for fish production are low flows, lack of good quality pools, and poor quality rearing habitat (Craig Johnson, 2005 field notes).

Baboon Creek
Baboon Creek flows into American River at river mile 8.1. The watershed area is 257 acres in size. Dredge mining has significantly altered the lower reach of the stream where it flows into American River. A private residence occurs at the mouth of the stream and a road crossing/culvert occurs approximately 125 feet from the mouth of the stream. During low flow periods, the lower 50–150 feet of the stream channel may not have not surface flows.

Westslope cutthroat trout and brook trout are present in Baboon Creek, although population levels are low (Craig Johnson 2005 field notes). The dominant channel types are A3 and A4 with a stream gradient of 4 to 7%, the dominant stream substrate is large gravel and subdominant substrate is small cobble. Estimated cobble embeddedness was 35–45% and surface fines were 10–15%. Summer water temperatures ranged from 17°C to 18°C. Mean low summer flows for the lower reach were less than 0.1 cfs, and mean high flows estimated to be 4–6 cfs. Estimated ECA for the drainage is 5%.

Riparian habitats are in mid-seral condition and are rated as being in "proper functioning condition." With the exception of the mouth area, where dredge mining and a road have encroached on the stream bottom area, the riparian areas are in good ecological condition and bank stability is 99%. The primary limiting factors for fish production are low flows and lack of good quality pools. Because of the small size of the watershed and low base flows this stream does not have high fish production capability (Craig Johnson, 2005 field notes).

East Fork American River–Prescription Watershed #17060305-05-10

Overview: East Fork American River flows into American River at river mile 10.6 and totals 11,392 acres. The watershed has two subwatersheds (prescription watersheds), which include East Fork American River and Flint Creek. The lower to mid reaches of the stream flow through a timbered bottom with some stringer meadows. A private residence occurs near the mouth. A non-motorized trail parallels the creek. The lower reaches crossing BLM lands are not leased for grazing; however, NPNF lands are permitted for grazing.

Fisheries: The East Fork American River provides habitat for steelhead trout, bull trout, spring chinook salmon, redband trout westslope cutthroat trout, mountain whitefish, sculpin, dace and brook trout. A culvert located at the mouth was a partial/full fish passage barrier; however, it was replaced with a 20-foot wide bridge during the summer of 2006 by BLM.

Bull trout redd surveys completed in 1999 and 2000 failed to document any confirmed bull trout redds, but brook trout redds were found (Nez Perce National Forest unpublished data). Fish population surveys by BLM, NPNF, and IDFG have documented the presence of bull trout; however, numbers were low and most fish were found in the middle reach. The stream may be used for bull trout spawning and early rearing; further investigations are needed for verification (USDA-FS, 2005a).

Fish Habitat: The East Fork American River was surveyed by the BLM in 1992 from the mouth to NPNF boundary (stream mile 2.33). In 1993 the NPNF surveyed from that point to the headwaters. Both surveys used a modified Hankin and Reeves survey methodology (Hankin and Reeves, 1988). The dominant channel type in the lower reaches was C3 or B3 and average gradient ranged from 1–2 percent, and unstable stream banks were 2%. BLM monitoring at river mile 0.2 found that cobble embeddedness was 44%, spawning gravel composition by depth had 35.6% less than 6.3 mm, and surface fines were 18%.

Water Quality, Water Yield, and Flow Regimes: The current sediment yield over base for the entire East Fork American River watershed is 12%. Current ECA for the East Fork American River watershed is 7%.

The seven-day running average maximum temperature during steelhead and cutthroat spawning periods is 13.4 degrees C, and is rated good (SM 0.1–1995). The seven-day running average maximum temperature for summer rearing is 16.1°C (SM 0.1–1995). No data on rearing temperatures are available for the middle reach, but spot monitoring during fish surveys in 1998 found cool water temperatures, which rated high for steelhead and bull trout rearing. The seven-day running average maximum temperature for bull trout spawning was 14.4°C (SM 0.1–1995), which is not optimal, cooler water temperatures occur upstream in the drainage.

Low summer flows at the mouth average 3–5 cfs and average high flows are estimated at 140 cfs.

Riparian Habitats: Riparian habitats are in mid- to late-seral condition, and are rated as being in "proper functioning condition." With the exception of the mouth area, where dredge mining, a residence and a road occur, the riparian areas along the East Fork American River are in good ecological condition.

Land Uses: Timber harvest and road construction have had low levels of impact in the drainage and have occurred primarily on NPNF lands. A culvert located at the mouth of the stream on private lands is a partial/full fish passage barrier. With the exception of a small tract of private land located at the mouth of the stream, the majority of the watershed ownership is NPNF and BLM lands. A trail parallels the stream. No timber harvest or roading has occurred within the watershed on BLM lands. No BLM lands within the drainage are leased for livestock grazing. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: The established fisheries/water quality objective for this watershed is 90% habitat potential. The existing condition is 80% habitat potential, making this stream below its objective. Current trends are slightly upward in the watershed.

Reconnaissance field investigation of the watershed during 2004 and 2005 have not identified any BLM land uses adversely impacting fish habitats, riparian habitats or chronic sources of erosion or sediment attributed to BLM management actions which would preclude or not support improving trends.

The primary limiting factor is elevated levels of deposited sediment (BLM 1992 Stream Surveys, BLM 2004 water Quality Monitoring, and Craig Johnson, 2004/2005 field notes). Because of low stream gradients and stream channel morphology, it is expected that this drainage would experience some elevated sediment levels under natural conditions.

Whitaker Creek–Prescription Watershed #17060305-05-12

Overview: The mouth area of Whitaker Creek occurs at approximately river mile 9.7 of American River. The watershed is approximately 1,000 acres in size, and 70% is NPNF lands, followed by 22% BLM lands, and 8% private. Dredge mining has altered the mouth area of the stream and it has no connecting channel to American River. The stream flows subsurface through dredge tailings at the mouth area. Two private residences occur along the lower reach of the stream.

Fisheries: The BLM during 2004 established a permanent monitoring station in the lower reach and electrofished 29 westslope cutthroat trout in a 55 square meter station. Whitaker Creek provides habitat for westslope cutthroat trout, brook trout, dace, and sculpin.

Dredge mining has altered the mouth area and it has no connecting channel to American River. The dredge mined blockage is a barrier for fish passage into the stream from American River. A natural barrier consisting of a small falls and cascade is a full fish passage barrier at stream mile 1.2; westslope cutthroat trout have been documented above this barrier (Craig Johnson, 2004 field notes).

Fish Habitat: Whitaker Creek was surveyed by the BLM in 1991 from the mouth to NPNF boundary (stream mile 1.5), using a modified Hankin and Reeves (1988) survey methodology. The NPNF surveyed their lands upstream in 1989 using the same methodology. The NPNF also conducted surveys in 2003 with the R1 Stream Reach Inventory and Channel Stability an Evaluation and Stream Reach Survey (Pfankuch, 1978), and a Fish Habitat Reconnaissance Survey (USDA-FS, 2000). The channel types starting from the mouth are C3 (short mouth area reach), B4, and A3; and average gradient ranges from 1–12%. Unstable stream banks were less than 3 percent. BLM monitoring (2004) at stream mile 0.4 found that cobble embeddedness was 56%, spawning gravel composition by depth had 47% less than 6.3 mm, and surface fines were 37%.

Water Quality, Water Yield, and Flow Regimes: The current percent over base sediment yield for the watershed is 31%. During 2004 water temperature was monitored and the instantaneous maximum water temperature was 18.1°C and the seven-day running average maximum summer water temperature was 16.8°C. The ECA for the Whitaker Creek watershed is 10%. Estimates of low flows at the mouth average less that one cfs and high flow average is estimated at 14 cfs.

Riparian Habitats: The stream flows through a moderately confined to confined timbered stream bottom. Riparian habitats are in mid- to late-seral condition, and are rated as being in "proper functioning condition." With the exception of the lower reach and mouth area (stream mile 0.0 to 0.4), where dredge mining, roads, timber harvest, and private land development has occurred, the upstream BLM and NPNF riparian areas along Whitaker Creek are in good ecological condition.

Land Uses: Timber harvest, road construction, private land development, and dredge and placer mining have had varying levels of impact in the watershed. Dredge mining has impacted the mouth and lower reach of the stream and no stream channel connects or flows into American River. Private land

development, timber harvest, and roading have occurred in the lower portion of the drainage. Timber harvest and road construction has also occurred on NPNF lands in the upper portion of the watershed. BLM lands within the drainage have had minimal past land uses and no livestock grazing is authorized on BLM lands in the watershed. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: The established fisheries/water quality objective for this watershed is 70% habitat potential. The existing condition is 70% habitat potential, making this stream at its objective.

Reconnaissance field investigation of the watershed during 2004 and 2005 have not identified any BLM land uses adversely impacting fish habitats, riparian habitats or chronic sources of erosion or sediment attributed to BLM management actions which would preclude or not support improving trends.

The primary limiting factors include lack of connectivity at mouth, elevated levels of deposited sediment, and low flows. (BLM 1991 Stream Surveys, BLM 2004 Substrate and Water Quality Monitoring, Craig Johnson, 2004 field notes).

Queen Creek–Prescription Watershed #17060305-05-13

Overview: The mouth area of Queen Creek occurs at approximately river mile 9.4 of American River. The watershed is approximately 1,088 acres in size, and 70% is NPNF lands, followed by 25% BLM lands, and 5% private. Dredge mining has altered the mouth area of the stream and the stream has no connecting channel to American River. The stream flows into dredge ponds and then subsurface through mine tailings at the mouth area.

Fisheries: Queen Creek provides habitat for westslope cutthroat trout and dace. A segment of the lower reach was electrofished in 2003 by the Forest Service, and high densities of resident fish were identified (22 westslope cutthroat and 6 dace in a 23 square meter reach) (USDA-FS, 2005a). The BLM during 2004 also established a permanent monitoring station in the lower reach and electrofished 29 westslope cutthroat trout in a 55 square meter station. The cutthroat population is isolated from the mainstem American River by dredge mining caused blockage and channel alteration of the mouth area and the stream has no connecting channel with American River. The stream flows into dredge ponds at the mouth. The BLM during 2004 conducted electrofishing in the dredge ponds the stream flows into at the mouth of the stream and documented the presence of dace and bridgelip sucker. These ponds have very high summer temperatures and during 2004 water temperatures of 20–26°C were documented. During high flow flood events, American River flows over its banks and floods the river bottom, which may allow unknown limited fish passage into the lower reach of Queen Creek.

Fish Habitat: Queen Creek was surveyed by the BLM in 1991 from the mouth to NPNF boundary (stream mile 1.5) using a modified Hankin and Reeves (1988) survey methodology. The NPNF surveyed their lands in 1989 using the same methodology and completed a Stream Reach Inventory and Stream Channel Stability Evaluation (Pfankuch, 1978). In 2003 the NPNF conducted a Stream Reach Reconnaissance Survey, R1 Stream Reach Inventory and Channel Stability Evaluation (Pfankuch, 1978), Rosgen Stream Channel Classification (Rosgen, 1996) with Wolman pebble count and channel profiles, and cobble embeddedness measurements.

The stream flows through a wide valley bottom at the mouth, while upstream reaches flow through a confined timbered stream bottom. The channel types starting from the mouth are C2 (mouth area), B3, and A3; and average gradient ranges from 2–7 percent. Unstable stream banks were less than one percent. BLM monitoring (2004) at stream mile 0.2 found that cobble embeddedness was 42%, spawning gravels had 44.7% less than 6.3 mm, and surface fines were 22%. Deposited sediment levels are elevated; however, fish densities are moderate to high for this small stream.

Water Quality, Water Yield, and Flow Regimes: The current percent over base sediment yield for the watershed is 37%. During 2004 water temperature was monitored and the instantaneous maximum water temperature was 15.8°C and the seven-day running average maximum summer water temperature was 15.3°C. ECA for the Queen Creek watershed is 13%. Estimates of summer flows at the mouth average less that one cfs and high flow average is estimated at 16 cfs.

Riparian Habitats: Riparian habitats are in mid- to late-seral condition, and are rated as being in "proper functioning condition." With the exception of the lower reach that has been disturbed by historic mining, the riparian areas are in good ecological condition with a stable to slight upward trend. Grand-fir is a common overstory riparian tree, followed by Engelmann spruce, Douglas-fir, and lodgepole pine. Understory vegetation includes alder, bracken-fern, arrowleaf groundsel, water sedge, small-fruited bulrush, bluejoint, mountain brome, and other forbs.

Land Uses: Timber harvest, road construction, and dredge and placer mining have had varying levels of impact in the watershed. Dredge mining has impacted the mouth and lower reach of the stream and no stream channel connects or flows into American River. Timber harvest and road construction has occurred on NPNF lands in the upper portion of the watershed. With the exception of some historic mining, BLM lands within the drainage have had minimal past land uses and no livestock grazing is authorized on BLM lands in the watershed. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: The established fisheries/water quality objective for this watershed is 70% habitat potential. The existing condition is 70% habitat potential, and stream survey data and field investigations indicate this stream is meeting objective.

Reconnaissance field investigation of the watershed during 2004 and 2005 have not identified any BLM land uses adversely impacting fish habitats, riparian habitats or chronic sources of erosion or sediment attributed to BLM management actions which would preclude or not support improving trends.

The primary limiting factors include elevated levels of deposited sediment, limited winter rearing habitat, lack of good quality pools, and low flows (BLM 1991 Stream Surveys; BLM 2004 Substrate and Water Quality Monitoring; Craig Johnson, 2004 field notes).

Box Sing Creek–Prescription Watershed #17060305-05-12

Overview: Box Sing Creek flows into American River at river mile 8.5 and the lower segment flows across the dredge mined flood plain of American River. Roads, logging, and mining have impacted the stream to varying levels. Box Sing is approximately 5.7 miles long with a watershed area of 1,140 acres. The watershed is 84% is NPNF lands, followed by 13% BLM lands, and 3% private. Dredge mining has altered the mouth area of the stream.

Fisheries: Box Sing Creek provides habitat for westslope cutthroat trout, brook trout, rainbow/steelhead trout, and chinook salmon. The FS documented the presence of chinook salmon juveniles in the lower segment of the stream during 2003. During 2005 the BLM monitored two permanent stations in the lower reach. Monitoring at stream mile 0.1 documented 10 cutthroat and 3 brook trout from a 57.5 square meter station and monitoring at stream mile 0.8 documented 30 cutthroat trout from a 32.5 square meter station.

During the summer of 1992 the BLM constructed approximately 250 feet of new stream channel to connect Box Sing Creek with American River. Historic dredge mining of the mouth area altered the American River floodplain and no stream channel connected the stream with American River. At the mouth area, Box Sing Creek flowed subsurface through the old tailings during low flows or during high flow events flowed into low depressions or over the floodplain area in no distinct channel.

Fish Habitat: Box Sing Creek was surveyed by the BLM in 1991 from the mouth to NPNF boundary (stream mile 0.67), using a modified Hankin and Reeves (1988) survey methodology. The NPNF surveyed the upstream reaches using the same methodology in 1989. NPNF recon surveys were

conducted in 2003 in support to this project. Surveys included Stream Reach Reconnaissance Survey, Rosgen Stream Channel Classification (Rosgen, 1996) with channel profiles and Wolman pebble count and R1 Stream Reach Inventory and Channel Stability Evaluation (Pfankuch, 1978).

The stream flows through a confined timbered stream bottom. The dominant channel type in lower reaches was B4 and average gradient was 2 percent. Unstable stream banks were less than 3 percent. Box Sing is approximately 5.7 miles long. BLM monitoring (2004) at stream mile 0.1 found that cobble embeddedness was 44%, spawning gravel composition by depth had 31.4% less than 6.3 mm, and surface fines were 19%.

Water Quality, Water Yield, and Flow Regimes: The current percent over base sediment yield for the watershed is 21%. During 2004 water temperature was monitored and the instantaneous maximum water temperature was 17.7°C and the seven-day running average maximum summer water temperature was 16.5°C. ECA for the Box Sing Creek watershed is 6%. Estimates of low flows at the mouth average less than one cfs and high flow average is estimated at 14 cfs.

Riparian Habitats: Riparian habitats are in mid-seral condition, and are rated as being in "proper functioning condition." With the exception of the mouth area, where dredge mining altered the channel, the riparian areas along Box Sing Creek are in good ecological condition with a slight upward trend. Common overstory riparian trees include grand fir, lodgepole pine, and Engelmann spruce. Understory vegetation includes alder, arrowleaf groundsel, water sedge, small-fruited bulrush, bluejoint, mountain brome, and other forbs/shrubs.

Land Uses: Low-moderate levels (16% of watershed) of historic timber harvest have occurred in the watershed and road density is 3.3 miles per square mile. The lower 2.0 miles of Box Sing Creek is moderately disturbed from past dredge mining and placer mining activities. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: The established fisheries objective for this watershed is 70% habitat potential. The existing condition is approximating 65% habitat potential indicating this stream is near objective. With successional advancement in riparian habitats (mid-age to mature timber) and increased contribution of active large woody debris to stream channels from lodgepole pine that is dead or dying, it is expected that pool/riffle ratios and active instream woody debris will improve in the watershed. BLM restoration work in the watershed includes barricading the lower reach of the stream from ATV use, closing a road across a wet meadow, and re-connecting the channel to American River in 1992. Further activities that support upward trend include the installation of an open arch culvert at a ford that was a chronic sediment source and graveling the road (2002).

Reconnaissance field investigation of the watershed during 2004 and 2005 have not identified any BLM land uses adversely impacting fish habitats, riparian habitats or chronic sources of erosion or sediment attributed to BLM management actions which would preclude or not support improving trends.

The primary limiting factors include elevated levels of deposited sediment, limited winter rearing habitat, lack of good quality pools, and low flows (BLM 1991 Stream Surveys; BLM 2004 Substrate and Water Quality Monitoring; Craig Johnson, 2004 field notes).

Kirks Fork–Prescription Watershed #17060305-05-12

Overview: Kirks Fork flows into American River at river mile 6.9. The watershed is approximately 6,530 acres in size, and approximately 98% is NPNF lands and approximately 2% BLM lands. Dredge mining has altered the mouth area and lower reach segment of the stream. A primitive road parallels American River on the east side and this road fords Kirks Fork near the mouth.

Fisheries: Kirks Fork provides habitat for steelhead, bull trout, spring chinook salmon, westslope cutthroat trout, brook trout, mountain whitefish, sculpin, and dace. Bull trout use the stream for adult and

subadult rearing. Fish population surveys of the stream in recent years by BLM, NPNF, and IDFG (1996–2003) have documented the presence of bull trout; however, numbers were low.

Fish Habitat: Kirks Fork was surveyed by the BLM in 1992 from the mouth to Forest Service boundary (stream mile 0.55) (USDI-BLM, 1992; USDA-FS 1999a). The Forest Service surveyed from the BLM boundary upstream in 1991. Both surveys used a modified Hankin and Reeves (1988) survey methodology. The NPNF conducted a recon fish habitat stream survey in 2003.

The stream flows through a confined timbered stream bottom. The dominant channel type in lower reaches was B3 and average gradient ranged from 2–3 percent. Unstable stream banks varied from 3–5 percent. BLM monitoring at stream mile 0.15 found that cobble embeddedness was 45%, spawning gravel composition by depth had 28.9% less than 6.3 mm, and surface fines were 15%.

Water Quality, Water Yield, and Flow Regimes: Current percent over base sediment yield for the watershed is 5%. ECA for the Kirks Fork watershed is 2%. During 2004 water temperature was monitored and the instantaneous maximum water temperature was 20.3°C and the seven-day running average maximum summer water temperature was 17.8°C. The seven-day running average maximum temperature was 16.7°C in 1995. ECA for the Kirks Fork watershed is 2%. Estimates of low flows at the mouth average 1–2 cfs, and high flow average is estimated at 80–85 cfs.

Riparian Habitats: Riparian habitats are in mid-seral condition, and are rated as being in "proper functioning condition." BLM and NPNF riparian areas along Kirks Fork documented a good ecological condition. Common overstory riparian trees include Engelmann spruce, lodgepole pine, grand fir, and subapline fir. Understory vegetation includes alder, red-osier dogwood, arrowleaf groundsel, water sedge, small-fruited bulrush, bluejoint, mountain brome, and other forbs/shrubs.

Land Uses: Timber harvest has occurred on 4% of the watershed and the road density is 0.6 miles per square mile. This watershed has relatively low levels of roading, timber harvest, and development. A primitive road and ford crossing occurs on Kirks Fork near the mouth of the stream. An ATV trail parallels Kirks Fork. Dredge mining has altered the mouth area and lower reach of the stream. With the exception of some historic mining and a ford at the mouth, BLM lands within the drainage have had minimal past land uses on BLM lands in the watershed. Refer to Section 3.4 (Watershed) and Table 3.4.2, for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: The established fisheries objective for this watershed is 80% habitat potential. The existing condition is approximating 75% habitat potential. With successional advancement in riparian habitats (mid-age to mature timber) and increased contribution of active large woody debris to stream channels from lodgepole pine that is dead or dying, it is expected that pool quality and active instream woody debris will improve in the watershed.

The primitive road and ford at the mouth of the stream is a source of erosion/sediment. With the exception of the ford, reconnaissance field investigation of the watershed during 2004 and 2005 did not identify any land uses adversely impacting riparian or aquatic habitats or chronic sources of erosion or sediment attributed to BLM management actions which would preclude or not support improving trends.

The primary limiting factors include elevated levels of deposited sediment, poor winter rearing habitat conditions, and lack of good quality pools (BLM 1992 Stream Surveys; BLM 2004 Substrate and Water Quality Monitoring; Craig Johnson, 2004 field notes). This subwatershed has relatively low levels of human disturbance; however, existing deposited sediment levels are elevated.

Elk Creek

Overview: Elk Creek flows into American River at river mile 1.5. Elk Creek includes the reaches from the mouth to the confluence of Big Elk Creek and Little Elk Creek at stream mile 2.7. The watershed is approximately 15,650 acres in size, and approximately 45% is NPNF lands, 39% private lands, and 16% BLM lands. The Elk Creek watershed is a composite watershed, with three subwatersheds. The lower

portion of the watershed is primarily in private ownership, and the creek meanders through a large meadow, which is grazed by cattle and horses. Portions of the meadow are also used for hay production. The stream flows through the community of Elk City and the watershed is the municipal water source. The lower watershed consists of a broad meadow, with moderate slopes that are timbered. The mid and upper portions of the watershed are timbered, with meadows occurring along some of the stream bottoms.

Fisheries: Elk Creek provides habitat for steelhead, spring chinook salmon, westslope cutthroat trout, brook trout, mountain whitefish, sculpin, and dace. Bull trout may use the stream for adult and subadult rearing; however, an IDFG fish population survey of the creek in 1998 did not document the presence of bull trout in the watershed. IDFG sampled ten transects in Elk Creek during 1998, which occurred from the mouth to the confluence of Big and Little Elk Creeks (IDFG, 1998). Survey efforts during 1998 documented that chinook salmon made up the greatest density (subyearlings) (71.4%), followed by mountain whitefish (20.48%), brook trout, rainbow/steelhead trout, and westslope cutthroat trout were the least populated species in Elk Creek (IDFG, 1998). Chinook salmon and steelhead trout densities can vary greatly from year to year, which is dependent on previous year adult salmon that returned to the watershed. Sculpin and dace were also observed during the 1998 surveys.

Fish Habitat: Elk Creek was surveyed by the BLM in 1991 using a modified Hankin and Reeves (1988) survey methodology. The dominant channel type was C4 and average gradient was less than 1%. Unstable streambanks varied from 5–45%. The stable streambanks occur within livestock exclosure areas constructed by the BLM. BLM monitoring at stream mile 0.8 found that cobble embeddedness was 64%, surface fines were 34%, and spawning gravels had 54% less than 6.3 mm. BLM monitoring at stream mile 2.2 found that cobble embeddedness was 62%, surface fines were 45%, and spawning gravels had 36% less than 6.3 mm.

Water Quality, Water Yield, and Flow Regimes: Elk Creek has some of the highest recorded summer water temperatures in the upper South Fork of the Clearwater River watershed. A seven-day running average maximum temperature of 23.0°C has been recorded for Elk Creek. The current percent over base sediment yield for the watershed is 18%. ECA for the watershed is 13%. Estimates of low flows at the mouth average 2–3 cfs and high flows average is estimated at 190 cfs.

Riparian Habitats: Riparian habitats are generally in poor to fair ecological condition. Unstable streambanks and lack of shrubs are common along some stream segments. Livestock grazing is common along most stream segments. The only segment (0.4 mile) of Elk Creek flowing across BLM lands has been fenced from livestock use. Common riparian vegetation includes Kentucky bluegrass, redtop, reed canary grass, water sedge, small-fruited bulrush, bluejoint, mountain brome, Drummond's willow, and other forbs/shrubs.

Land Uses: Timber harvest, livestock grazing, home construction, urban development, road construction, and mining have had varying levels of impact in the watershed. The Elk Creek watershed is the municipal watershed for the community of Elk City. Specific stream reaches flowing across private lands have had historic and present summer grazing which have had adverse effects on riparian vegetation and streambank stability. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses and watershed condition evaluations.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: Because of the small amount of BLM ownership in the Elk Creek 6th code HUC, no specific fisheries or water quality objectives have been established. Livestock grazing is one of the primary land uses impacting this stream reach, and the BLM has excluded livestock grazing along the segment flowing across BLM lands. BLM Elk Creek exclosures were constructed in 1983 and 2000 and riparian condition and bank stability have improved from poor to good along the stream reach flowing across BLM lands. Livestock grazing on private lands has resulted in streambank and riparian degradation. The BLM is currently cooperating and coordinating with Framing Our Community on several American River restoration projects. One project involves

private land riparian restoration (e.g., riparian fencing, streambank plantings, and streambank stabilization) for Elk Creek.

The primary limiting factors for Elk Creek are high summer water temperatures, elevated deposited sediment levels, poor winter rearing habitat conditions, and lack of good quality pools (1991 BLM stream surveys; 2005 BLM Riparian/Greenline Monitoring; Craig Johnson, 2005 field notes).

Little Elk Creek

Overview: Little Elk Creek flows into Elk Creek at stream mile 2.7. The watershed is approximately 5,100 acres in size, and approximately 63% is NPNF lands, 23% private lands, and 14% BLM lands. The majority of the watershed is timbered with the exception of the lower meadow portion. The lower portion of the watershed is primarily in private and BLM ownership, while the mid and upper portion is primarily NPNF lands. The creek meanders through a large meadow in the lower reaches. In the mid and upper sections, the creek flows through stringer meadows or timbered/shrub stream bottoms.

Fisheries: Little Elk Creek provides habitat for steelhead trout, spring chinook salmon, cutthroat trout, brook trout, mountain whitefish, sculpin, and dace. Bull trout may use the stream for adult and subadult rearing; however, an IDFG fish population survey of the creek in 1998 did not document the presence of bull trout in the watershed. IDFG sampled 25 transects in Little Elk Creek during 1998 (IDFG, 1998). Survey efforts during 1998 documented that brook trout were the most abundant species in the watershed (60.09%), followed by cutthroat trout (40.98%), chinook salmon (subyearlings) (12.36%), mountain white fish (2.13%), and rainbow/steelhead trout (1.64%) (IDFG, 1998).

Fish Habitat: Little Elk Creek was surveyed by the BLM in 1991 from the mouth to the NPNF boundary using a modified Hankin and Reeves (1988) survey methodology (mouth to NPNF boundary). The dominant channel type was C4 and C3 in the lower and mid reaches and B3 in the upper reaches. The average gradient ranges from less than 1% to 2%. Unstable streambanks for various stream reaches ranged from 10–25%. BLM monitoring at stream mile 3.2 found that cobble embeddedness was 56%, surface fines were 39%, and spawning gravels had 37% less than 6.3 mm.

The primary limiting factors include high summer water temperatures, elevated levels of deposited sediment, poor winter rearing habitat, and lack of good quality pools.

Water Quality, Water Yield, and Flow Regimes: The current percent over base sediment yield for the watershed is 24%. A seven-day running average maximum temperature of 23.0°C has been recorded for Little Elk Creek. ECA for the watershed is 11%. Estimates of low flows at the mouth average less than 0.5–1 cfs and high flow average is estimated at 60–70 cfs.

Riparian Habitats: Riparian habitats are generally in fair ecological condition. Livestock grazing is common along most stream segments. Common riparian vegetation includes Kentucky bluegrass, redtop, reed canary grass, water sedge, small-fruited bulrush, bluejoint, mountain brome, Drummond's willow, and other forbs/shrubs in meadow reaches. Timbered stringer meadows will have redtop, water sedge, small-fruited bulrush, bluejoint, mountain brome, and other forbs/shrubs in meadow reaches. Common riparian trees and shrubs in the mid and upper reaches include lodgepole pine, Engelmann spruce, grand fir, alder, red-osier dogwood, and Drummond's willow.

Land Uses: Timber harvest, livestock grazing, home construction, road construction, and mining have had varying levels of impact in the watershed. Little Elk Creek occurs within the Elk Creek watershed, which is the municipal watershed for the community of Elk City. Stream reaches of Little Elk Creek have been dredge mined, and sinuosity has been significantly increased in these reaches. Refer to Section 3.4 (Watershed) and Table 3.4.2 for additional summaries and discussion concerning land uses.

Fisheries/Water Quality Objectives, Trends, and Limiting Factors: The established fisheries objective for this watershed is 80% habitat potential. The existing condition is approximating 60% habitat potential. With successional advancement in riparian habitats (mid-age to mature timber) and increased contribution

of active large woody debris to stream channels from lodgepole pine that is dead or dying, it is expected that pool quality and active instream woody debris will improve in the watershed.

The primary limiting factors for Little Elk Creek are high summer water temperatures, elevated deposited sediment levels, lack of large woody debris, poor winter rearing habitat conditions, and lack of good quality pools (1991 BLM stream surveys; Craig Johnson, 2004 field notes).

South Fork Clearwater River

Overview: The South Fork Clearwater River subbasin is approximately 746,000 acres in size and BLM lands within the subbasin total 2% (15,203 acres). The majority of BLM lands occurring within the subbasin are in the Elk City township (12,859 acres). The elevations range from 1,240 feet at the mouth (Kooskia) to 10,000 feet. American River and Red River flow together at river mile 62.5 to form the South Fork Clearwater River. The South Fork Clearwater River flows into the Clearwater River at river mile 74.4.

Fisheries: Special status fish found in the South Fork Clearwater River include: steelhead trout, bull trout, fall chinook salmon, spring chinook salmon, Pacific lamprey, rainbow/redband trout, redband trout, and westslope cutthroat trout. Other native fish known to occur in the South Fork Clearwater River include: mountain whitefish, northern pikeminnow, chiselmouth, brdigelip sucker, sculpin, redside shiner, speckled dace, and longnose dace. Non-native species occurring in the South Fork Clearwater River include: brook trout Yellowstone cutthroat trout, black bullhead, and smallmouth bass.

The following Table 3.6.5 lists the lifestages for select special status species in the upper South Fork Clearwater River and American River/tributaries.

Table 3.6.5 Lifestages for Federally Listed and BLM Sensitive Species–Upper S. Fk. Clearwater R.

Lifestage	Steelhead Trout	Bull Trout	Sp/Summer Chinook Salmon	Westslope Cutthroat Trout	Pacific Lamprey
Adult Migration	AUG–APR S.Fk.Clearwater	JUN–AUG S.Fk.Clearwater	APR–JUL S.Fk.Clearwater	MAR–JUN S.Fk.Clearwater	JUL–OCT S.Fk.Clearwater
Adult Spawning	MAR–JUN S.Fk.Clearwater & Trib. Streams	Late AUG–SEP Trib. Streams	AUG–SEP Trib. Streams	MAR–JUN Trib. Streams	APR–JUL S.Fk.Clearwater Trib. Streams
Adult Overwintering	NOV–MAR S.Fk.Clearwater	NOV–MAR S.Fk.Clearwater.	N/A	NOV–MAR S.Fk.Clearwater	NOV–MAR S.Fk.Clearwater
Adult / Subadult Rearing	N/A	YEARLONG S.Fk.Clearwater & Trib. Streams	N/A	YEARLONG S.Fk.Clearwater & Trib. Streams	N/A
Incubation & Emergence	MAR–JUN S.Fk.Clearwater & Trib. Streams	SEP–MAY Trib. Streams	SEP–MAY S.Fk.Clearwater Trib. Streams	MAR–JUN Trib. Streams	APR–JUL S.Fk.Clearwater & Trib. Streams
Juvenile Rearing	1–3 Years S.Fk.Clearwater & Trib. Streams	2–3 Years Trib. Streams	1 Year S.Fk.Clearwater & Trib. Streams	1–3 Years Trib. Streams	4–6 Years S.F.Clearwater Trib. Streams
Smolt Emigration	APR–JUN	Sub Adults SEP–OCT	APR–JUL	N/A	APR–JUL

Fish Habitat: The mainstem South Fork Clearwater River begins at the confluence of American and Red River (River Mile 62.5). From this point to about Tenmile Creek (River Mile 47.1), the river is a relatively low gradient riffle/pool stream dominated by gravel and cobble substrate (USDA-FS, 1998a). In this reach, it is typically a C channel. It has been highly altered by dredge mining and placement of State Highway 14. From Tenmile Creek to Mill Creek (River Mile 32.8), the river is steeper, more confined, and the substrate is dominated by boulders and cobbles. The channel type is typically A, B, or C. This is a high energy reach through which sediment is readily transported. From Mill Creek to just above Threemile Creek (River Mile 7.6) to its confluence with the Middle Fork Clearwater River at Kooskia (Clearwater River–river mile 74.7), the South Fork is a relatively flat, unconfined riffle/pool channel with gravel and cobble substrate. The channel type is predominately C. This reach tends to be aggradational, with fine sediment depositing in the relatively few pools, and gravel and cobble depositing from upstream sources and the mouths of tributaries. The lowest reach of the river has also been partially confined by dikes, most notable in the vicinity of Stites and Kooskia. BLM monitoring (2000) at river mile 58.6 found that cobble embeddedness was 30%, spawning gravels had 40% less than 6.3 mm, and surface fines were 5.3%.

Water Quality, Water Yield, and Flow Regimes: The current estimated annual sediment yield over base delivered to the main stem South Fork Clearwater River at the NPNF boundary is approximately 5.6% (USDA-FS, 2005a). The South Fork Clearwater River has elevated summer water temperatures, which are summarized in Section 3.4 (Watershed). Refer to Figure H.2, Appendix H, which depicts flow regimes for the upper South Fork Clearwater River, immediately upstream from the mouth of Crooked River.

Riparian Habitats: The upper South Fork Clearwater River riparian vegetation includes the following tree species: Engelmann spruce, subalpine fir, grand fir, and Douglas-fir. Understory shrubs, forbs, and grasses include: alder, willow, red-osier dogwood, serviceberry, reed canarygrass, mountain brome, redtop, and hairgrass. Spotted knapweed infestations are common along roads and disturbed river bottoms. Historic dredge mining and Highway 14 have encroached on riparian habitats and the river channel.

Fish/Water Quality Objectives, Trends, and Limiting Factors: The primary limiting factors for fish production include high summer water temperatures, sediment, and poor instream cover conditions (USDA-FS, 1999a).

3.6.2.4 Summary of Habitat Factors

The following table 3.6.6 provides a summary of conditions observed and/or documented by the BLM and NPNF for streams potentially affected by this action.

Table 3.6.6 American River and Tributaries Existing Conditions of Fish Habitat Indicators Compared to Objectives

Prescription Watershed	Cobble Embeddedness (BO Standard)		Percent Fines By Depth Spawning Gravels (DFC Standard)		Percent Surface Fines (Steelhead/Bull Trout Matrix Standard)		Pool:Riffle Ratio (DFC Standard)		Acting Large Woody Debris Pieces per 100 meters (DFC Standard)	
	Objective	Existing	Objective	Existing	Objective	Existing	Objective	Existing	Objective	Existing
Middle American River 17060305-05-06	<30	40	23	25.2	≤20	10	40:60	29:71	40	22
Maggie Creek	N/A	60	N/A	No Data	N/A	60	N/A	10:90	N/A	15
Lower American River 17060305-05-16	<30	31	23	27.6	≤20	8	40:60 40:60	20:80 42:58[1]	40 40	3 22[1]
Telephone Creek	N/A	77	N/A	68.5	N/A	67	N/A	10:90	N/A	20
Baboon Creek	N/A	40	N/A	No Data	N/A	10–15	N/A	10:90	N/A	35
East Fork American River 17060305-05-10	<30	40	21	35.6	≤20	18	45:55	20:80	45	28
Whitaker Creek 17060305-05-12	<40	56	25	47.2	N/A	37	30:70	15:85	35	30
Queen Creek 17060305-05-13	<40	42	25	44.7	N/A	20	30:70	11:89	35	20
Box Sing Creek 17060305-05-15	<40	44	25	31.4	≤20	19	30:70	15:85	35	28
Kirks Fork 17060305-05-11	<30	45	23	28.9	≤20	22	40:60	33:67	40	22
Elk Creek 17060305-05-11	<30	64	N/A	34	≤20	54	N/A	13:87	N/A	3
Little Elk Creek 17060305-05-11	<30	56	23	39	≤20	37	40:60	21:79	40	9
South Fork Clearwater River	<30	30	N/A	39.5	N/A	5	N/A	N/A	N/A	N/A

[1] BLM stream reaches in Lower American River with instream fish habitat projects constructed, which included rock upstream "v" check dams and installation of large woody debris.

Deposited Sediment (Cobble Embeddedness and Percent Fines)
Using the above cobble embeddeness measurements, the FISHSED model was used to estimate the existing conditions of summer and winter rearing habitat in American River and its tributaries potentially affected by this action. As displayed in Table 3.6.7 below, summer rearing is at or near objective for most streams. Winter rearing however is well below objective and has been identified as a limiting factor. Sediment can also settle in low gradient pool habitats and affects important holding areas for fish in the winter.

Table 3.6.7 Existing Conditions of Select FISHSED Variables, Which Are Relevant to the Deposited Sediment Indicator

Watershed Name/ Channel Type	Existing Cobble Embeddedness (%)[1]	Existing Summer Rearing Capacity (Percent of Optimal)[2]	Existing Winter Rearing Capacity (Percent of Optimal)[2]
Middle American River/C	40	89	35
Lower American River/C	31	94	45
East Fork American River/C	40	89	35
Kirks Fork/B	45	87	31
Whitaker Creek/B	56	79	23
Queen Creek/B	42	88	34
Box Sing Creek/B	44	87	32
Elk Creek/C	64	72	19
Little Elk Creek/C	56	79	23
South Fork Clearwater River/C	30	94	46

[1]Existing cobble embeddedness was measured in the stream.
[2]Values derived from FISHSED Model.

Habitat Connectivity/Fish Passage
Habitat connectivity involves perennial and intermittent stream channels that have human-caused impairments which may affect habitat connectivity and fish passage. These impairments include culverts or dredge mining that altered stream channels, causing fish passage blockage. Vehicle use of fords generally can result in localized disturbance and displacement of fish, or may disturb spawning fish or destroy redds. These fords are a chronic sediment source, and vehicle use would result in minor short-term increases in turbidity. Properly designed bridges or culverts that do not adversely encroach or alter natural stream channels do not impair fish passage. Table 3.6.8 displays a summary of stream channel crossings within the project area which have been impacted by culverts, dredge mining, bridges, or fords.

Table 3.6.8 Existing Fish Bearing Stream Crossings in Eastside Project Area[1]

Watershed Name	Culvert Crossings	Vehicle Bridge Crossings[2]	ATV Bridge[2]	Vehicle Fords[3]	Dredge Mining Blockage	Total Crossings (Partial or Full Barriers)
Middle American River	0	3	0	1	0	4 (0)
Maggie Creek	0	0	0	0	1	1 (1)
Lower American River	0	3	1	1	0	5 (0)
Baboon Creek	1	0	0	0	1	2 (2)
Telephone Creek	0	0	0	2	1	3 (1)
East Fork American River	0	1	0	0	0	1 (0)
Kirks Fork	0	0	1	1	0	1 (0)
Whitaker Creek	0	0	0	0	1	1 (1)
Queen Creek	0	0	0	0	1	1 (1)
Box Sing Creek	1	0	1	0	0	2 (0)
Total	3	6	3	5	5	17 (7)

[1] Includes stream reaches (BLM and private) within or adjacent to East Side project area only.
[2] Existing vehicle bridges and ATV bridges are not partial/full barriers to fish passage. However, dependent on bridge design, such may encroach on stream channel or cause localized channel scouring or bank erosion.
[3] Fords are not full passage barriers to fish. However, dependent of ford characteristics would have varying effects on stream channel, streambanks, and riparian habitats. Vehicle use of ford causes turbidity and disturbance or displacement to fish utilizing stream crossing habitat. Potential vehicle caused mortality or injury may occur to incubating eggs in redds or juvenile fish rearing in the interstitial spaces in the streambottom substrate.

Water Quality/Temperature
Monitoring of water temperature within the American River watershed has documented that streams are not in compliance with the Idaho State Water Quality Standards. Cold-water biota, salmonid spawning, and bull trout criteria were exceeded at selected stream monitoring sites within the past four years. See Watershed section 3.4 (Indicator 5 – Water Quality), Tables 3.4.9 and 3.4.10, for additional information in regards to water quality and temperature.

3.6.3 Environmental Effects

3.6.3.1 Introduction

This section will assess the effects of various alternatives on fish and aquatic habitats and the methods used to analyze the changes as a result of the Eastside Project. Assessment will focus on action alternative effects to “key” indictors, along with corresponding analysis of cumulative effects.

Direct and Indirect Environmental Effects

Riparian Habitat Conservation Areas
RHCA widths identified in PACFISH (USDI-USDA, 1995) were developed to protect sensitive areas that are important to maintenance of aquatic ecosystem integrity. RHCAs do this by: (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams: (2) providing root strength for channel stability; (3) shading the stream; and (4) protecting water quality (Naiman et al., 1992). Eastside Project RHCA widths should be sufficient to provide and protect riparian functions, including delivery of organic matter and woody debris, stream shading, and bank stability (Gregory et al., 1987; Beschta et al., 1987; McDade et al., 1990; Belt et al., 1992).

Watershed and Stream Restoration
For a complete description of the activities covered in this section, please refer to Appendix I. Most of the restoration actions are associated with streamside riparian areas and rehabilitation of past dredge mining and roads. Listed (ESA) fish and BLM sensitive fish are present in the area. The in-channel and streambank disturbance from this work would cause some previously deposited sediment at the work sites to be mobilized within the stream. This short-term impact must be weighed against the long-term benefit, particularly when the activities provide long-term reduction in sediment and improve riparian, aquatic, and water quality conditions. The NEZSED model is not designed for use with instream projects, soil restoration, watershed improvements or culvert removal/replacement.

In-channel and streambank activities may result in disturbance to individual fish, both within the immediate work area and downstream. Increased turbidity during work may locally affect individual fish but would not be at a magnitude where serious harm or mortality would be expected to occur. Timing restrictions for in-channel work would result in avoidance of spawning fish or occupied redds.

3.6.3.2 Indicator 1–Sediment/Substrate Condition Analysis

Direct and Indirect Effects Sediment/Substrate Condition Analysis

A review by Belt et al. (1992) of studies in Idaho and elsewhere concluded that non-channelized sediment flow rarely travels more than 300 feet and that 200–300 foot riparian "filter strips" are generally effective at protecting streams from non-channelized sediment flow. In a review of past studies, Broderson (1973) noted that a stream buffer width of 200 feet had been found to control overland flows of sediment under the most extreme conditions.

Channelized flow can travel in excess of 1,000 feet (Belt et al., 1992). RHCAs would help, but not eliminate the risk of channelized sediment reaching streams. Field verification has taken place during 2004 and 2005 to delineate perennial, intermittent, and ephemeral streams, seeps, springs, and bogs to ensure all appropriate areas are included and protected in designated and mapped RHCAs. Field verification also documented and verified the occurrence of two additional American River tributary streams as being fish bearing: Baboon Creek and Maggie Creek (Craig Johnson, 2005 reconnaissance stream survey and field notes).

Disturbed Water Erosion Prediction Project (WEPP)
The disturbed WEPP soil model (Elliot et al., 2000) is a tool to allow users to describe numerous forest and rangeland erosion conditions. The model disclosures for the WEPP model can be reviewed in Appendix H. Disturbed WEPP allows summary outputs, and presents the probability of a given level of erosion occurring the year following a given disturbance. Disturbed WEPP is designed to predict runoff and sediment yield from:

- Young and old disturbed forests
- Skid trails and harvested forests
- Prescribed and wildfires

Values for disturbed WEPP modeling of the proposed projects, such as slope, and percent cover for different activities, were either collected in the field during 2004 and 2005, or are estimates based on knowledge of the area. The accuracy of WEPP-predicted runoff or erosion rate may be plus or minus 50 percent. The primary purpose of using the WEPP model was to provide additional analysis information for the evaluation of the effectiveness of RHCA buffers in reducing sediment delivery to stream channels.

Using a minimum 100 foot RHCA, WEPP modeling predicts no probability of sediment delivery to a channel based on a 2-year climatic period for timber harvest, skid trails, and low severity prescribed burning (see Table 3.6.9 below). Based on a 30 year climatic period, the probability of sediment delivery from timber harvest and skid trails is 10% and 23% for prescribed burning. WEPP modeling indicates the minimum 100-foot RHCA would be able to filter sediment and yield a low risk of harvest-associated

sediment affecting RMOs for the project area subwatersheds. Most RHCA buffers in the project would exceed the 100 foot minimum.

Table 3.6.9 WEPP Modeled Sediment Delivery for Action Alternatives (Based on Minimum 100 Foot Buffer to Intermittent Stream Channel)

Activity	Based on 30 Year Climate Period		Based on 2 Year Climate Period	
	Sediment Leaving Profile (Tons/Acre)	Probability of Sediment Delivery First Year	Sediment Leaving Profile (Tons/Acre)	Probability of Sediment Delivery First Year
Skid Trails	0.102	10%	0%	0%
Timber Harvest	0.067	10%	0%	0%
Prescribed Burn (Low Severity)	0.169	23%	0%	0%

Deposited Sediment Analysis and FISHED

Model results are reasonable estimates and not absolute numbers with high statistical precision. The capability of the FISHSED model in analyzing and displaying change at the levels shown in these tables is somewhat limited. In this case, data from FISHSED are most useful in comparing the relative effects among alternatives. The model also reflects short-term changes only and does not reflect long-term benefits in sediment reduction as predicted by NEZSED. The results must be used in combination with sound professional judgment. Disclosures for FISHED and NEZSED models can be found in Appendix H.

All modeling was conducted for age 0+ steelhead trout. The data shown for Alternative A is the existing condition. The analysis of effects on fish habitat from increased sediment is based on the Watershed analysis of sediment in Section 3.4 (Watershed) above. Table 3.6.10 displays the existing and predicted changes in cobble embeddedness for each action alternative. Tables 3.6.11 and 3.6.12 display the FISHSED-predicted impacts to summer and winter rearing habitat. Modeled activities include road construction, road reconstruction, timber harvest, fuel treatments, and road decommissioning. It does not include site treatments for watershed, stream, and riparian restoration. This is a reflection of the model's limitations, not the amount of actual on the ground improvements.

The FISHSED model uses predicted peak sediment yields from NEZSED to calculate potential changes in cobble embeddedness, embryo survival, summer rearing capacity, and winter rearing capacity (Stowell et al. 1983). The specific fish response curves have drawn heavily upon the work of Bjornn (1969), Klamt (1976), McCuddin (1977), and Bjornn et al. (1977). These studies were conducted primarily in the laboratory and may constitute only a partial simulation of natural conditions. The model calculates short-term changes only and does not have the capability to provide estimates in substrate response to long-term declines in sediment yield.

Tables 3.6.10, 3.6.11, and 3.6.12 below display the existing condition of Eastside Project area streams and South Fork Clearwater River, and changes predicted by FISHSED.

Table 3.6.10 Comparison of Predicted Cobble Embeddedness (CE) by Alternative

Stream/Channel Type	Predicted Percent (%) CE			
	Alt A (Legacy[2])	Alt B	Alt C	Alt D
Middle American River/C[1]	40 (42)	43	42	42
Lower American River/C[1]	31 (33)	35 (2006)	34 (2006)	34 (2006)
		34 (2007)	34 (2007)	34 (2007)
East Fork American River/C[1]	44 (46)	46	46	46
Whitaker Creek/B	56 (59)	61	59	61
Queen Creek/B	42 (45)	47	45	46
Box Sing Creek/B	44 (46)	48	48	48
Kirks Fork/B	45 (45)	46	46	46
Elk Creek/C	64 (67)	67	67	67
Little Elk Creek/C	56 (60)	60	60	60
South Fork Clearwater River/C[1]	30 (33)	33	33	33

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.
[2] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base). Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

Table 3.6.11 Comparison of Summer Rearing Capacity (SRC) by Alternative

Stream/Channel Type	Predicted Percent (%) SRC			
	Alt A (Legacy[2])	Alt B	Alt C	Alt D
Middle American River/C[1]	89 (88)	88	88	88
Lower American River/C[1]	94 (93)	92 (2006)	92 (2006)	93 (2006)
		93 (2007)	93 (2007)	93 (2007)
East Fork American River/C[1]	87 (86)	86	86	86
Whitaker Creek/B	79 (77)	75 (2007)	77 (2007)	75 (2007)
Queen Creek/B	88 (86)	85 (2007)	86 (2007)	86 (2007)
Box Sing Creek/B	87 (86)	84	84	84
Kirks Fork/B	87 (86)	86	86	86
Elk Creek/C[1]	72 (70)	70	70	70
Little Elk Creek/C	79 (76))	76	76	76
South Fork Clearwater River/C[1]	94 (93)	93	93	93

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.
[2] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base). Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

Table 3.6.12 Comparison of Winter Rearing Capacity (WRC) by Alternative

Stream/Channel Type	Predicted Percent (%) WRC			
	Alt A (Legacy[2])	Alt B	Alt C	Alt D
Middle American River/C[1]	35 (34)	33	33	33
Lower American River/C[1]	45 (42)	41 (2006)	41 (2006)	41 (2006)
		42 (2007)	42 (2007)	42 (2007)
East Fork American River/C[1]	32(30)	30	30	30
Whitaker Creek/B	23 (22)	20 (2007)	22 (2007)	20 (2007)
Queen Creek/B	34 (31)	29 (2007)	31 (2007)	31 (2007)
Box Sing Creek/B	32 (30)	29	29	29
Kirks Fork/B	31 (31)	31	31	31
Elk Creek/C[1]	19 (18)	18	18	18
Little Elk Creek/C	23 (21)	21	21	21
South Fork Clearwater River/C[1]	46 (43)	42	42	42

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.
[2] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base). Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

The results of FISHSED show predicted increases in cobble embeddedness and correspondingly, no change or slight decreases in summer and winter rearing capacity for most fish-bearing streams under all action alternatives. As stated by Stowell et al. (1983), FISHSED is most appropriately used to assess the effects of "substantial" changes in habitat quality greater than 10 to 20 percent and to document the relative differences among alternatives. Stowell et al. (1983) also stated that sound biological judgment should be used when comparing the relative differences among alternatives.

Of the above results, predicted changes in cobble embeddedness in Lower American and Queen Creek (Alternative B) exceed this 10 percent threshold; for all the others, the predicted changes in cobble embeddedness are less than 10 percent.

Predicted changes in winter rearing capacity exceed 10 percent in Whitaker Creek (Alternatives B and D) and Queen Creek (Alternative B). Percent change in cobble embeddedness, summer rearing capacity, and winter rearing capacity are presented below in Table 3.6.13.

Table 3.6.13 Percent Change in Cobble Embeddedness, Summer Rearing Capacity, and Winter Rearing Capacity, Based on FISHSED Results

Subwatershed	Percent Change Cobble Embeddedness[2] (Legacy[3])			Percent Change Summer Rearing Capacity[2] (Legacy[3])			Percent Change Winter Rearing Capacity[2] (Legacy[3])		
	Alt B	Alt C	Alt D	Alt B	Alt C	Alt D	Alt B	Alt C	Alt D
Middle American River	+7.50 (+5.00)	+5.00 (+5.00)	+5.00 (+5.00)	-1.12 (-1.12)	-1.12 (-1.12)	-1.12 (-1.12)	-5.71 (-2.81)	-5.71 (-2.81)	-5.71 (-2.81)
Lower American River	+12.90 (+6.45)	+9.67 (+6.45)	+9.67 (+6.45)	-2.13 (-1.07)	-2.13 (-1.07)	-1.07 (-1.07)	-8.89 (-6.67)	-8.89 (-6.67)	-8.89 (-6.67)
East Fork American R.	+4.54 (+4.54)	+4.54 (+4.54)	+4.54 (+4.54)	-1.15 (-1.12)	-1.15 (-1.15)	-1.15 (-1.15)	-6.25 (-6.25)	-6.25 (-6.25)	-6.25 (-6.25)

Subwatershed	Percent Change Cobble Embeddedness[2] (Legacy[3])			Percent Change Summer Rearing Capacity[2] (Legacy[3])			Percent Change Winter Rearing Capacity[2] (Legacy[3])		
	Alt B	Alt C	Alt D	Alt B	Alt C	Alt D	Alt B	Alt C	Alt D
Whitaker Creek	+8.92 (+5.36)	+5.36 (+5.36)	+8.92 (+5.36)	-5.06 (-2.53)	-3.80 (-2.53)	-5.06 (-2.53)	-13.04 (-4.35)	-4.35 (-4.35)	-13.04 (-4.35)
Queen Creek	+11.90 (+7.14)	+9.52 (+7.14)	+9.52 (+7.14)	-3.41 (-2.27)	-2.27 (-2.27)	-2.27 (-2.27)	-14.70 (-8.82)	-8.82 (-8.82)	-8.82 (-8.82)
Box Sing Creek	+9.09 (+4.54)	+9.09 (+4.54)	+9.09 (+4.54)	-3.44 (-1.15)	-3.44 (-1.15)	-3.44 (-1.15)	-9.37 (-6.25)	-9.37 (-6.25)	-9.37 (-6.25)
Kirks Fork	+2.17 (+2.17)	+2.17 (+2.17)	+2.17 (+2.17)	-1.15 (-1.15)	-1.15 (-1.15)	-1.15 (-1.15)	-0.00 (-0.00)	-0.00 (-0.00)	-0.00 (-0.00)
Elk Creek	+4.69 (+4.69)	+4.69 (+4.69)	+4.69 (+4.69)	-2.78 (-2.78)	-2.78 (-2.78)	-2.78 (-2.78)	-5.86 (-5.86)	-5.86 (-5.86)	-5.86 (-5.86)
Little Elk Creek	+7.14 (+7.14)	+7.14 (+7.14)	+7.14 (+7.14)	-3.80 (-3.80)	-3.80 (-3.80)	-3.80 (-3.80)	-8.89 (-8.89)	-8.89 (-8.89)	-8.89 (-8.89)
South Fork Clearwater R.	+10.00 (+10.00)	+10.00 (+10.00)	+10.00 (+10.00)	-1.06 (-1.06)	-1.06 (-1.06)	-1.06 (-1.06)	-6.52 (-6.52)	6.52) (-6.52)	-6.52 (-6.52)

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.
[2] Percent changes based on FISHSED results from legacy/existing sediment yield over base and Eastside Project.
[3] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base) only. Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

With the exception of three subwatersheds, predicted increases in deposited sediment is not at a magnitude where measurable changes would be expected to occur, and differences between the action alternatives, as modeled, are all within the margin of error for the model. Erosion control measures, project design features, and effectiveness of buffers are expected to minimize or prevent erosion and sediment from reaching stream channels. As stated above, the proper use of NEZSED and FISHSED is to assess the effects of "substantial" changes in habitat quality greater than 10 percent and to document the differences among alternatives. Most subwatersheds have FISHSED modeled increases in cobble embeddedness, and subsequent decreases to summer and winter rearing capacity primarily attributed to legacy sediment effects and not from the Eastside Project. There is a difference between Alternative A and the action alternatives, reflecting the short-term spike from the actions.

Specific only to restoration actions identified for improvement of watershed, water quality, and fish habitat conditions, Alternative C would have the highest long-term beneficial effects. Although most of the restoration actions were not specifically modeled for sediment production, short-term pulses would occur, followed by long-term reductions. See Appendix I, for a summary by alternatives of overall short term and long term effects from vegetation treatments and restoration projects.

Winter rearing is a limiting factor for fish production within the analysis area. Sediment analysis conducted specifically in regards to winter rearing habitat and comparison of alternatives, has identified the largest potential changes from sediment by action alternatives occurring in Lower American River, Middle American, Whitaker Creek, Queen Creek, and Box Sing Creeks. Alternative C would have the least sediment effects in these watersheds and Alternative B the most.

The basic model assumption behind FISHSED is that an inverse relationship exists between the amount of fine sediments in spawning and rearing habitats and fish survival and abundance. In general, when sediment yields are increased over natural rates in Idaho batholith watersheds, especially on a sustained basis, fish biomass decreases. Fine sediment is known to degrade salmonid spawning and rearing habitat (Chapman and McCleod, 1987; Bjornn and Reiser, 1991), as suggested by the FISHSED model. Specifically, high sediment levels can impair habitat for spawning and rearing by:

1. Trapping fry in redds when they are attempting to emerge;
2. Depleting intergravel oxygen levels in redds, smothering eggs contained within;
3. Limiting aquatic invertebrate populations used a food source;
4. Filling and thereby reducing the number of large pools which serve as primary feeding and resting areas for juvenile salmonids; and
5. Filling spaces between rocks that serve as over wintering refuge for juvenile salmonids (NOAA-NMFS, USFWS, USDA-FS, and USDI-BLM. 1998).

It is expected that changes in substrate condition from (modeled) increased sediment yield are of an amount that only discountable or negligible effects on fish would occur. However, recent findings suggest that there is no threshold below which increased fine-sediment delivery will be harmless (Suttle et al., 2004). That study also found that sediment reduction could produce immediate benefits for salmonid restoration. When combining the modeled activities with the improvements, increased short-term spikes in sediment is likely; however, long-term reduction from chronic sources, such as roads and fords are expected.

An important concept in assessing effects on fish habitat from increases in surface sediment erosion for this project is that both the FISHSED and NEZSED models represent peak sediment yields, which in this case are temporary. The final result of the project would be reduced road density and improvement in various existing baseline conditions, including a long term reduction in sediment yield and delivery to salmonid habitat. The consequence of long-term improvement in watershed condition is a short-term increase, or spike, in surface sediment yield, which must occur in order for the long-term goal of improvement to occur.

Short-term risks of increased sediment yields have been considered in the context of long-term improvement in watershed and stream habitat condition.

Sediment Effects Analysis and Modeling of Aquatic Habitat Effects

As displayed in Tables 3.6.10–3.6.12 above, all action alternatives have identified varying levels of modeled sediment yield, corresponding effects to cobble embeddedness, and related effects to fish summer rearing and winter rearing habitat. Short-term modeled increases in sediment yield may be of a magnitude where changes in cobble embeddedness may result in a modeled slight decrease in summer or winter rearing capacity. When interpreting these results, it is important to note that peak sediment yields modeled by FISHSED include sediment yield from both existing (legacy) sources and sources proposed under the action alternatives. With the exception of three subwatersheds, sediment yield from legacy sources comprises the majority of the peak, and contributions from alternatives when considered alone would probably not affect the above streams or have measured instream increases.

As discussed above, increases in sediment yield could occur from road construction, vegetation treatments, road reconditioning, and road decommissioning, all of which have been included in the sediment model NEZSED. In addition, increases in sediment could occur from stream crossing upgrades and riparian restoration projects. Temporary increases in suspended sediment (i.e., turbidity) are likely from stream crossing restoration, riparian restoration projects, culvert installations, and construction of the Queen Creek re-connect channel.

Since mainstem American River and some of the tributaries already exhibit high levels of deposited sediment, the question becomes not so much how much sediment is yielded to the stream but what happens to it once it gets there. Sediment transport within a stream is affected by gradient and flushing flows. Fish bearing streams within the analysis area are comprised of both low gradients and/or small watersheds with relatively low peak average flows. Lower gradient stream reaches are particularly susceptible to sediment deposition and long-term storage.

Of the streams within the analysis area which may be affected by the project, Middle American River, Lower American River, East Fork American River, Little Elk Creek, and Elk Creek all have a substantial portion of their length with a gradient less than 2 percent. Conversely, Whitaker Creek, Queen Creek, Box Sing Creek, and Kirks Fork have substantial portions of their lengths that are greater than 4 percent. With regard to sediment deposition and transport, the Rosgen stream classification system suggests that A channels are relatively high in sediment transport capacity, followed by B channels, and C, E, and F channels (Rosgen, 1996). A and B channels in the American River watershed are generally found in lower order headwater reaches. The mainstem South Fork Clearwater River is a low gradient C channel in the river reach immediately below the confluence of American and Red Rivers.

Overall, all action alternatives are very similar, and the differences of peak year high sediment yield predictions is generally between 0 (no difference for all alternatives) to 4 percent. The subwatersheds with the greatest differences between one or more alternatives include Lower American, Whitaker, Box Sing and Queen Creek. For all action alternatives, subwatershed peak year increases above existing conditions range from 0.1 to 27 percent. Subwatersheds with the highest range of alternative increases include Whitaker Creek (31 to 58 percent), Box Sing Creek (21 to 47 percent), Queen Creek (37 to 59 percent) and Lower American (15 to 22 percent).

Subwatersheds with low to moderate peak year high increases include: Middle American River (12 to 17 percent), Lower Elk Creek (16 to 18 percent), Kirks Fork (5 to 7 percent), East Fork American River (11.8 to 12.2 percent), and Little Elk Creek (23.8 to 23.9 percent).

Maximum modeled sediment yields for Whitaker Creek, Queen Creek, and Box Sing Creek range from 34 to 59 percent. Compared to other American River subwatersheds, these subwatersheds are very small, and sensitivity to sediment modeling is compounded. The general threshold at which FISHSED model assumes measurable deposition in B channels is peak sediment yields that exceed 30 percent over natural. No-treatment buffers and project design features to minimize or prevent erosion and sediment delivery are expected to result in negligible amounts of sediment reaching stream channels in these watersheds.

Maximum modeled sediment yields for Little Elk Creek and Lower American River range from 22 to 24 percent. The general threshold at which FISHSED model assumes measurable deposition in C channels is at peak sediment yields that exceed 20 percent over natural. The majority of sediment in these watersheds is from legacy sediment and not from the Eastside Project.

The maximum predicted increase over existing from project implementation for Little Elk Creek is 0.1 percent for all alternatives. All peak sediment yields modeled for Little Elk Creek are attributed to legacy sediment and increases from action alternative implementation would be discountable.

The maximum predicted increase over existing for Lower American River ranges between 1 and 7 percent for all action alternatives. The majority of predicted peak sediment yield for Lower American River is attributed to legacy effects and lower amounts are attributable to the action alternatives. However, the FISHSED model assumption is that measurable effects would occur to fish habitat in the Lower American River subwatershed. Restoration measures to reduce chronic sources of sediment (e.g., roads, fords, dredge mined areas) along with no-treatment buffers (timber harvest, prescribed burning), and project design features to minimize or prevent erosion and sediment delivery are expected to result in negligible sediment reaching American River.

Maximum modeled sediment yields for Middle American River, East Fork American River, and Lower Elk Creek range from 12 to 18 percent. Based on the FISHSED model assumptions for C channels, measurable deposition would probably not be detectable because modeled sediment yields do not exceed 20 percent over natural.

Kirks Fork modeled maximum sediment yield would not exceed 10 percent and based on FISHSED model assumptions for B channels, measurable deposition would probably not be detectable because modeled sediment yields do not exceed 30 percent over natural. This subwatershed does not approach threshold levels and effects to fish habitat would be negligible.

In summary, there are predicted short-term spike sediment yield increases and long-term chronic sediment yield decreases associated with the project. These changes in sediment yield should be reflected in substrate conditions, but over longer periods of time. Accurate predictions for recovery rates for deposited sediment (i.e., surface fines, cobble embeddedness, fines by depth) is very difficult, and in addition to land uses is also dependent on variables such as channel morphology, geologic parent material, stream channel characteristics, climate, and natural disturbance events. The BLM has been monitoring deposited sediment in the American River watershed since the 1980s. Monitoring is conducted at the same site because of high instream variability. Additional substrate measurements and observations at sites are made to assist with data interpretation.

Alternative A (No Action Alternative)

Under the "no action" alternative, the existing substrate condition would probably improve very slowly over time. Because of historic dredge mining and associated legacy effects to riparian habitats and stream channels, natural recovery would be negligible in some stream reaches without active restoration taking place. Restoration improvements in the watershed may occur as funding became available and substrate conditions in streams would likely be stable to slightly improving. The risk of more severe wildfire would increase over time in the absence of vegetation treatments. With severe wildfire, there are risks associated with pulses of sediment delivered rapidly to streams, which could adversely affect habitat already impaired by past human activities.

Benefits of Alternative A include no further ground-disturbing activities, which would result in no additional human-caused spikes of sediment. This alternative would not address the need for active stream, watershed and soils restoration. However, the BLM has an ongoing watershed and fisheries restoration program which would continue to address restoration various actions as funding becomes available.

Common to all Action Alternatives–Alternatives B, C, and D

Timber Harvest and Associated Roads–Effects on Sediment Delivery

Established RHCAs widths are expected to be very effective at protecting streams from non-channelized sediment. RHCAs may not totally protect streams from sediment production that is carried in channelized flow. However, this would be unexpected for the Eastside Project because only one small segment of temporary road (Alternative D) crossing an intermittent stream channel, no other temporary roads or skid trails associated with timber harvest cross any stream channels. Negligible or discountable amounts of sediment would be expected to reach channels.

Refer to previous Tables 3.6.10, 3.6.11, 3.6.12, and 3.6.13 for a summary of action alternatives modeled erosion/sediment effects to cobble embeddedness and summer and winter rearing habitats.

One helicopter landing would be located within the American River RHCA; the landing would be located 200–300 feet from American River and occurs in an area that does not have drainage slope that would deliver erosion or sediment to American River. Access to the landing would include the use of 0.07 mile of existing road and the landing area would be less than one acre in size. The landing occurs in a meadow area and no tree harvest would occur. After timber harvest is completed, landing restoration actions would

be implemented to reduce adverse effects to soils and vegetation, which include ripping (reduce soil compaction), seeding, and weed control measures. No short or long-term adverse water temperature or sediment effects to American River are expected to occur from use of this landing.

No timber harvest is proposed within streamside and wetland RHCAs or in landslide prone RHCAs. No short-term or long-term increase in risk of mass wasting and landslide type disturbance is expected to occur from Eastside Project actions. Eastside Project action alternative actions which affect erosion and sediment processes have the ability to directly or indirectly affect water quality and fish habitat in the short-term and long-term. For additional project related short-term and long-term effects to these processes refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Alternative B

A short-term spike from restoration and timber harvest/fuel treatments would occur. A long-term reduction of baseline sediment yield from chronic sediment sources would result from restoration activities and aid in recovery of watershed and aquatic conditions.

Primary restoration benefits and reduction in sediment would occur in the mainstem American River (i.e., Middle American River and Lower American River). Restoration actions include decommissioning roads, re-location of roads out of the riparian area, stream ford crossing obliterations, reduction of road related sediment by converting roads to ATV trails, and riparian restoration.

Winter rearing is a limiting factor for fish production within the analysis area. Sediment analysis conducted specifically in regards to winter rearing habitat and comparison of alternatives has predicted Alternative B as having the largest modeled negative changes to winter rearing habitat from increased sediment. These predicted changes would occur in Whitaker Creek and Queen Creek. Predicted habitat changes in all other watersheds would be less than 10% and, according to the FISHSED model protocols, would be undetectable. The reconnection channel of Queen Creek to American River would allow access to additional habitat and the channel would be designed to provide additional winter rearing habitat.

This alternative has the highest amount of new temporary roads (15.1 miles) identified for timber harvest, the majority of the roads are located on ridge tops or upper slopes. This alternative has the highest amount of timber harvest and fuel treatments proposed and totals 1,293 acres. No temporary road construction would occur in any RHCAs.

For additional project related short-term and long-term effects from erosion and sediment processes specific to Alternative B actions refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Alternative C

This alternative has the highest amount of watershed restoration actions identified. Under Alternative C, the percent over base sediment would have the least short-term peak associated with the implementation of timber harvest activities and sediment risks to winter rearing habitat.

Winter rearing is a limiting factor for fish production within the analysis area. Sediment analysis conducted specifically in regards to winter rearing habitat and comparison of alternatives, has predicted Alternative C as having the smallest modeled negative changes to winter rearing habitat from increased sediment. Predicted habitat changes in all watersheds would be less than 10% and, according to the FISHSED model protocols, would be undetectable.

Various soil restoration treatments, fish passage improvements, and native vegetation restoration would result in improvement to watershed conditions. An additional restoration action that is included in this alternative is the decommissioning and restoration of 0.89 mile of road paralleling American River and a stream ford located at stream mile 12.8. The reduced baseline sediment yield resulting from road

decommissioning and other improvement activities would aid in recovery of the watersheds, and it is expected that fish habitat conditions would improve over time.

This alternative has the least amount of temporary roads (10.5 miles) identified for timber harvest, the majority of the roads are located on ridge tops or upper slopes. This alternative has the second highest amount of timber harvest proposed and totals 1,284, which is only 10 acres less than alternative B.

A new access road for the American River subdivision includes the construction of 0.56 mile of permanent road and the construction of a new vehicle bridge. Approximately 0.12 mile of the new road would be constructed within the RHCA. Erosion and sediment measures would be implemented to reduce adverse water quality effects to American River. Several trees would be cut within the riparian area; however, no adverse water temperature effects are anticipated to occur from this action and short-term and long-term sediment effects are expected to be negligible.

For additional project related short-term and long-term effects from erosion and sediment processes specific to Alternative C actions refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Alternative D

Winter rearing is a limiting factor for fish production within the analysis area. Under Alternative D, the percent over base sediment would be similar to Alternative B in regards to short-term peak associated with the implementation of timber harvest activities and sediment risks to winter rearing habitat in the Whitaker Creek watershed. Predicted habitat changes in all other watersheds would be less than 10% and, according to the FISHSED model protocols, would be undetectable. Various soil restoration treatments, fish passage improvements, and native vegetation restoration, would support improvement of watershed condition. The reduced baseline sediment yield resulting from road decommissioning and other improvement activities would aid in recovery of the watersheds, and it is expected that fish habitat conditions would improve over time.

This alternative has the second highest amount of temporary roads (10.7 miles) identified for timber harvest, the majority of the roads are located on ridge tops or upper slopes. This alternative has the lowest amount of timber harvest proposed and totals 1,171 acres.

A new access road for the American River subdivision includes the construction of 0.56 mile of permanent road and the construction of a new vehicle bridge. Approximately 0.12 mile of the new road would be constructed within the RHCA. Erosion and sediment measures would be implemented to reduce adverse water quality effects to American River. Several trees would be cut within the riparian area. Short-term and long-term sediment effects are expected to be negligible.

For project related short-term and long-term effects from erosion and sediment processes specific to Alternative D actions refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Irreversible and Irretrievable Effects–Sediment/Substrate Condition

There are no known irreversible or irretrievable effects associated with the sediment/substrate condition indicator.

Cumulative Effects–Sediment/Substrate Condition

The cumulative effects analysis area for sediment and substrate is the American River watershed and the upper South Fork Clearwater River to just downstream of the mouth of Crooked River.

As previously described, the current condition of the American River watershed reflects past events that have elevated base sediment yields above natural levels. In its pre-development condition, deposited

sediment in American River, tributaries, and the South Fork Clearwater River was probably substantially less than the current condition.

Activities contributing to the change from historic to existing condition of the deposited sediment indicator are generally associated with road construction, continued existences of roads and high road density on the landscape, roads in riparian areas, in-channel dredge mining and placer mining in and adjacent to stream channels, timber harvest that emphasized tractor yarding, grazing of domestic livestock, and rural and urban development.

There are a number of on-going and proposed activities in the American River watershed involving BLM, NPNF, and private lands. A list of these projects is provided in Table 3.0.1. Past events and activities occurring within the analysis area, and affecting American River, tributaries, and the South Fork Clearwater River have been discussed throughout this document. The existing condition of the watershed and aquatic habitats reflect the past disturbance history.

Cumulative sediment effects in the American River watershed analysis area and the South Fork Clearwater River have been quantified through the NEZSED model, which included sediment from timber harvest, road construction, road reconstruction, road decommissioning, and prescribed fire. Refer to Section 3.4 (Watershed) for specific and additional cumulative sediment analysis information. Road to trail conversions, riparian restoration, fish passage projects, and instream fish habitat improvements were not included in the model. Specific projects that were modeled for the Eastside Project include NPNF American and Crooked River Project, timber harvest and road construction on private lands, and road decommissioning. The results of cumulative effects sediment modeling follow through to FISHSED, which was used to address cumulative sediment effects to cobble embeddedness, summer rearing capacity, and winter rearing capacity.

Table 3.6.14 Comparison of Predicted Cobble Embeddedness (CE) by Alternative, Including Effects of NPNF American and Crooked Project & Recent Timber Harvest on Private Lands

Stream/Composite/Channel Type	Predicted Percent (%) CE			
	Alt A (Legacy[2])	Alt B	Alt C	Alt D
Middle American River/C[1]	40 (42)	43	43	43
Lower American River/C[1]	31 (33)	35 (2006)	35 (2006)	35 (2006)
		35(2007)	34(2007)	34(2007)
East Fork American River/C[1]	44 (46)	47	47	47
Whitaker Creek/B	56 (59)	61 (2006)	61 (2006)	61 (2006)
		61 (2007)	59 (2007)	61 (2007)
Queen Creek/B	42 (45)	47 (2006)	47 (2006)	47 (2006)
		47 (2007)	46 (2007)	46 (2007)
Box Sing Creek/B	44 (46)	48	48	48
Kirks Fork/B	45 (45)	46	46	46
Elk Creek/C[1]	64 (67)	67	67	67
Little Elk Creek/C	56 (60)	60	60	60
South Fork Clearwater River/C[1]	30 (33)	33	33	33

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.

[2] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base). Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

Table 3.6.15 Comparison of Summer Rearing Capacity (SRC) by Alternative, Including Effects of NPNF American and Crooked River Project and Recent Timber Harvest on Private Lands

Stream/Composite/Channel Type	Predicted Percent (%) SRC			
	Alt A (Legacy[2])	Alt B	Alt C	Alt D
Middle American River/C[1]	89 (88)	88	88	88
Lower American River/C[1]	94 (93)	92 (2006)	92 (2006)	92 (2006)
		93(2007)	93(2007)	93(2007)
East Fork American River/C[1]	87 (88)	85	85	85
Whitaker Creek/B	79 (77)	75 (2006)	75 (2006)	75 (2006)
		75 (2007)	76 (2007)	75 (2007)
Queen Creek/B	88 (86)	85 (2006)	85 (2006)	85 (2006)
		85 (2007)	86 (2007)	86 (2007)
Box Sing Creek/B	87 (86)	70	70	70
Kirks Fork/B	87 (86)	86	86	86
Elk Creek/C[1]	72 (70)	70	70	70
Little Elk Creek/C	79 (76)	76	76	76
South Fork Clearwater River/C[1]	94 (93)	93	93	93

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.
[2] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base). Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

Table 3.6.16 Comparison of Winter Rearing Capacity (WRC) by Alt., Including Effects of NPNF American and Crooked River Project and Recent Timber Harvest on Private Lands

Stream/Composite/Channel Type	Predicted Percent (%) WRC			
	Alt A (Legacy[2])	Alt B	Alt C	Alt D
Middle American River/C[1]	35 (34)	33	33	33
Lower American River/C[1]	45 (42)	40 (2006)	41 (2006)	41 (2006)
		42(2007)	42(2007)	42(2007)
East Fork American River/C[1]	32 (34)	30	30	30
Whitaker Creek/B	23 (22)	20 (2006)	20 (2006)	20 (2006)
		20 (2007)	21 (2007)	20 (2007)
Queen Creek/B	34 (31)	29 (2006)	29 (2006)	29 (2006)
		29 (2007)	31 (2007)	30 (2007)
Box Sing Creek/B	32 (30)	18	18	18
Kirks Fork/B	31 (31)	31	31	31
Elk Creek/C[1]	19 (18)	18	18	18
Little Elk Creek/C	23 (21)	21	21	21
South Fork Clearwater River/C[1]	46 (43)	42	42	42

[1] Data compiled for composite watersheds, not pure watersheds. Includes upstream sediment contributing subwatersheds and routed downstream sediment.

[2] Identifies modeled FISHSED effects from legacy/existing sediment (percent over base). Displayed for alternative comparison purposes so that legacy and existing NEZSED modeled sediment (percent over base) effects and Eastside Project action alternative effects can be identified. These are the FISHSED predicted changes attributed to existing levels of sediment over base (Alternative A), with no increases attributed to Eastside Project action.

As indicated in the tables above, addition of cumulative effects from FISHSED modeling is similar to cobble embeddedness levels predicted for the Eastside Project only. The reason for this is staggered NPNF and BLM entries for road construction and timber harvest within specific subwatersheds that potentially may yield elevated modeled sediment yields (i.e., Whitaker Creek and Queen Creek). The staggered entry would reduce potential sediment spikes that may occur if all FS and BLM soil disturbing actions occurred in the same year. In addition, a considerable number of sediment sources cannot be modeled in NEZSED and are therefore not reflected in the above results of FISHSED. Sediment sources such as past and active mining activity, grazing, trails, instream fish habitat restoration, and sediment sources from mass wasting are not included in NEZSED calculations. However, by using actual data for the cobble embeddedness measures, the legacy impact of these activities is included in the summer and winter rearing habitat analysis. Of these, past mining activity and private land grazing (in some subwatersheds), and urban/rural development have contributed to sediment loading in the watershed. The BLM is currently cooperating with Framing Our Community on several projects that would occur in the foreseeable future and would reduce sediment production on BLM and private lands. These actions include additional fencing of the stream corridor along Elk Creek to prevent livestock grazing and decommissioning of road segments on private and BLM lands.

One specific BLM planned (2007–2008) restoration action (USDI-BLM, 2006) that would directly affect this indicator includes the Telephone Creek road to ATV trail conversion and channel re-connect project. The Telephone Creek road (0.9 mile) which occurs in the stream bottom has been identified as a chronic source of sediment to Telephone Creek and American River (USDI-BLM, 2006).

In summary, American River and tributaries are subject to cumulative sediment effects due to past impacts in the watershed and the existing degraded condition. Additional sediment, regardless of the source, could further impact deposited sediment and other associated habitat elements. This could adversely affect listed and BLM sensitive fish in the project area. Sediment impacts are expected to decline, and fish habitat condition is expected to improve in the long-term, resulting in higher habitat condition than currently exists. Of the alternatives, Alternative B presents the greatest risk in terms of cumulative sediment risks and Alternative C presents the least risk. Alternative A, while presenting no short-term risks, would also not result in long-term improvement in watershed condition or the deposited sediment indicator. The action alternatives (Alternative C and D) only include one long-term new chronic sediment source (negligible effects) for the American River stream channel/riparian area, which is the new vehicle bridge and new permanent road. It is acknowledged that ongoing BLM and NPNF restoration actions would continue, which would result in long-term benefits to watershed and aquatic habitats.

3.6.3.3 Indicator 2–Large Woody Debris Analysis

Direct and Indirect Effects–Large Woody Debris Analysis

Alternative A (No Action Alternative)
No instream improvement work is planned under this Alternative to improve LWD. BLM has an ongoing restoration program which would continue, and dependent on funding, future restoration actions could continue to take place, and actions that install LWD would result in beneficial effects to treated stream reaches. With increased dead and dying lodgepole pine or other trees having potential to fall into streams, it is expected that LWD conditions would continue to improve with time within the analysis area.

The risk of a severe wildfire would increase over time in the absence of vegetation treatments. With severe wildfire, there are risks associated with impacts to riparian trees, which would affect LWD in the

short and long-term. Generally, with stand replacing fires, fire-killed trees would provide an abundance of LWD as trees fall into the stream.

Alternatives B, C, and D
Research indicates that with the established RHCA buffers, harvest activities would be expected to have negligible effects on large woody debris recruitment. Because no timber harvest would take place within any RHCAs under all action alternatives, harvest activities would be expected to present a negligible risk of retarding attainment of temperature or LWD RMOs or causing adverse impacts to this management indicator.

No instream improvement work to install LWD is proposed with this project. PACFISH guidance would be applied to streamside, landslide prone and wetland RHCAs. No actions that would adversely impact this indicator are proposed. Decommissioning roads in riparian habitats and riparian restoration actions would result in long-term improvements for large woody debris recruitment. Alternative C has the highest level of riparian restoration actions, followed by Alternatives B and D.

Eastside Project action alternative actions which affect riparian condition and LWD processes have the ability to directly or indirectly to affect instream cover conditions and pool quality and quantity. For additional project related short-term and long-term effects to these processes refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Irreversible and Irretrievable Effects–Large Woody Debris

There are no known irreversible or irretrievable effects associated with the large woody debris indicator.

Cumulative Effects–Large Woody Debris

The cumulative effects analysis area for large woody debris is the American River watershed and the upper South Fork Clearwater River to just downstream of the mouth of Crooked River.

Similar to deposited sediment, the existing condition of this indicator reflects a long history of human development in this watershed. Riparian encroachment by roads has affected streamside conditions in the American River watershed, including large woody debris. The presence of streamside roads generally results in the permanent removal of large woody debris, sometimes all the debris, that otherwise could be recruited into streams. Riparian areas throughout the watershed have been affected by past road streamside road construction, dredge mining activities, domestic livestock grazing, and timber harvest. Rural home construction and development has encroached on riparian habitats, particularly within the Elk City township (e.g., American River subdivision). The RHCA road density for the entire American River watershed is 1.9 miles per square mile, it expected that this density would be higher within the Elk City township for roads occurring streamside or within riparian areas, because many roads parallel streams and provide private land access. The continued existence of streamside roads generally translates into reduced ability of stream to recruit wood.

Significant lengths and areas of American River, Buffalo Gulch, and Little Elk Creek, and other streams were subjected to flood plain and in-channel placer and dredge mining that generally eliminated most or all of the large woody debris. Dredge mining additionally resulted in dredge piles that are primarily composed of cobble/gravel material. Soils in dredge and placer-mined areas have been removed, and sterile tailing piles remain in localized areas. Soil and riparian vegetation (e.g., trees) recovery has been very slow and some of these areas still are relatively devoid of vegetation (e.g., riparian vegetation, trees, shrubs). The conditions created by historic mining activities continue to affect riparian and floodplain processes, including growth and recruitment of large woody debris.

Effects from implementation of Alternatives B, C, and D are unlikely to contribute to reduction of LWD, when considered cumulatively with past contributors to the degraded condition. With the exception of a new public access road and vehicle bridge (American River) (Alternatives C and D); and a temporary

road constructed for timber harvest (intermittent non-fish bearing stream) (Alternative D); no additional streamside roads would be constructed adjacent to or cross any streams. No tree harvest would occur within any RHCAs and no LWD would be removed from channels. Implementation of restoration actions, specifically streamside road decommissioning and riparian restoration is expected to contribute to improvement of LWD over time. In addition, increased natural LWD recruitment is expected to continue, even in the absence of restoration. Dead and dying lodgepole pines that occur within riparian areas are expected to be a primary LWD source along some stream channels.

There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of Chapter 3 could affect the large woody debris indicator include NPNF American and Crooked River Project, proposed BLM restoration actions, private land restoration actions, private land timber harvest and road construction, and firewood cutting. Specific BLM planned restoration actions (USDI-BLM, 2006) that would directly affect this indicator includes the installation of LWD, in addition to construction of pool habitats and installation of habitat rocks in 3.4 miles of American River (foreseeable future 2007–2009). The BLM implemented a similar project in 2.5 miles of American River during 1992. Pre- and post-project monitoring of this restoration project documented that sub-optimal LWD levels of 1–2 pieces occurred in dredge mined reaches and was improved to over 15 to 20 pieces per 100 meters and supported meeting LWD objectives for American River.

3.6.3.4 Indicator 3–Pool Habitat Analysis

Direct and Indirect Effects–Pool Habitat Analysis

Alternative A (No Action Alternative)
This alternative would not implement specific watershed improvement projects or construction of pool habitats. Chronic sources of erosion/sediment such as stream fords, roads, and historic dredge mined areas would continue to contribute sediment to stream channels and subsequent pool filling. BLM has an ongoing restoration program which would continue and, dependent on funding, future restoration actions would continue to take place, and actions that construct pools, install LWD, or reduce erosion would result in beneficial effects to pool quality and quantity within treated reaches and watersheds.

In addition, increased natural LWD recruitment is expected to continue, even in the absence of restoration. Along some stream reaches, dead and dying lodgepole pine occurring in riparian areas and streamside are expected to be a primary LWD source. LWD recruitment would support creation of additional pools and improve instream cover. Existing non-point sediment sources would slowly recover over time and pool habitat would slowly improve.

Alternatives B, C, and D
No instream improvement work for pool construction is planned in American River or tributaries, except the Queen Creek reconnect. The small reconnection channel would be designed to provide some pool structure, as well as improved riparian vegetation and LWD. Short-term increases in sediment would occur but no measurable effects to pool habitats are expected to occur in American River. A limited amount of new permanent roads and a new vehicle bridge (Alternatives C and D) is planned to occur within RHCAs under the action alternatives, consequently negligible sediment effects or impacts to riparian habitats is expected from these actions. However, watershed, watershed improvement projects and road decommissioning would reduce sediment sources and would likely improve pool habitat over time with the reduction of chronic sediment sources attributed to roads, fords, and historic dredge mined areas. Actual pool quality and quantity would improve in the long-term with restoration actions that improve riparian habitats and large woody debris recruitment to stream channels.

Alternative C restoration actions have greatest potential to improve riparian habitats, LWD recruitment, and reduce sediment to streams, which would improve pool quality and quantity in the long-term and is followed by Alternatives B and D.

Eastside Project action alternative actions which could affect riparian condition, erosion, sediment, and LWD processes have the ability to directly or indirectly to affect pool quality and quantity. For additional project related short-term and long-term effects to these processes refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Irreversible and Irretrievable Effects–Pool Habitat

There are no known irreversible or irretrievable effects associated with the large pool habitat indicator.

Cumulative Effects–Pool Habitat

The cumulative effects analysis area for pool habitat debris is the American River watershed.

The quantity and quality of pools and the effects from historic events have been previously discussed. Accelerated sediment yield has resulted in reduction of pool volume. Streamside land uses such as road construction, in-channel/riparian mining, and riparian development that removed existing LWD, reduced LWD recruitment potential. LWD is a primary factor for pool creation in many streams.

Effects from implementation of Alternatives B, C, and D are unlikely to contribute to reductions in pools and pool volume, as discussed previously, even when considered cumulatively with past contributors to the degraded condition. With the exception of a new public access road and vehicle bridge (American River) (Alternatives C and D); and a temporary road constructed for timber harvest (intermittent non-fish bearing stream) (Alternative D); no additional streamside roads would be constructed adjacent to or cross any streams. No tree harvest would occur within any RHCAs. Implementation of restoration actions, specifically streamside road decommissioning and riparian restoration is expected to contribute to improvement of pool habitat over time. In addition, increased natural LWD recruitment is expected to continue, even in the absence of restoration.

There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of Chapter 3 that could affect the pool habitat indicator (quality and quantify) include NPNF American and Crooked River Project, proposed BLM restoration actions, private land restoration actions, private land timber harvest and road construction, and firewood cutting. Specific BLM planned restoration actions (USDI-BLM, 2006) that would have direct affect on this indicator includes the construction of pool habitat (construction of upstream rock “v” check dams) and installation of LWD and habitat rocks in 3.4 miles of American River (foreseeable future 2007–2008). The BLM implemented a similar project in 2.5 miles of American River during 1992. Pre- and post-project monitoring of this restoration project documented that sub-optimal pool:riffle ratio of 20:80 was improved to desired objectives of 35:65–50:50 ratios. In addition, the installation of LWD in pool habitats created high quality instream cover for the recently constructed pools. Consequently, this foreseeable future action is predicted to improve quality and quantity of pools within treated reaches in Lower and Middle American River.

3.6.3.5 Indicator 4–Water Quality Analysis (Toxics and Temperature)

Direct and Indirect–Water Quality Analysis (Toxics and Temperature)

Toxics–Alternative A (No Action Alternative)
Historic dredge mining resulted in some accumulation of heavy metals and introduction of mercury, since it was often used as an amalgam in the gold mining process. The risks of historic mining related hazardous material impacting water quality or aquatic resources would not change from existing conditions because no disturbance to historic mined areas is proposed.

Under this alternative, no use of herbicides, fuels, or any fire suppression chemicals is proposed above current levels. The risk of these materials entering streams would remain unchanged from the existing condition. All herbicide application would be in accord with BLM's multi-year program submittal and completion of Section 7 consultation. Application of herbicides within riparian areas and RHCAs would be ground based and risks would be at low levels to aquatic organisms and non-target vegetation.

Toxics–Alternatives B, C, and D
Toxic materials used under the action alternatives include fossil fuel derivatives, including diesel fuel, hydraulic fuel, various petroleum-based lubricants, and gasoline.

The two factors determining the degree of risk from toxic materials are the toxicity of the chemical and the likelihood that non-target organisms would be exposed to toxic doses (Norris et al., 1991). Toxicity alone does not make a chemical hazardous; exposure to a toxic dose must also occur. Chemicals may enter water by one or more of the following routes: direct application, drift, and mobilization in ephemeral stream channels, overland flow, and leaching (Norris et al., 1991).

In addition, fueling and storage of fuels is addressed with specific Eastside Project design measures. Transport of fuels is regulated through project design measures that minimize the risk of accidents or accidental introduction of these materials to streams. Therefore, the risk of fuel delivery to streams is considered extremely unlikely to occur.

Historic dredge mining of the American River stream bottom resulted in some accumulation of heavy metals and introduction of mercury, since it was often used as an amalgam in the gold mining process. There is some potential to liberate mercury during the implementation of restoration projects that involve disturbance of historic mined areas, stream channels, substrate materials, and streambanks. The potential to release mercury in harmful amounts is considered to be slight because of historic leaching beyond the depths of disturbance and/or mobilization during the dredge mining process. It is expected that depth of restoration disturbance and remaining buffer material would reduce or eliminate the potential of intercepting adverse amounts of heavy metals during excavation which may reside at the bedrock level.

The Eastside Project design measures identified for equipment fueling and maintenance would minimize the risks associated with accidents, spills, or introduction of fuels to fish bearing waters.

Stream Temperatures–Alternative A (No Action Alternative)
Stream temperatures within the analysis area would remain unchanged over the short-term. Some improvement may occur over time as vegetation recovers in areas where shade has been reduced from past activities or where dredge mining has resulted in over-widened, shallow streams. Road encroachment in riparian areas has also reduced shrub and trees shading potential along some stream reaches. Historic dredge mining along some stream reaches has severely altered and disturbed the streambottoms, floodplains, riparian areas, and stream channels. Some of these mined areas contain dredged materials that are still relatively devoid of shrubs and trees. These dredge materials may contain gravel and cobble materials that are lacking in soils which promote vegetation growth.

Lack of vegetation treatments may contribute to continued accumulation of fuels, potentially resulting in more severe wildfires, which, depending on size, severity, and location, could affect water temperature.

Effects would be dependent on amount of stand replacing fire that occurred within riparian habitats and changes resulting to shading.

Stream Temperatures–Alternative B, C, and D
Since harvest of timber within streamside RHCAs is not proposed under any of these alternatives, the risk of adverse effect on stream temperature is discountable, or extremely unlikely to occur. Riparian restoration actions and decommissioning of roads within RHCAs and riparian areas result in improved shading and riparian conditions in the long-term.

A new access road for the American River subdivision includes the construction of 0.56 mile of permanent road and the construction of a new vehicle bridge for Alternatives C and D. Approximately 0.12 mile of the new road would be constructed within the RHCA. Several trees would be cut within the riparian area; however, short-term and long-term riparian condition, stream shading, and water temperature effects are expected to be discountable.

Alternatives B and C include the relocating and decommissioning of an existing road (0.53 mile) which parallels American River within the riparian area, to a toeslope area. This action would include the construction of 0.57 mile of new road in the toeslope area, a portion of this new road would utilize an old existing road prism (0.22 mile). Moving the road out of the stream bottom area and implementation of riparian restoration actions would improve riparian habitat conditions and shading along this stream reach in the long-term. A small portion of the new road construction would occur in the American River RHCA. Tree cutting for the new road would be more than one tree distance in length from American River, consequently no tree shading or water temperature effects are expected to occur to American River from this action.

Alternative D includes the construction of approximately 300 feet of new temporary road within the American River RHCA. This road would also cross a small intermittent stream that drains into dredge ponds. Tree cutting for the temporary road would be more than one tree distance in length from American River, consequently no tree shading or water temperature effects are expected to occur to American River from this action.

Alternative C restoration actions have greatest potential to improve riparian habitats, shading, and water temperatures in the long-term, and is followed by Alternative B and D.

The restoration activities should moderate current stream temperature levels, and possibly decrease stream temperature in the long-term with growth of streamside trees and shrubs, and subsequent increased shading. For additional project related short-term and long-term effects to riparian shading, riparian condition, and water temperature processes specific to the action alternatives, refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Irreversible and Irretrievable Effects–Water Quality

There are no known irreversible or irretrievable effects associated with the water quality indicator.

Cumulative Effects–Water Quality

The cumulative effects analysis area for toxics is the American River watershed. The American River watershed and the upper South Fork Clearwater River to just downstream of the mouth of Crooked River are the cumulative effects analysis area for water temperature.

The two factors determining the degree of risk from toxic materials are the toxicity of the chemical and the likelihood that non-target organisms would be exposed to toxic doses (Norris et al., 1991). Toxicity alone does not make a chemical hazardous; exposure to a toxic dose must also occur. Chemicals may enter water by one or more of the following routes: direct application, drift, and mobilization in ephemeral stream channels, overland flow, and leaching (Norris et al., 1991).

Toxics
There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of Chapter 3 that could affect water quality and toxics include NPNF American and Crooked River Project, herbicide application on private and public lands, proposed BLM restoration actions, private land restoration actions, private land timber harvest and road construction, and hauling or storage of fuels. Risks do occur for an accidental hazardous material spill or toxic materials reaching live waters, consequently streamside uses of toxic material in close proximity to riparian areas and streams have higher risks. Safe guard measures generally are used when using large quantities of hazardous or toxic materials. Various restoration, road construction, and mining operations that take place on historic mined areas have the potential to liberate mercury. Overall, risks from such actions are considered low because of probable leaching of such toxic material below expected disturbance depth.

The potential for the introduction of toxic materials reaching aquatic habitats has been previously discussed. In summary they include: mining operations, herbicide application, use and storage of fuels and petroleum products, and fire suppression chemicals. Historic dredge mining of the American River stream bottom and other streams within the analysis area has resulted in some accumulation of heavy metals and introduction of mercury, since it was often used as an amalgam in the gold mining process.

Effects from implementation of Alternatives B, C, and D are unlikely to contribute to increased risks to water quality from toxic materials, even when considered cumulatively with past, ongoing, and foreseeable actions. There is some potential to liberate mercury during the implementation of restoration projects that involve disturbance of historic mined areas, stream channels, substrate materials, and streambanks. The potential to release mercury in harmful amounts is considered to be slight because of historic leaching beyond the depths of disturbance and/or mobilization during the dredge mining process.

In addition, fueling and storage of fuels is addressed with specific Eastside Project design measures. Transport of fuels is regulated through project design measures that minimize the risk of accidents or accidental introduction of these materials to streams. Therefore, the risk of fuel delivery to streams is considered extremely unlikely to occur.

Water Temperature
There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of Chapter 3 could affect riparian conditions and improved shading of streams within the analysis area include NPNF American and Crooked River Project, proposed BLM restoration actions, private land restoration actions, private land timber harvest and road construction, and firewood cutting.

The existing condition of this indicator reflects a long history of human development in this watershed. Encroachment by roads has affected streamside/riparian conditions in the American River watershed, including shading and water temperatures. The presence of streamside roads generally results in the permanent removal of riparian vegetation and associated stream shading. Riparian areas throughout the watershed have been affect by past streamside road construction, dredge mining activities, domestic livestock grazing, and timber harvest. Rural home construction and development has encroached on riparian habitats, particularly within the Elk City township (e.g., American River subdivision).

Significant lengths and areas of American River, Buffalo Gulch, and Little Elk Creek, and other streams were subjected to in-channel placer and dredge mining that degraded riparian areas and stream channels. Soils in dredge and placer-mined areas have been removed, and sterile tailing piles remain in some areas. Soil and riparian vegetation (e.g., trees) recovery has been very slow and some of these areas still are

relatively devoid of vegetation (e.g., riparian vegetation, trees, shrubs). The conditions continue to affect riparian and floodplain processes, including riparian vegetation establishment, growth, and shading to streams.

Domestic livestock grazing continues to occur within the watershed on private, NPNF, and BLM lands. Private land grazing is prevalent in the large meadows associated with Elk Creek, Big Elk Creek, and Little Elk Creek. Grazing on BLM and NPNF lands within the watershed has been conducted at levels to minimize or reduce effects to riparian vegetation and listed fish. Some private land grazing still occurs at levels that result in localized adverse impacts to riparian vegetation and streambanks, which have direct and indirect effects on water temperature (e.g., Elk Creek).

Effects from implementation of Alternatives B, C, and D are not expected to adversely affect water temperature within the analysis area, when considered cumulatively. With the exception of a new public access road and vehicle bridge (American River) (Alternatives C and D); and a temporary road constructed for timber harvest (intermittent non-fish bearing stream) (Alternative D); no additional streamside roads would be constructed adjacent to or cross any streams. No tree harvest would occur within any RHCAs. Implementation of restoration actions, specifically streamside road decommissioning and riparian restoration is expected to contribute to improved riparian conditions, stream shading, and improvements to water temperature. In addition, natural recovery to riparian areas and improved shading would also occur.

3.6.3.6 Indicator 5–Water Yield Analysis

Direct and Indirect Effects–Water Yield

Section 3.4 (Watershed) discusses changes in ECA for affected watersheds in the project area. Alternative A displays the existing condition for each watershed. None of the alternatives propose increases in water yield that are expected to result in channel degradation or long-term impacts to fish habitat.

Alternative A (No Action Alternative)
Under this alternative, ECA and any changes in water yield from past activities would continue to recover, except for areas affected by land uses that result in soil compaction, such as past tractor logging, dozer piling, and log landings. These areas are affected by low soil infiltration rates and may not recover in the absence of soil and other watershed restoration efforts. In addition, existing roads would continue to contribute towards ECA, and recovery, if any, would occur extremely slowly in the absence of road decommissioning and soil restoration. Lack of vegetation treatments may contribute to continued accumulation of fuels, potentially resulting in more severe wildfires, which, depending on size, severity, and location, could result in significant water yield changes. Significant water yield changes could result in adverse effects on habitat not fully recovered from past impacts.

The benefits of this alternative, with respect to ECA and water yield, include no short-term changes in ECA and thus, no potential short-term changes in water yield and habitat condition.

Alternatives B, C, and D
A complete ECA analysis is included in Section 3.4 (Watershed). ECA would increase as a result of implementation of these alternatives. Road decommissioning and soil restoration contribute to a reduction in compaction, thus improving infiltration and reducing surface runoff. This effect would be most pronounced in Alternative C and least in Alternative D. The BO for Land and Resource Management Plans set 15 percent ECA as a threshold which triggers a watershed assessment in priority watersheds such as American River. Within the American River watershed, ECA would increase from 9 to 10 percent under all action alternatives. Whitaker Creek and Queen Creek, which support an isolated population of westslope cutthroat trout and no listed steelhead or bull trout, exceed 15 percent under all action alternatives, all other subwatersheds would be below this threshold. Implementation of action alternatives would increase ECA for Whitaker Creek from 10 percent to 16 or 17 percent; and for Queen Creek, ECA

would increase from 13 to 18 percent. Stream channel evaluation conducted during 2004 found that Whitaker and Queen Creek channels are stable and resilient, and capable of withstanding predicted increases in water yield. Unstable streambanks in Whitaker Creek and Queen Creek are one to three percent. Field investigations of all fish bearing stream segments within the project area during 2004 and 2005 documented a channel stability rating of high-fair to good for the stream channels. The exception was lower Elk Creek. However, within this drainage a very small amount of vegetation treatments are proposed and discountable effects to ECA and no adverse effects to channel stability are expected from the Eastside Project.

Irreversible and Irretrievable Effects–Water Yield

There are no know irreversible or irretrievable effects associated with the water yield indicator.

Cumulative Effects–Water Yield

The cumulative effects analysis area for water yield is the American River watershed and the upper South Fork Clearwater River to just downstream of the mouth of Crooked River.

Timber harvest, road construction, fires, mining, and development activities have the ability to affect ECA conditions in the American River watershed. Water yield refers to stream flow quantity and timing and is a function of water/soil/vegetation interactions. Changes in amount or distribution of vegetation can affect water yield by changing rates of interception and infiltration, evapotranspiration, and alter shading. These factors affect the accumulation and melt rates of snow packs and how rainfall is processed, which have an effect on the timing and total amount of water yield that flows off the landscape. Determining the ECA, which represents the extent of forest canopy opening from fire, harvest, and roads, can assess changes in amount and distribution of vegetation. Compacted soils and road systems (watershed networks) can also have an effect on the timing and amount of runoff. Increased runoff and peak flow may be associated with stream downcutting, bank instability, and deposition of sediment in low-gradient stream reaches and can cause alteration of riparian function and lower the quality of fish habitat.

Effects from implementation of Alternatives B, C, and D would increase ECA, when considered cumulatively with past activities. ECA cumulative analysis and discussion including existing conditions and expected ECA effects from the Eastside Project and American and Crooked River Project are also found in Section 3.4 (Watershed). Implementation of the action alternatives B, C, and D, when combined with the past, present, and reasonably foreseeable projects, would increase ECA by an additional 0to 10% in watersheds that could be affected by the Eastside Project. With the exception of three watersheds, ECA would still be below 15%. The three watersheds that would be above or at 15% include: Whitaker Creek (10 to 20%), Queen Creek (13 to 23%), and Box Sing Creek (6 to 15%). ECA increases are more apparent in these watersheds because of the small size of the watersheds. A stream reach inventory and channel stability evaluation was conducted in Whitaker, Queen, Box Sing Creeks, and several representative small first order streams within these watersheds during the 2004 and 2005 field season, using protocols detailed by Pkankuch (1975). These procedures were developed to systemize measurements and evaluations of the resistive capacity of mountain stream channels to the detachment of bed and bank materials. The evaluation provides information about the capacity of streams to adjust and recover from potential changes in flow and/or increases in sediment production. These surveys documented overall channel stability ratings of high fair to good and predicted increases in water yield are not expected to result in adverse impacts to the channels.

There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of

Chapter 3 could affect ECA include NPNF American and Crooked River Project, private land timber harvest and road construction, restoration projects, and road decommissioning projects on NPNF, BLM, and private lands.

3.6.3.7 Indicator 6–Habitat Connectivity, Fish Passage, and Ford Use Fish Disturbance Analysis

Direct and Indirect Effects–Habitat Connectivity, Fish Passage, and Ford Use Fish Disturbance Analysis

The Eastside Project offers opportunities for increasing connectivity of fish populations. Drainages with fish blockages within the immediate project area include Queen, Whitaker, Telephone, Baboon and Maggie Creeks in American River. Dredge mining and alteration of the stream channels at the mouths of these watersheds has blocked fish access between these streams and the mainstem American River. The East Fork American River barrier culvert was replaced with a 20 foot wide bridge in 2006. Improvement of Queen Creek fish passage has been identified and is included with the restoration activities associated with the Eastside Project. Increasing connectivity allows individual fish to migrate in and out of tributaries to seek cool water. Increased connectivity also promotes genetic exchange between populations thus potentially increasing diversity. All stream crossings proposed would be designed to prevent channel encroachment and to handle the capacity of a 100 year flood event.

Other projects include decommissioning and restoration of several existing ford crossings in streams providing habitat for federally listed fish. Decommissioning or armoring the fords would reduce instream fish disturbance (particularly for spawning and incubation), reduce chronic sources of sediment, and reduce increased turbidity when vehicles cross the stream.

Table 3.6.17 Miles of Stream with Improved Fish Access, Decommissioning of Stream Fords, and Stream Ford Restoration

Alternative	Type of Stream With Improved Fish Passage and Available Habitat (Miles)			Decommissioning Stream Ford Crossing and Restoration	Stabilization and Armoring of Stream Ford Crossing
	Fish Bearing Streams	Perennial Non-Fish Bearing	Intermittent Non-Fish Bearing		
A	0	0	0	0	0
B	1.4	0	0	2	1
C	1.4	0	0	3	0
D	1.4	0	0	3	0

Alternative A (No Action Alternative)
The "no action" alternative would not include any fish passage improvement projects. The BLM has implemented a variety of restoration projects in the analysis area, and this would be expected to continue. Future stream restoration actions would be dependent on acquisition of funding for projects.

The existing human-caused physical barrier for Queen Creek fish passage would continue to restrict fish use of 1.4 miles of historical stream habitat for spawning and rearing. Keeping Queen Creek isolated from American River would insure that no risks associated with hybridization with non-native cutthroat trout or rainbow trout or competition with nonnative fish, such as brook trout would occur.

The BLM has an ongoing restoration program which has been replacing culverts which impede fish passage. The East Fork American River barrier culvert was replaced with a 20 foot wide bridge in 2006. The Telephone Creek watershed is proposed to be have a re-connect channel to American River

constructed (2007–2008). Additional stream passage work would continue to occur over an extended period and would be dependent on future funding.

Alternative B, C, and D

Queen Creek Channel Re-Connect
Alternatives B, C, and D would provide fish passage to 1.4 miles of stream in Queen Creek by constructing approximately 100 feet of new channel to connect the stream to American River. The newly constructed stream channel would cross the American River road and it is proposed to install a seven-foot wide culvert that is embedded approximately 35–50%. Culvert capacity would allow for 100 year flow events. As needed, suitable sized substrate (e.g., 3–6 inch) material would be placed throughout the length of the culvert. The new stream channel would simulate a natural channel, and streambank restoration would include riparian seedings and plantings with native species.

Within the upper South Fork of the Clearwater River subbasin, westslope cutthroat trout have co-evolved with steelhead trout and resident rainbow/redband populations of *O. mykiss*. Westslope cutthroat trout occur in the Queen Creek watershed. Westslope cutthroat trout do hybridize with rainbow trout and other non-native cutthroat trout subspecies. Many remnant genetically pure cutthroat trout populations are located above barriers that protect them from non-native species.

Re-connecting Queen Creek with American River would result in potential increased use of the watershed by steelhead trout, and potentially westslope cutthroat trout hybridization. The potential for natural introgression with either native redband or steelhead trout was not considered a risk where these species co-evolved with westslope cutthroat trout (Shepard et al., 2003). Box Sing Creek is located 0.9 mile downstream from Queen Creek and had a dredge mined caused blockage similar to Queen Creek. In 1992 the BLM constructed a new channel to connect the stream to American River, monitoring of this watershed during 2005 at stream miles 0.1 and 0.8 did not visually document any cutthroat trout/rainbow trout hybridization. Monitoring conducted during 2004 and 2005 in the Buffalo Gulch watershed, which is also an American River tributary, supported the conclusion identified by the NPNF above for the South Fork of the Clearwater River subbasin, rainbow trout and cutthroat trout occurred in the lower reaches; however, the upper reaches were completely dominated by cutthroat trout.

Brook trout, a nonnative species can compete with cutthroat trout for food and space. If brook trout became dominate in the stream they could replace westslope cutthroat.

The dredge mined caused blockage at the mouth of Queen Creek does not function as a full barrier every year. There may be periodic fish access during flood events. However, during most years fish access would be restricted.

Although potential for hybridization would occur between rainbow/steelhead and cutthroat trout, this should result in low risks to westslope cutthroat trout genetics. Competition between brook trout and westslope cutthroat is also expected also have low risks, and should not reduce the viability of cutthroat trout in the watershed. Increasing connectivity to Queen Creek would allow individual fish to migrate in and out of tributaries to seek cool water. Increased connectivity also promotes genetic exchange between populations, potentially increasing diversity.

Decommissioning of Stream Fords and Stream Ford Stabilization
American River Ford (River Mile 6.3) and Kirks Fork Ford (Stream Mouth) Rehabilitation
Alternatives B, C and D identify the decommissioning and restoration of fords located at river mile 6.3 of American River, and at the mouth of Kirks Fork. These components are interrelated with a road to ATV trail conversion project for a primitive road that parallels American River for approximately 1.6 miles. Decommissioning the fords would reduce two chronic sources of sediment and turbidity from the native surface stream crossings and associated vehicle use. Closing the fords would also eliminate risks associated with vehicle use and fish using the stream at the ford crossing for rearing, spawning, incubation, or passage.

Upper American River Ford (River Mile 12.8) Restoration Actions
Alternative B would improve and stabilize a severely rutting road segment (400 feet) crossing a meadow and a stream ford located at river mile 12.8 of American for vehicle passage. Restoration would include streambank stabilization and "armoring" the ford. This would reduce turbidity and streambank erosion. The "armoring" would also restrict fish from using the ford for rearing or spawning. These actions would reduce a chronic sediment source attributed to a native surface stream ford and road crossing a meadow adjacent to American River. The conflict of vehicle use and fish using the ford for spawning or rearing would be eliminated.

Alternative C identifies that the American River ford crossing at river mile 12.8 would be decommissioned and rehabilitated. Associated with this action would be the decommissioning of 0.89 mile of primitive road which parallels American River. This action would reduce sediment from the ford crossing and eliminate risks associated with vehicle disturbance or harm to fish utilizing the ford for spawning, rearing, or passage.

Alternative D identifies that the American River ford crossing at river mile 12.8 would be decommissioned and rehabilitated. Associated with this action would be the conversion of 0.89 mile of primitive road which parallels American River to an ATV trail, decommissioning of approximately 500 feet of road through a meadow area, and constructing approximately 0.5 mile of new ATV trail along the east side of American River, which would connect with Forest Service road 443. This action would reduce sediment from the ford crossing and eliminate risks associated with vehicle disturbance or harm to fish utilizing the ford for spawning, rearing, or passage.

Irreversible and Irretrievable Effects–Habitat Connectivity, Fish Passage, and Ford Use Fish Disturbance

There are no know irreversible or irretrievable effects associated with habitat connectivity, fish passage, and ford use fish disturbance indicator.

Cumulative Effects–Habitat Connectivity, Fish Passage, and Ford Use Fish Disturbance

The cumulative effects analysis area for sediment and substrate is the American River watershed and the upper South Fork Clearwater River to just downstream of the mouth of Crooked River.

There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands that may affect aquatic habitat connectivity and reduce impacts to native fish at ford crossing areas. Some of these projects occur within the American River watershed and/or immediate project area. A list of these projects is provided in Table 3.0.1. Projects and other activities displayed at the beginning of Chapter 3 would affect aquatic habitat connectivity and fish disturbance at fords include NPNF American and Crooked River Project, private land timber harvest and road construction, road decommissioning projects on NPNF, BLM, and private lands, and culvert replacement projects for improved fish passage. With increased emphasis on maintaining or improving fish passage, it can be expected that no future actions on BLM or NPNF would result in adverse impacts to aquatic habitat connectivity and most would result in improvement in the long-term. Road crossings and aquatic habitat connectivity involving the Idaho Transportation Department (Highway 14), county roads, and private roads would be expected to provide for improved fish passage when an existing or new road crossing in a fish bearing stream was being constructed, maintained, or upgraded in the long-term, particularly when authorization for such projects would require appropriate Federal (Section 404 of the Clean Water Act, through application of either Nationwide or site-specific permits) or State Permits (Idaho Stream Channel Protection Act).

As discussed previously, some stream crossing structures (roads and culverts) limit or prevent seasonal upstream movement by fish and other aquatic biota. Juvenile salmonids living in rivers may seek refuge

in tributary streams during high flow events. Dredge mining of stream bottom areas has altered tributary stream channels and in some instances has created blockage for fish passage as no stream channel exists. These blockages typically occur near the mouth areas of small tributary streams to American River within the analysis area. Dredge mining has also altered floodplains and riparian habitats and had degraded or eliminated side channels or high flow channels along some low gradient stream channels. Stream fords, have altered the stream channel in areas at the crossing. Vehicle use may disturb and displace fish using the crossing area, or cause mortality or injury to fish using the area.

Table 3.6.18 summarizes BLM past and foreseeable future fish passage enhancement projects in the upper South Fork Clearwater River subbasin.

Table 3.6.18 BLM Past and Foreseeable Future Fish Passage Projects in the Upper South Fork Clearwater River

Stream	Fish Passage Projects	Year
Box Sing Creek (American River Tributary–RM 8.5)	Constructed re-connect channel (mouth) through dredge tailings (mouth). Facilitate access to 2.4 miles of stream.	1992
Box Sing Creek (American River Tributary–RM 8.5)	Replaced barrier culvert (SM 0.1) with 6 ft. open arch culvert. Facilitate access to 2.4 miles of stream.	2002
Little Campbell Creek (Big Campbell Creek Trib.–SM 0.15) (Red River Tributary 0.7)	Replaced barrier culvert (SM 0.6) with partially embedded 6 ft. culvert. Facilitate access to one mile of stream.	2004
Little Campbell Creek (Big Campbell Creek Trib.–SM 0.15) (Red River Tributary–RM 0.7)	Removed barrier culvert (SM 0.35), rocked ford crossing, and closed road to public vehicle use. Facilitate access to one mile of stream.	2004
Buffalo Gulch (American River Tributary–RM 1.3)	Replaced barrier culvert (SM 0.8) with 8 ft. partially embedded culvert. Facilitate access to 5 miles of stream.	2005
Buffalo Gulch (American River Tributary–RM 1.3)	Replaced barrier culvert (SM 2.1) with 7 ft. partially embedded culvert. Facilitate access to 5 miles of stream.	2005
Buffalo Gulch (American River Tributary–RM 1.3)	Replaced barrier culvert (SM 4.5) with 6 ft. partially embedded culvert. Facilitate access to 5 miles of stream.	2005
East Fork American River (American River Tributary–RM 10.6)	Replaced barrier culvert (mouth) with 20 foot bridge. Facilitate access to 13 miles of stream	2006
Telephone Creek (American River Tributary–RM10.5)	Proposed to construct feet of re-connect channel and install 6 ft. partially embedded culvert at American River road crossing (mouth). Proposed to armor and stabilize two ford crossings for road to ATV trail conversion project. Facilitate access to 0.7 mile of stream.	2007

Effects from implementation of Alternatives B, C, and D would improve aquatic habitat connectivity and reduce potential disturbance and mortality to fish utilizing stream fords, when considered cumulatively with past activities. Implementation of the action alternatives B, C, and D would increase accessible native fish habitat by 1.4 miles and eliminate or reduce fish disturbance at three ford crossings. No activities proposed by the action alternatives would impair or adversely impact aquatic habitat connectivity or result in long term instream disturbances at stream crossings (i.e., stream fords).

3.6.3.8 Indicator 7–Riparian Areas/Stream Channels Analysis

Direct and Indirect Effects–Riparian Areas/Stream Channel Analysis

Alternative A (No Action Alternative)
Riparian habitats within the analysis area would remain unchanged over the short-term. Some improvement may occur over time as riparian habitats and vegetation succession continues. Riparian habitat has been impacted by past land uses, particularly where dredge mining has impacted stream bottom areas. Road encroachment in riparian areas has also impacted riparian habitats along some stream reaches. Historic dredge mining along some stream reaches has severely altered and disturbed the stream bottoms, floodplains, riparian areas, and stream channels. Some of these mined areas contain dredged materials that are still relatively devoid of shrubs and trees. These dredge materials may contain gravel and cobble materials that are lacking in soils which promote vegetation growth. Other ongoing land uses would continue to have varying levels of impacts to riparian habitats and includes livestock grazing, recreation, roads, and home construction.

Lack of vegetation treatments may contribute to continued accumulation of fuels, potentially resulting in more severe wildfires, which, depending on size, severity, and location, could affect riparian condition streambank stability, and water temperature. Effects would be dependent on amount of stand replacing fire that occurred.

Alternative B, C, and D
Since harvest of timber within streamside RHCAs is not proposed under any of these alternatives, the risk of adverse effect on riparian habitat is discountable, or extremely unlikely to occur. Riparian restoration actions and decommissioning of roads within riparian areas would improve conditions in the long-term. Re-contouring of stream banks altered by historic dredge mining would improve floodplains and enhance vegetation growth along 1.2 miles of American River, and is expected to improve these areas from a riparian rating of “functional at risk” to “proper functioning condition” in the long-term. Decommissioning and restoration of roads within RHCAs/riparian areas would total 2.55 miles for Alternative B, 3.70 miles for Alternative C, and 3.57 miles for Alternative D. Implementation of these actions would improve infiltration, riparian conditions, filter sediment, and provide for improved streamside vegetation and shading. Increased additional riparian habitat attributed to road decommissioning and restoration for Alternative B, C, and D would be expected to increase by 3.7 acres, 5.4 acres, and 5.2 acres.

A new access road for the American River subdivision includes the construction of 0.56 mile of permanent road and the construction of a new vehicle bridge for Alternatives C and D. Approximately 0.12 mile of the new road would be constructed within the RHCA. Several trees would be cut within the riparian area; however, short-term and long-term riparian condition, stream shading, and water temperature effects are expected to be negligible.

Alternatives B and C include the relocating of an existing 0.46 mile of road which parallels American River to a toeslope area. This action would include the major reconstruction of 0.22 mile of existing road and construction of 0.35 mile of new road. Moving the road out of the stream bottom area and implementation of riparian restoration actions would improve riparian habitat conditions and shading along this stream reach in the long-term. A small portion of the new road construction would occur in the American River RHCA. Tree cutting for the new road would be more than one tree distance in length from American River, consequently no tree shading or water temperature effects are expected to occur to American River from this action.

Alternative D includes the construction of approximately 300 feet of new temporary road within the American River RHCA. This road would also cross a small intermittent stream that drains into dredge ponds. Tree cutting along the route road would be more than one tree distance in length from American

River, consequently no tree shading or water temperature effects are expected to occur to American River from this action.

Alternative C restoration actions have the greatest potential to improve riparian conditions in the long-term, and these are followed by Alternative B and D.

The restoration activities should moderate current stream temperature levels, and possibly decrease stream temperature in the long-term with growth of streamside trees and shrubs, and subsequent increased shading. For additional project related short-term and long-term effects to riparian shading, riparian condition, and water temperature processes specific to the action alternatives, refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Irreversible and Irretrievable Effects–Riparian Areas/Stream Channel

There are no know irreversible or irretrievable effects associated with the riparian areas/stream channel indicator.

Cumulative Effects–Riparian Areas/Stream Channel

The cumulative effects analysis area for riparian habitats and stream channels is the American River watershed.

There are a number of past, recent, on-going, and proposed activities in the American River watershed and upper South Fork Clearwater River involving BLM, NPNF, State of Idaho, Nez Perce Tribe, and private lands. Some of the proposed restoration projects occur within the immediate project area. A list of these projects is provided in Table 3.0.1. Some of the projects and other activities displayed at the beginning of Chapter 3 would affect the riparian habitat and stream channel indicator, and include the NPNF American and Crooked River Project, proposed BLM restoration actions, private land restoration actions, private land timber harvest and road construction, firewood cutting, and urban and rural development. Private land road construction, timber harvest, and urban/rural development activities which may happen in the future is unquantifiable, but it is expected that additional riparian development would occur.

The existing condition of this indicator reflects a long history of human development in this watershed. Dredge mining activities within stream bottom areas and road encroachment into riparian habitats have been the primary land use which has affected riparian habitats. In addition, riparian areas throughout the watershed have been affected to varying levels by domestic livestock grazing, timber harvest, and urban and rural development. Rural home construction and development has encroached on riparian habitats, particularly within the Elk City township (e.g., American River subdivision).

Some stream reaches of American River, Buffalo Gulch, and Little Elk Creek, and other streams were subjected to in-channel and flood plain placer and dredge mining. Dredge mining resulted in sterile dredge piles that are primarily composed of cobble/gravel material. Soil and riparian vegetation (e.g., trees) recovery has been very slow and some of these areas still are relatively devoid of vegetation (e.g., riparian vegetation, trees, shrubs). Riparian vegetation may be lacking in these areas and the riparian plant communities are in an early to mid seral stage. The conditions caused by these historic mining activities continue to affect stream channel morphology and riparian and floodplain processes, including riparian vegetation growth, composition, and seral stage.

Domestic livestock grazing occurs within the watershed on private, NPNF, and BLM lands. Private land grazing is prevalent in the large meadows associated with Elk Creek, Big Elk Creek, and Little Elk Creek. Grazing on BLM and NPNF lands within the watershed has been conducted at levels to minimize or reduce effects to riparian vegetation or listed fish. Some private land grazing occurs at levels that impact riparian vegetation and stream banks (e.g., Elk Creek).

Effects from implementation of Alternatives B, C, and D would not contribute to long-term adverse impacts to riparian habitats, when considered cumulatively with past contributors to the degraded condition. With the exception of a new public access road and vehicle bridge (Alternatives C and D), and a temporary road constructed for timber harvest (intermittent non-fish bearing stream) (Alternative D), no additional streamside roads would be constructed. No tree harvest would occur within any RHCAs. Implementation of restoration actions, specifically streamside road decommissioning and riparian restoration would improve riparian habitats over time. In addition, some natural improvements in riparian habitats are expected to continue, even in the absence of restoration.

Specific BLM planned restoration actions (USDI-BLM, 2006) that would directly affect this indicator includes the Telephone Creek road to trail conversion project (0.9) mile and channel re-connect project (250 feet). This project would implement restoration of road encroachment within riparian areas, construct approximately 250 feet of new stream channel through dredge tailing areas, and improve riparian vegetation (seedings and plantings) along the new channel.

The Elk Creek stream reach which flows across BLM lands has been fenced off from livestock grazing (0.4 miles); this riparian restoration effort has improved bank stability and riparian conditions from poor to good within this reach. The BLM is coordinating with Framing Our Community regarding the construction of riparian fences and restoration efforts along an additional one mile of Elk Creek flowing across private lands.

3.6.3.9 South Fork Clearwater River Analysis of Effects

Direct and Indirect Effects

Of the indicators discussed in this section, sediment and temperature are the most relevant in terms of direct and indirect effects to the South Fork Clearwater River.

Alternative A (No Action Alternative)
Under the "no action" alternative, the existing substrate condition in the South Fork Clearwater River would probably improve very slowly over time. Because of historic dredge mining and associated legacy effects to riparian habitats and stream channels, natural recovery would be negligible in some stream reaches without active restoration. Restoration improvements in the watershed may occur as funding becomes available.

Benefits of Alternative A include no further ground-disturbing activities, which would result in no additional human-caused spikes of sediment. This alternative would not address the need for active stream, watershed and soils restoration. However, the BLM has an ongoing watershed and fisheries restoration program which would continue to address restoration various actions as funding becomes available.

Stream temperatures would remain unchanged over the short-term. Some improvement may occur over time as vegetation recovers in areas where shade has been reduced from past activities or where dredge mining has resulted in over-widened, shallow streams. Highway 14 and other road encroachment in riparian areas has reduced shrub and trees shading potential along some river reaches. Historic dredge mining along some stream reaches has severely altered and disturbed the streambottoms, floodplains, riparian areas, and stream channels. Some of these mined areas contain dredged materials that are still relatively devoid of shrubs and trees. These dredge materials may contain gravel and cobble materials that are lacking in soils which promote vegetation growth.

Lack of vegetation treatments may contribute to continued accumulation of fuels, potentially resulting in severe wildfires, which, depending on size, severity, and location, could affect sediment yield and water temperature. With severe wildfire, there are risks associated with pulses of sediment delivered rapidly to streams, which could adversely affect habitat already impaired by past human activities. Effects would be

dependent on amount of stand replacing fire that occurred within riparian habitats and changes resulting to sediment yield and shading.

Alternative B, C, and D
For specific direct or indirect effects expected from the Eastside Project, refer to indicator analysis conducted for the indicators and the American River watershed above.

No timber harvest is proposed within streamside and wetland RHCAs or in landslide prone RHCAs. No short-term or long-term increase in risk of mass wasting and landslide type disturbance is expected to occur from Eastside Project actions. Eastside Project action alternative actions which affect erosion and sediment processes have the ability to directly or indirectly affect water quality and fish habitat in the short-term and long-term. Predicted increases in deposited sediment would not be at a magnitude where measurable changes would be expected to occur in the South Fork Clearwater River (see Tables 3.6.10–3.6.13 above), and differences between the action alternatives, as modeled, are all within the margin of error for the model.

A short-term spike of sediment from restoration and timber harvest/fuel treatments would occur. A long-term reduction of baseline sediment yield from chronic sediment sources would result from restoration activities and aid in recovery of watershed and aquatic conditions.

Since harvest of timber within streamside RHCAs is not proposed under any of these alternatives, the risk of adverse effect on stream temperature is discountable, or extremely unlikely to occur. Riparian restoration actions and decommissioning of roads within RHCAs and riparian areas would result in improved shading and riparian conditions in the long-term.

Alternative C restoration actions have greatest potential to improve riparian habitats, shading, and water temperatures in the long-term, and is followed by Alternatives B and D.

The restoration activities should moderate current stream temperature levels, and possibly decrease stream temperature in the long-term with growth of streamside trees and shrubs, and subsequent increased shading. For additional project related short-term and long-term effects to these processes refer to Appendix H, Tables H.3 and H.4, American River Aquatic Trend Analysis and Summary.

Irreversible and Irretrievable Effects

There are no known irreversible or irretrievable effects associated with fisheries or aquatic indicators for any of the alternatives.

Cumulative Effects

Cumulative effects include past, present, reasonably foreseeable actions within the analysis area (see Table 3.0.1). The cumulative effects area for fisheries resources includes subwatersheds within American River watershed and the upper South Fork Clearwater River, downstream to below Crooked River (RM 58.4). Findings for aquatic resources in American River and the South Fork Clearwater River include substantial physical changes since the initiation of human disturbances in the 19th century.

Both American River and the South Fork Clearwater River are subject to cumulative effects, with sediment and temperature impacts being prevalent. Aquatic restoration projects have been implemented overtime in the American River and the upper South Fork Clearwater River.

Specific activities include but are not limited to mainstem river dams, in-channel mining in the mainstem rivers and tributaries, timber harvest throughout the subbasin, road construction and encroachment on streams, domestic livestock grazing, home construction and private land development, agriculture and cultivation, fire suppression, and many others. It is generally accepted that water quality and habitat in the South Fork Clearwater River is in a degraded condition, both from sediment and temperature impacts (USDA-FS, 1998a; USDA-FS, 1999a).

Table 3.0.1 lists the aforementioned activities and the possible effects of these actions are described below. Section 3.4 (Watershed) highlights the natural (fire) and management activities that have affected the project area. The detailed discussions of sediment yield and water temperature highlights these elements and how they have changed overtime. Both elements have adversely affected fish populations and aquatic habitats in the South Fork Clearwater River

As described in this section, dredge mining and hydraulic mining caused significant erosion in the tributaries, and accelerated sediment deposition in the mainstem river. Fish passage in the South Fork Clearwater River has been impacted by mainstem dams since the early days of settlement. The first dam reported in the South Fork Clearwater River was the Dewey Mine Dam in place by about 1895. This dam was reported to be 6 to 8 feet high and located about 3.3 miles above the Harpster Bridge. The dam was in place for a few years with no documentation of fish passage conditions. Lower in the South Fork, near the town of Kooskia was the site of the Kooskia Flower Mill Dam. This dam was in place from 1910 into the 1930s. The dam was estimated to be about 6 feet high. The Washington Water Power Dam was reportedly built in 1911 (Siddall, 1992). This dam was a total barrier to fish migration although a fish ladder was constructed in 1935 but was washed out in 1949. This dam was reported to be 33 or 56 feet high depending on the source. It was removed on August 3, 1963. The existing salmon and steelhead populations are a result of fish stocking, and likely supplemented by straying adults from the Clearwater River.

Current land uses occurring on private lands include livestock grazing, timber harvest, agriculture, residence construction, road construction, sewage treatment, and water withdrawals for domestic use and irrigation. It is estimated that increases in general land uses would occur in the next decade. Additional information on private land activities is found in the South Fork Clearwater River Biological Assessment (USDA-FS, 1999a).

Given all the above information, the South Fork Clearwater River is at high risk for cumulative impacts, especially from additional sediment and increased water temperature. The Eastside Project is designed to improve overall fish habitat by reducing non-point sediment sources and improving instream fish habitat. Sediment increases from road and harvest activities will however, increase sediment in the short-term. In general, the level of activity on federal lands is currently substantially less than in recent decades, and many federal actions contain watershed improvements as part of the project. Proposed mining activities may contribute to the conditions in the subbasin, but mitigation for these projects is expected to reduce some of these impacts. Proposed timber sales on BLM and National Forest lands are subject to similar mitigation and upward trend requirements as the Eastside Project, and although spikes of sediment may occur, in general, stream habitat is expected to improve at least locally.

Actions associated with the Eastside Project area may contribute cumulatively to sediment in the South Fork Clearwater River downstream from the mouth of American River. As discussed in the Watershed Cumulative Effects section, these effects would be short-term only, and improvements in watershed condition over time would contribute to improved conditions in the river.

Cumulative sediment effects to the South Fork Clearwater River from the Eastside Project, American and Crooked River Project, and other projects in the upper subbasin would occur. Sediment produced in American River would be routed downstream into the South Fork Clearwater River. The difference between alternatives (including Alternative A) is relatively inconsequential (less than one percent), when considered in relation to the total sediment yield to the upper South Fork Clearwater River. Currently, routed sediment delivery to upper South Fork cumulative assessment reach is approximately 6% over base. Therefore, measurable cumulative increases in deposited sediment in the upper South Fork Clearwater River are not expected from implementation of any of the action alternatives when coupled to past, present and reasonably foreseeable actions. Short-term sediment yield attributed to the Eastside Project and American and Crooked River project action alternatives is primarily short term increases in sediment yields, while the focus of restoration projects is the reduction of chronic sediment sources (i.e.,

decommissioning of roads, riparian restoration of mined areas) and long-term reduction of erosion sources.

Specific BLM planned restoration actions identified for the South Fork Clearwater River include the *South Fork Clearwater River Restoration Project* (USDI-BLM, 2005Bb). This project includes reduction of sediment, reconnecting a small perennial (non-fish bearing stream), riparian restoration, decommissioning small segments of road and a primitive campsite adjacent to the river, and maintenance of side channel habitats for juvenile rearing habitat. This project is anticipated to take place in the foreseeable future (2007–2008).

Over the long-term, sediment yield is expected to decrease, especially with the implementation of watershed improvement projects, and in the absence of additional disturbance, sediment yields in tributary streams to the upper South Fork Clearwater River would also decrease. Consequently, decreases would occur in the South Fork Clearwater River.

Past, present and future riparian restoration actions will provide long-term improvement to shade conditions for the South Fork and some of its tributaries. These actions should provide a long-term trend to improved temperature conditions.

The South Fork Clearwater River TMDL (see Section 3.4 Watershed) for sediment and water temperature will govern activities on State and private lands as well as Federal lands. Under this guidance, aquatic conditions should continue to improve in the South Fork Clearwater River.

3.6.3.10 Consistency with the Management Framework Plan and Environmental Law

The MFP direction and regulatory framework relevant to fisheries is presented in Section 3.6.1.2 and Table 3.6.1. It includes a description of general guidelines for activities in BLM fisheries/water quality prescription watersheds, a summary of relevant direction from PACFISH (1995), and direction associated with the ESA for listed fish species potentially affected by actions in the American River area. All alternatives are in conformance with the BLM MFP and compliance with environmental law. The project design incorporates measures to minimize effects to ESA listed and BLM sensitive fish.

Upward Trend Of Below Objective Watersheds–All Action Alternatives

In addition to Eastside Project restoration actions, upward trend can also be supported by other ongoing and planned BLM management actions.

The MFP supplement (USDI-BLM, 1985; USDI-BLM, 1989) for fisheries/water quality objectives for prescription watersheds provides direction that timber harvest in subwatersheds that do not meet their fisheries/water quality objectives would occur only where concurrent watershed improvement efforts result in a positive upward trend in habitat condition. Most prescription watersheds in the analysis area were included in this category (see Table 3.6.1).

Direct watershed improvement actions, which range from road obliteration, road decommissioning, riparian restoration, conversion of roads to ATV trails, and non-point sediment stabilization, are included with all action alternatives (Appendix I). Large-scale vegetation treatments, which include timber harvest, are designed in part to reduce fuel accumulations and improve stand condition within the analysis area. The combined vegetation treatments and watershed restoration activities will result in a short-term increase in sediment but a long-term improvement in watershed condition.

Long-term declines in surface sediment yield are displayed in figures and tables included in Section 3.4 (Watershed). These figures and tables display a long-term improvement in baseline sediment yield conditions expected as a result of the action alternatives. The action alternative restoration actions are very similar, with Alternative C offering slightly more improvement versus the least short-term risk, and are followed by Alternatives B and D.

Irreversible or Irretrievable Effects

There are no known irreversible or irretrievable effects associated with fisheries or aquatic resources for any of the alternatives.

3.6.3.11 Conclusions

Existing Condition

Fish habitat in the analysis area is generally in poor to fair condition, with a few streams rated as high-fair to good. Past bucket line dredging of the mainstem American River, Little Elk Creek, and upper South Fork Clearwater River, have left these systems with a reduced carrying capacity for fish. Dredging activity has also impacted the mouth areas and lower reaches of tributary streams to American River. Water temperatures are elevated due to the vegetative canopy that was removed by roads and dredging. Many of the streams in the analysis area are below objectives (see Table 3.6.1). Habitat elements of most concern include high levels of deposited sediment, lack of LWD, low number of high quality pools, high summer stream temperatures, and an overall simplification of habitat leading to reduced carrying capacity.

Road/stream crossings in the project area have culverts that block or impede upstream fish migration. Dredge mining has altered the mouth area and lower reach of several tributary streams, causing fish passage blockages. Dredge mining of some stream bottom areas has altered stream channel morphology and reduced amount of side channels and high flow channels within floodplains.

Migratory steelhead trout, bull trout, spring chinook salmon, and westslope, while located in the project and analysis area streams, are at very low densities and the American River is a designated priority watershed (USDA-FS, 1998a). Resident rainbow/redband trout occur within the American River watershed. Pacific lamprey have been documented in the South Fork Clearwater River, and American River provides potential habitat for the species. Current habitat conditions may be limiting growth, reproduction, and survival of these species in the tributaries as well as in the mainstem rivers.

Non-native brook trout exist in many streams in the analysis area, and may compete with or displace native species as well as hybridize with bull trout.

Environmental Consequences

If Alternative A is implemented, watersheds and some stream reaches would remain in a poor to fair condition and recover slowly over time.

Under the action alternatives, a limited short-term increase in sediment production is expected from vegetation treatments, road construction/reconstruction, temporary road construction, road decommissioning, new road and bridge construction, riparian restoration projects, Queen Creek re-connect channel construction, ford obliteration and restoration, and road to ATV trail conversion projects.

This short-term increase in sediment yield is not at a level where changes in stream substrate (cobble embeddedness) are expected to occur.

Under the action alternatives, vegetation treatments, including timber harvest, may result in lower risk of large, stand-replacing fires. Such fires could adversely affect watershed condition and fish habitat. Short-term increases in sediment yield under the action alternatives are partly due to watershed improvement activities, which are expected to result in long-term improvement in habitat condition.

Equivalent Clearcut Area (ECA), a predictor of changes in water yield, would increase slightly under all action alternatives. This increase is not likely to result in adverse changes in fish habitat.

Of the action alternatives, Alternative C offers the most rapid improvement in watershed condition, with the least short-term risks. Alternative B offers a lesser rate of improvement, and is followed by Alternative D.

Fish in the project area, including steelhead trout, bull trout, spring chinook salmon, Pacific lamprey, redband trout and westslope cutthroat trout, may be adversely affected by potential short-term changes in habitat condition and spike sediment yields. However, these species are also expected to benefit from long-term improvement in habitat condition with reductions of chronic sediment yields, improved riparian habitats and improvements to water temperature, improved active and potential LWD, more accessible habitat, reduced disturbance from vehicle use of fords, and improved channel conditions with recontouring of streambanks.

3.7 Wildlife

3.7.1 Introduction

3.7.1.1 Scope of the Analysis

Species were evaluated in relation to available habitat quality and quantity for the proposed Eastside Project. The scope of this analysis and extent of cumulative effects varies depending on each species relative home range size and critical habitat niche(s). For most wildlife species, effects analyses will be limited to the American River watershed. For certain species, the amount (acres) of potentially suitable habitat that would be modified will be the primary indicator for analysis and will be carried throughout the alternatives. Direct, indirect, and cumulative effects will be addressed predominantly within the American River watershed, and where applicable extend beyond the watershed.

3.7.1.2 Regulatory Framework

BLM Management Framework Plan and North Idaho Timber Management EIS
The Chief Joseph Management Framework Plan (MFP) (USDI-BLM, 1981a) and North Idaho Timber Management EIS (NITMEIS) (USDI-BLM, 1981b) provide principle policy and guidance which is relevant to wildlife and forest management. The MFP and NITMEIS documents goals, standards and guidelines for wildlife species. Following are some pertinent excerpts in regards to the Eastside Project proposal.

- Practice snag management to maintain adequate habitat for snag dependent species.
- Active raptor nests would be protected by non-disturbance zone.
- Appropriate vehicle use restrictions will be established to protect known high resource values.
- Protect and/or restore habitat for moose.
- Identifies riparian buffers for wildlife cover and travel.
- Avoid adverse actions to federally listed species.
- Guidance for closure of temporary roads.
- Maintenance of adequate hiding/security cover for deer and elk.
- Provides guidance for coordinating logging and elk habitat requirements.
- Riparian and aquatic restoration priorities for American River drainage.

Federal Land Policy and Management Act of 1976 and Endangered Species Act
Analysis and evaluation of wildlife and terrestrial threatened, endangered, and sensitive (TES) species data in this environmental impact statement (EIS) is based on direction contained in the Federal Land Policy and Management Act of 1976 and the Endangered Species Act of 1973 (ESA). The above Acts and BLM regulations require federal land managers to maintain viable populations of all native and desirable non-native wildlife species and to assure that federally listed (threatened and endangered) species populations are allowed to recover.

Threatened Species: Threatened or endangered status provides a species and its habitat special protections from adverse impacts from federally authorized or funded projects. It is the responsibility of the BLM to design activities that contribute to the recovery of listed species in accordance with recovery plans developed as directed by the ESA (50 CFR part 402). Section 9 of the ESA requires threatened and endangered species be protected from “harm” and “harassment” wherever they occur, regardless of recovery boundaries. According to U.S. Fish and Wildlife Service list #SL 06-0328 (dated 3/1/2006), federally listed wildlife species include gray wolf (*Canis lupus*) as a threatened experimental/nonessential species. The Canada lynx (*Lynx canadensis*) and bald eagle (*Haliateetus leucocephalus*) are listed as threatened species.

Sensitive Species: In accordance with national policy (BLM Manual 6840), the Idaho BLM Special Status Species List (2003) provide management direction and prioritization for BLM sensitive species and conservation management needs. An associated Memorandum of Understanding (MOU) has been signed by the State Director and Idaho Department of Fish and Game Director that designates BLM sensitive species (those species of concern but not federally listed or candidates for listing). Consistent with national policy, all BLM offices are to use this list to help them "…ensure, to the best of their abilities, that critical habits and populations of sensitive species occurring on lands administered by the BLM will be managed and/or conserved to minimize the need for listing these animals as threatened or endangered by either Federal or State governments in the future."

Neotropical Migratory Bird Laws: Migratory Bird Treaty Act (MBTA) of 1918 and Executive Order 13186 (E.O.) titled "Responsibilities of Federal Agencies to Protect Migratory Birds," provides specific direction that environmental analysis of Federal actions are to evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern.

On January 10, 2001, President Clinton signed Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." The BLM and the U.S. Fish and Wildlife Service (FWS) signed a MOU complementing the Executive Order.

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the FWS identify "…all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." Carrying out this mandate, the FWS published "Birds of Conservation Concern 2002" and recommends that its lists be consulted in accordance with Executive Order 13186.

The Migratory Bird Treaty Act covers many ground-nesting and shrub-nesting birds. Some migratory birds are covered by state hunting regulations; others are protected by non-game status by the Idaho Department of Fish and Game.

3.7.1.3 Desired Future Conditions and Analysis Methods

Historical Range of Variability

Ecosystems are not static and their conditions vary over time and space. The Historical Range of Variability (HRV) describes the dynamic nature of ecosystems. The historic range of conditions found in a given setting is used to understand the likely range of conditions found under natural disturbance regimes. HRV refers to the range of composition, structure, pattern and function of landscape elements like streams and aquatic communities, and terrestrial plant and animal communities in recent time (the last 2000 years) of relative climatic stability. It is considered to include the era prior to European settlement, but concurrent with Native American occupation. This concept is based on the assumption that if elements are sustained or restored to within their historic range of variability, viable populations will more likely be maintained and rates of extinction will not exceed natural rates. Actual information on historic conditions is inferred from more recent (1500s–early 1900s) information and available research data.

The wildlife analysis uses information at four scales: South Fork Clearwater Sub-basin 4th Code HUC (752,000 acres), American River watershed 5th Code HUC (58,612 acres), immediate project area, and treatment area. Each species listed in Table 3.7.4 that occurs in the American River watershed is discussed. Analysis of each species includes available habitat and population information. Species habitat analysis includes a summary of important habitat requirements and available habitat quality and quantity. Population information includes sighting information from local BLM and FS reports and Idaho Conservation Data Center reports and available survey information. The wildlife resource direct and indirect effects project analysis area is the American River watershed (7.79% of the South Fork Clearwater River Sub-basin). Table 3.7.1 displays proposed actions by alternatives at two scales.

Table 3.7.1 Size of Alternative Treatment Acres at Two Scales (South Fork Clearwater River and American River Watershed)

	Alt A	Alt B	Alt C	Alt D
Acres Treated	0	1,293	1,284	1,171
Percent of South Fork Clearwater River	0	0.17	0.17	0.16
Percent of American River Watershed	0	2.21	2.19	2.00

The extent of historical habitat for various wildlife species chosen for analysis in the South Fork Landscape Assessment (USDA-FS, 1998a) was calculated by identifying acres of potential habitat for each Vegetative Response Unit (VRU) and Ecological Reporting Unit (ERU) (geographic areas that provide structure for describing where conditions occur and a sense of place). The American River is identified as an ERU for the subbasin. Since not all acres would have supported certain wildlife species or would have possessed the preferred vegetation and structure, the midpoint of the HRV for various wildlife habitat components was multiplied by the number of potential acres within the subbasin. The end product was then termed "historical acres." Habitat for some wildlife species has increased, while habitat for some species has decreased due to fire exclusion. While the quantity of habitat may have increased, habitat quality could have decreased due to snag losses from firewood cutting, and loss of habitat heterogeneity from fire suppression, loss of large diameter trees due to timber harvest, and high road densities have direct and indirect effects on wildlife security and disturbance.

To characterize the historical (pre-settlement condition) and current condition of wildlife habitat, Vegetation Response Units (VRUs) were used. The components used to develop the VRU classification system are habitat type groups (potential vegetation), landform, and pre-settlement disturbance processes (like fire and disease regimes). VRUs are broad ecological land units that display unique patterns of habitat type and terrain with similar patterns of disturbance and succession processes. Patterns of plant community composition, age class structure, and patch size would tend to fall within certain ranges for each VRU. VRUs were used in this assessment to estimate resource capabilities, ecological integrity, and responses to natural and human-caused disturbance. Table 3.7.2 summarizes the VRUs found in the American River watershed (USDA-FS, 1998a).

Table 3.7.2 American River (ERU)–Vegetation Response Units[1]

Vegetation Response Units						
1	3	6	7	8	9	10
974	74	36340	10077	674	392	10100

[1]Source–*South Fork Clearwater River Landscape Assessment Volume 1*–page 93 (USDA-FS, 1998a)

VRU 6 (cold basins, grand fir and subalpine fir) is the most prevalent VRU in the watershed (USDA-FS, 1998a). This VRU is common at mid elevations. Grand fir and subalpine fir habitat type are dominant. Lodgepole pine was the dominant seral species. Western larch, Douglas-fir, and Engelmann spruce were important.

VRU 10 (uplands, alder, grand fir and subalpine fir habitat types) and VRU 7 (moist uplands, grand fir and Pacific yew) comprise similar amounts of the watershed (USDA-FS, 1998a).

The Eastside Project is in VRU 6, which comprises 36,340 acres and 62 percent of the American River watershed. Table 3.7.3 summarizes natural/historic disturbance regimes by size class for this VRU and existing conditions. The BLM utilized the NPNF data set for tree size class data within the American River watershed that used a large tree class of greater than 15 inch dbh.

Table 3.7.3 VRU 6 Natural/Historic and Existing Conditions in the American River Drainage

Size Class	Natural/Historic Disturbance Regimes[1]	Available Size Class Data Used For Analysis	Alt A Current Acres (%)[2]
Non-Forest	5–10%	Non-Forest & Shrub Dominated	3,005 (8.6%)
Seedling/Sapling (<5 inch dbh)	10–30%	Seedling/Sapling (<5 inch dbh)	10 (<0.5%)
Pole (5–9 inch dbh) and	30–45%	Small Tree (5–9.9 inch dbh)	4,178 (12%)
Small Tree (9–14 inch dbh)		Medium Trees (10–14.9 inch dbh)	11,988 (34.4%)
Medium Tree (14–21 inch dbh)	20–40%	Large (15+ inch dbh)	15,659 (44.9%)
Large Tree (>21 inch dbh)	5–20%		

[1]Source–*South Fork Clearwater River Landscape Assessment Volume 1*–page 96 (USDA-FS, 1998a)
[2]Source–NPNF GIS analysis data.

Analysis of effects for most species used comparisons of resultant effects of each alternative and any past, present, and reasonably foreseeable future actions on the most limiting habitat factors, habitat components, or species sensitivities known relative to the analysis area or larger landscapes as appropriate. Where appropriate, wildlife information related to the amount of existing habitat potentially available for certain sensitive and other species of interest was modeled using the Region 1 Vegetation Mapping project (R1-VMP) to describe abundance and distribution of wildlife habitat for the American River drainage (USDA-FS, 2005a). This product provided a consistent and continuous geospatial database for existing vegetation and associated attributes covering the Eastside Project area, in conjunction with the American and Crooked River project (USDA-FS, 2005a). Vegetation composition (habitat type and forest cover type), structural stages (tree size classes and canopy cover), acres, and distribution were all considered in defining the existing condition. These same criteria were used to determine the effects of the different alternatives on species habitat.

Where appropriate, the BLM utilized the Nez Perce National Forest 2000–2002 Forest Inventory and Analysis (FIA) survey to determine the abundance and distribution of certain wildlife habitat, old growth and snag habitats at the watershed (5th Hydrologic Unit Code–HUC) and subbasin (4th HUC) level. The FIA survey is a general purpose, national inventory that is designed for strategic assessments and produces statistical reports and analytical information on status and trends in forest vegetation across the nation (Czaplewski et al., 2003). FIA data were used to describe existing conditions for the following species and habitats: Northern goshawk, Williamson's sapsucker, olive-sided flycatcher, fisher, black backed woodpecker, old growth, early seral, and snags. Criteria used for data queries are located in the project file.

In addition, this EIS incorporates the effects on BLM terrestrial sensitive species (i.e., Biological Evaluation). Refer to Table 3.7.4 below for a summary of environmental consequences and conclusions for this analysis.

Elk Habitat: Outputs from the habitat suitability index model for north Idaho (Leege, 1984) were used to analyze summer elk habitats. The analysis area does not occur in primary elk winter range.

Lynx: The analysis for Canadian lynx followed conservation measures and habitat criteria direction from the *Canada Lynx Conservation Assessment and Strategy* (LCAS) (Ruediger et al., 2000). Analysis of effects to lynx and/or their habitat is conducted for lynx analysis units (LAUs) as directed by the LCAS. The LAU for the Eastside Project area includes BLM lands located in the east side of the Elk City township and NPNF lands located east and north east of the township (#3020306).

Old Growth: The BLM conducted stand exams within the project area to determine if individual stands met old growth criteria and no old growth stands were identified in harvest units. In addition, cumulative assessment was conducted at the watershed level by the NPNF for the American and Crooked River project (2005) which is summarized as follows. NPNF Stand exam data was queried for stands meeting criteria from the North Idaho Zone Old Growth methodology, as well as Forest Plan definitions. Stands meeting all criteria for existing old growth were reviewed using ARC/GIS system to ensure they have not been harvested or thinned in a manner that may have compromised their habitat effectiveness. Stands that met all criteria for replacement old growth were similarly verified. Unsampled stands were reviewed using the "Large Tree 2002" ARC/GIS screen (stands with large trees in 1935 and not since harvested or burned), and compared against known old growth stands using tree size, canopy, and common canopy texture as a guide before being considered old growth. These were also verified to be present on the landscape using the ARC/GIS tool along with aerial photos.

3.7.1.4 Alternative Comparison and Effects Determinations

Table 3.7.4 displays a brief summary of effects determination for federally listed species, BLM sensitive species, and other species of interest and habitat associations.

Table 3.7.4 Wildlife Species Effects Determinations for Federally Listed Species, BLM Sensitive Species, Other Management Indicators (Species and Habitat Associations) and Alternative Comparisons

Primary Status	Species and Status	Guild/ Priority Habitat	Alt A	Alt B	Alt C	Alt D
Threatened and Endangered Species	Canada Lynx (Threatened)	Early-seral Security	No Effect	May affect, but not likely to adversely affect		
	Gray Wolf (Experimental Population)	Early-seral Security	No Effect	Not likely to jeopardize continued existence of the species		
	Bald Eagle (Threatened)	Early-seral Riparian	No Effect	May affect, but not likely to adversely affect		
BLM Sensitive Species	Northern goshawk	Late-seral/ Old growth	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar, Alt. B impacts most habitat, Alt. D least.		
	Williamson's sapsucker	Late-seral	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar, Alt. B impacts most habitat, Alt. D least.		
	Olive-sided flycatcher	Early-seral	No impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar, all Alts. beneficial. Alt. B improves most habitat, Alt. D improves least amount of habitat.		

Primary Status	Species and Status	Guild/ Priority Habitat	Alt A	Alt B	Alt C	Alt D
	Fisher	Late-seral/ old growth security	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar, Alt. B impacts most habitat, Alt. D least.		
	Wolverine	Security	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species		
	Western toad	Aquatic Riparian	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar. Alt. C most beneficial for riparian restoration , followed by B.		
	Common gartersnake	Riparian	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar. Alt. C most beneficial for riparian restoration, followed by B.		
	Idaho giant salamander	Aquatic Riparian	No Impact	May impact individuals or habitat, but would not likely result in a trend toward federal listing or reduced viability for the population or species. Alternatives very similar. Alt. C most beneficial for riparian restoration, followed by B.		
Other Management Indicators	Elk	Early seral Security	Low-mod. summer habitat effectiveness; no forage improvement	Creation of more forage areas. Short term disturbance during project implementation. Decommissioning roads beneficial. Timber harvest related road construction, temporary roads would be obliterated after project. Varies slightly by alternative, Alternative B and C most beneficial, followed by Alt. D.		
	Shiras Moose	Late-seral/ Grand fir/ Pacific yew Riparian	No measurable impacts	Loss of some mature, dense canopy grand fir habitats. No loss of important moose winter range. Riparian habitat restoration and decommissioning roads in riparian areas beneficial. Varies slightly by alternative, Alternative C most beneficial for riparian restoration.		

Primary Status	Species and Status	Guild/ Priority Habitat	Alt A	Alt B	Alt C	Alt D
	Black-backed Woodpecker (BLM Watch List)	Fire/insect disturbance	No measurable impacts, no direct loss of nesting or foraging habitat	Losses of nesting and foraging habitat. Alternatives very similar. Alt. D impacts least acres, Alt. B impacts most acres.		
	Neotropical Migratory Birds	Old growth (Priority) Riparian habitats	No measurable impacts, no direct loss of nesting habitat	Old growth maintained; low nesting habitat loss. Some loss of mature-dense canopy mixed conifer stands, negligible effects at the watershed level. Varies slightly by alternative. Alternatives very similar.		
	Old growth habitat	Late-seral/ Old growth	Low improvement for old growth	Old growth maintained, treatments would reduce fire threats. Some loss of mature-dense canopy mixed conifer stands, negligible effects at the watershed level. Varies slightly by alternative. , Alt. B impacts most "large tree" stands, Alt. D least.		
	Fragmentation and Connectivity	Late-seral Riparian Disturbance Regimes	Existing trends and condition continue	Treatment caused "openings" in mixed-conifer and lodgepole stands. Mobile, wide-ranging species slight effects; small, less-mobile species, may affect more. Decommissioning roads and moving roads out of riparian areas beneficial. Fuel treatments would reduce threats of more severe fires in treated stands. Alternatives very similar, Alt. C most beneficial with road decommissioning, and Alt. D modifies least acres.		
	Snags and Large Down Wood	Late-seral/ Disturbance Regimes	Existing trends and condition continue	Loss of snags and large down wood in treatment areas, negligible effects at the watershed level because of dead and dying lodgepole. Following snag guidelines would reduce potential for adverse effects. Alternatives very similar, Alt. B most impacts and Alt. D least.		
	Riparian Habitats	Late-seral/ Mid-seral	Low improvement for riparian; successional trends continue	Riparian restoration in all alternatives supports upward trends within dredge mined areas. Decommissioning roads in riparian areas beneficial. Alternatives very similar. Alt. C most beneficial for riparian restoration, followed by B.		

3.7.2 Existing Habitat Conditions

3.7.2.1 Introduction

The purpose of this section is to present existing wildlife species' habitat conditions and to document the direct, indirect and cumulative effects of past, present, and reasonable foreseeable activities on wildlife species and their habitats.

American River wildlife species composition and abundance are primarily influenced by climate, landscape, and disturbance regimes. Disturbance events, primarily fire, insects, and disease pathogens, initiate plant community vegetative succession. Vegetative transitions support a varying abundance and diversity of wildlife habitat and species. Some species are adapted to early seral communities, others are best suited for late seral communities and old growth habitats, while others utilize a variety of habitats and are adapted to vegetative successional mosaics. American River watershed wildlife habitats are going through a large scale transition at this time due to the mountain pine beetle epidemic in the area.

Landscapes undergo large and small natural disturbances creating patches that have different structures, and compositions. The amount, spatial arrangement, shape, and size of landscape patches determine wildlife species composition and abundance supported by the landscape.

South Fork Clearwater River

The following summary was taken from the South Fork Clearwater River Landscape Assessment (SFLA) (USDI-FS, 1998A).

"The South Fork Clearwater River Subbasin provides habitat for approximately 190 birds, 61 mammals, 8 reptiles, and 6 amphibians (Groves et al., 1997)… Most however, are primarily associated with either the Camas Prairie or coniferous forest… The subbasin's coniferous forest varies from warm, low-elevation ponderosa pine, to cold, high-elevation whitebark pine. Similar coniferous forest abuts the subbasin to the north, east, and south, although there are subtle differences that affect wildlife (USDI-FS, 1998A:99)."

The SFLA concludes by recommending priority management themes by resource area, including wildlife and vegetation. Wildlife habitat themes were recommended for each of the 13 ecological reporting units (ERU), one of the ERUs was the American River watershed. The priority American River ERU wildlife habitat themes included: produce early seral habitat; conserve late seral habitat; and enhance wildlife security (USDI-FS, 1998A:140). The priority American River ERU vegetation theme was to restore vegetation pattern for Lower American River, specific to VRU 6 (USDI-FS, 1998A:139).

American River Watershed

The American River watershed is dominated by moderately warm, moderately dry grand fir (habitat group 3) and moderately warm, moist grand fir (habitat group 4). Key habitat features include riparian zones and streams, moist and wet shrublands and meadows, and moist old growth. Refer to Section 3.3 (Vegetation) for more information about cover types, structure, and canopy cover in the American River watershed. Habitat groups 3 and 4 are characterized by moderately cool and relatively dry grand fir and moderately warm and moist grand fir habitats. Tree species characteristic of this habitat include grand fir, Douglas-fir, lodgepole pine, Engelmann spruce and occasionally ponderosa pine and western larch. Understories range from beargrass and huckleberry to more diverse shrub and forb understories. These habitats are found at mid elevations on ridges or rolling hills in the south and east parts of the subbasins and on north slopes and lower slopes in areas that are too dry for western red cedar.

Other common habitat groups found within the watershed include cool, moist subalpine fir (habitat group 7), cool, wet subalpine fir (habitat group 8), and cool, moderately dry subalpine fir (habitat group 9). These habitat groups are dominated by subalpine fir, Engelmann spruce, and lodgepole pine with western larch and Douglas-fir less common. The cool and moist subalpine fir is common at upper

elevations on north aspects and moist lower slopes. The cool and wet subalpine fir is uncommon and occurs at upper elevations in riparian areas. Cool and moderately dry subalpine fir is very common on upper elevation ridges.

Wildlife Use of Lodgepole Pine Habitat

The dominant cover type occurring within the project area is lodgepole pine, of which the majority is dead or dying (for specifics, see Section 3.3 Vegetation). Lodgepole pine cover type dominance is 53% of the Eastside Project area and 15% of the American River watershed.

Information in this section of the document was extracted from the Forest Service Fire Effects Information System in November 2004 (USDA-FS, 2003e) and from the Red Pines Final EIS (2005b). Mule deer, moose, and elk may browse lodgepole pine, generally when other food is scarce. Lodgepole pine forests provide summer range for big game animals and habitat for a variety of non-game birds. Small mammals including snowshoe hares, pocket gophers, voles, porcupines, and squirrels feed on the cambium of lodgepole pine, as do porcupines and black bears. Downed lodgepole pine provides drumming sites for ruffed grouse.

Lodgepole pine seeds are an important food source for red crossbills year-round. Blue grouse and spruce grouse also eat seeds as well as needles of lodgepole pine. In late summer and fall, seeds are important for small mammals, especially red squirrels, which are lodgepole pine's most significant seed predator.

In Washington, densely stocked lodgepole pine stands are preferred foraging habitat for Canada lynx due to abundant populations of snowshoe hares. Mountain pine beetle larvae harbored by lodgepole pine are an important food source for woodpeckers.

Lodgepole pine stands provide cover for big game animals, upland game birds, small non-game birds, and small mammals. Cover value for big game animals changes over time, reflecting the growth and structural development of lodgepole pine stands. Lodgepole pine is used for roosting cover by ruffed grouse and provides nesting sites for a variety of birds including the northern goshawk.

Wildlife Habitat and Communities in Post-Epidemic Lodgepole Pine Forests in Northern Utah

Stone (1995) studied "The Impacts of a Mountain Pine Beetle Epidemic on Wildlife Habitat and Communities in Post-Epidemic Stands of a Lodgepole Pine Forest in Northern Utah." The 1995 Stone dissertation is lengthy. Included here is a brief summary of findings.

> "The abundance and diversity of wildlife species are generally enhanced following epidemic levels of this insect pest. Exceptions to this pattern are red squirrels, pine grosbeaks and Audubon's warblers…Goshawks were also most abundant in undisturbed stands…
>
> The most important aspect of forest habitat changes following the epidemic…was the increase in understory biomass as canopy foliage was reduced. Understory plant species diversity and structural heterogeneity also contributed significantly to explaining the variability in species' abundances in affected stands…The abundances of most species of birds and mammals were highest when understory plant biomass, species diversity, and heterogeneity had high values. Grazing herbivores appeared to be among the animals most benefited by mountain pine beetle epidemics in these lodgepole pine stands."

The resulting species diversity of understory plants, insects, birds, and mammals over the continuum of beetle-caused tree mortality generally suggests that species richness is highest when disturbance is intermediate in frequency or intensity. However, species diversity of the insect community and the small mammal community appeared to remain high or decrease only slightly in the most severely-disturbed stands. The study did not address colonization rates of new species, extinction rates of species, or competitive interactions between species.

Additionally, the cause of the increased diversity at moderate levels of beetle-caused tree mortality *could not* be determined. However, a high degree of association does exist between the diversity and abundance of avian and mammalian species and the habitat variables that indicate resource (principally food and cover) abundance, diversity, and heterogeneity.

The study concludes that the bark beetle epidemic was an intermediate type of disturbance in the northern Utah forest. The intensity of disturbance in these situations was identified as the primary factor of the disturbance regime in creating environmental heterogeneity or patchiness in the landscape. The American River was at 50–60% lodgepole pine mortality in 2003 (USDA-FS, 2005a), placing the American River environment in a moderate to high mortality category according to Stone (1995).

Past Events Affecting Existing Wildlife Habitat Conditions

The American River landscape has changed over the last 120 years in response to vegetative succession, insect and disease activity, timber harvest, road building, human-caused fire and fire exclusion, grazing, mining, and the introduction of non-native species. Motorized and non-motorized recreation use of forest habitats has altered wildlife habitat and use patterns as well. Fires, timber harvest, and fire exclusion have resulted in areas of lodgepole pine dominance. Harvest activities, as well as human-caused and natural wildfires, have removed larch and ponderosa pine overstories occurring at low and mid-elevations, leaving smaller size class lodgepole and mixed conifer understories.

Forest tree size classes and timber stand structure have changed from historic conditions; the most conspicuous change has been in early seral habitats and mature forest of medium and large trees. American River climate, geology, management history, species composition and fire history support smaller trees with lodgepole pine dominating in areas. Relatively simple one- and two-story stands have transitioned into complex multi-story stands in some places. Natural variation in structure within and between stands has declined. Past timber harvest units are simple, small to medium patches, without snags or residual large fire-resistant trees. Natural timber stands often had snag and residual large tree components and varied widely in size and shape. Low and mid elevation mature forest habitats have been fragmented by timber harvest and roads. The late 19th to early 20th century wildfires plus the 1950s–1990s timber harvests have left many areas low in large legacy trees, snags, and down wood. The recent lodgepole pine mortality has created dense patches of small-medium (9–14 inches dbh) snags; however they have lower utility to wildlife than other preferred tree species for snags. The preferred snags in the American River watershed are large (>21 inches dbh) ponderosa pine, western larch and Douglas-fir.

Lodgepole Pine Mortality

Lodgepole pine areas and mixed conifer forest (much of which has a lodgepole pine component) were established after wildfires in the late 1800s. These habitats have grown to small and medium tree size. Currently, the American River watershed is exhibiting widespread lodgepole pine mortality from a mountain pine beetle epidemic. More information can be found in Section 3.3 (Vegetation) of this document. Beetle epidemics predictably interact with fire, drought, and other climatic events to shape vegetative successional trends and structure plant communities. The current mortality is expected in lodgepole systems, also expected is large, stand-replacing fire. In the absence of wildfire, canopy cover will continue to decline and will continue affecting species use based on canopy cover conditions. Some species are negatively affected (i.e., fisher) and some are positively affected (i.e., elk).

Timber Harvest

Within the American River watershed, approximately 15 percent (8,820 acres) has undergone some sort of timber harvest (USDA-FS, 2005a). Past timber harvest left few live and dead medium and large trees in harvested areas compared to what would be left in an area maintained by wildfire disturbances.

Access Management/Recreation Development/Urban Area

Highway 14 parallels American River along the lower reach and provides the main access to Elk City. There are about 269 road miles in the American River watershed. Motorized use is restricted on approximately 55 percent of these roads, some of which are not passable due to vegetative growth. Groomed snowmobile routes overlap many of the watershed's roads and trails. Snowmobiles use non-groomed areas incidentally. Motorized use is increasing and use of motorized vehicles is not limited to roads and trails. Road restriction violations and off road and trail use of motorized vehicles has increased, increasing potential wildlife disturbance.

The effects on wildlife from roads, trails and recreational facilities (i.e., campgrounds) are generally negative. Roads and trails result in increased human access, habitat fragmentation, direct habitat alteration, disturbance, and in some cases direct mortality due to vehicle collisions. Roads and trails increase human access to once secure areas. Roads and trails increase human-animal encounters, increasing trapping, hunting, and poaching pressures. Access restrictions mitigate many of these effects. Habitat alterations (sometimes permanent) are associated with motorized and non-motorized recreation, development of campgrounds and facilities, and establishment of dispersed camping areas, among other activities. Motorized and non-motorized trails perpetuate human use within the American River watershed and continue to be places where human-animal encounters are probable. High human use areas (campgrounds, roads and trails) may be avoided by some species.

Mining

Mining has occurred throughout the watershed, with intensive mining activity occurring in the Elk City township. A minimum of 307 acres has been affected by dredge mining. American River, Little and Big Elk Creeks, and Buffalo Gulch have been most affected (USDA-FS, 1998a).

Noxious Weed

Weeds displace valuable forage plants and affect herbaceous communities important to wildlife. There is risk that current infestations will spread or new invasive species will enter the watershed. Invasive plants can expand following human-caused or natural disturbances and colonize degraded as well as intact habitats. Refer to Section 3.3.5 (Weeds) for more information.

3.7.3 Indicator 1–Threatened or Endangered Species

Listed species that may occur within the project area include gray wolf (experimental non-essential), Canada lynx (threatened), and bald eagle (threatened).

Gray Wolf

Existing Condition

Wolves were reintroduced into north central Idaho beginning in 1995. Within Central Idaho, total confirmed wolf packs now easily exceed 15 (http://mountain-prairie.fws.gov/wolf/annualreports.htm). The Rocky Mountain Wolf Recovery 2005 Annual Report (U.S. Fish and Wildlife Service et al., 2006) stated that an estimated 512 wolves occupy the state of Idaho. The report also identified that Idaho had 59 resident packs (40 packs reproduced and 36 packs qualified as breeding pairs). Based on local sightings, sign and formal monitoring results, wolves are abundant, widely distributed within the upper South Fork of the Clearwater River subbasin, and increasing numbers of reports suggest local populations of wolves continue growing. Relative to the Eastside Project proposal, only one wolf den exists in the general analysis area. The nearest Eastside Project harvest unit is approximately 2–3 miles from the den site. Denning and rearing take place in early spring/summer, proximity of the harvest unit and related activities are not expected to interfere with denning or rearing at this location. In addition, the "no land-use

restrictions may be employed" provision of the Wolf Reintroduction Final Rule (Federal Register, Nov. 22, 1994) is now applicable to wolves throughout the Cottonwood Field Office management area.

There are currently a total of at least 40 active packs in the Central Idaho Wolf Recovery Area. The Wolf Reintroduction Final Rule (Federal Register Nov. 22, 1994) stated that, "*when six or more breeding pairs are established in an experimental population area, no land-use restriction may be employed outside of national parks or national wildlife refuges, unless wolf populations fail to maintain positive growth rates toward population recovery levels for 2 consecutive years*." Currently, wolf populations locally are increasing.

Environmental Effects

Human activities can reduce habitat quality and availability for wolves and their prey. Various lands uses have altered the American River landscape. The presence of roads and motorized trails is likely the most significant landscape alteration related to quality wolf habitat. Wolf habitat is directly related to available prey and human-induced mortality. Wolf habitat was assessed based on Elk Habitat Effectiveness and big game security area effects discussed in the Elk section. Comparing gray wolf home range size with the scale of the proposed actions indicates the actions may not be large enough to make meaningful changes in the American River landscape compared to ongoing changes resulting from the mountain pine beetle epidemic. Wolves can withstand high levels of habitat variability in their relatively large home ranges. As evidenced by the increasing wolf populations in the upper South Fork of the Clearwater River, wolves can and will survive in highly managed settings where human presence is common. Human attitudes and tolerance for wolves are key factors in wolf recovery.

Based on available information, the analysis criteria for wolves and their habitat for this project is relative impact on ungulate prey (elk) and elk habitat effectiveness. Watershed restoration actions and post-harvest slash treatments are not expected to negatively impact wolves, elk or their habitats considerably regardless of alternative. Fire use would help cycle plant nutrients back to the soil increasing vigor and nutritive quality of post-burn forage plants. Noxious weeds that could infest burned and harvested sites would negatively impact elk foraging areas by displacing desirable plants, but this would not be expected to be sufficiently extensive or widespread to be of major significance under any alternatives.

Alternative A (No Action Alternative)
Alternative A would have few direct effects on wolves, but moderately high levels of motorized access in American River would continue to limit elk habitat effectiveness and quality prey habitat in the short term. Indirectly, as dead lodgepole trees begin to fall and eventually increase fuel buildup, the indirect effect of no action in some areas may eventually begin to discourage elk and deer prey from using the units because of difficulty of travel and the appearance of these habitats as "entrapment" areas. In the longer term, the "no action" alternative would increase the probability that untreated sites would add cumulatively to overall fuel loads increasing the total acres with high fuel loading. As a result of fuel continuity, more extensive and severe fires may become more likely which may have adverse affects on elk hiding cover (Refer to the fire effect analysis for more details). Stand-replacing fires would result in an increase of early seral habitats and improved forage production for prey species such as elk, deer, and moose.

Alternatives B, C, and D
The action alternatives would directly provide modest reductions in motorized access in the American River analysis area. Alternative B harvests the most acreage and Alternative C reduces motorized access to the highest levels. Overall, all three action alternatives are very similar, with a difference of only 122 acres between Alternative B with the most acres (1,293) and Alternative D with the least acres (1,171) acres. A difference of only 1.0 mile exists between the highest net reduction for decommissioned roads in Alternative C (minus 1.9 miles) and the lowest net reduction in Alternative D (minus 0.9 mile).

Timber harvest and burning in some stands would reduce available cover and connectivity in the short term. Thinned stands might enhance hiding cover quality over the long term. Under each alternative, certain aspects of he project such as road decommissioning would improve security for gray wolves. However, a slight short term reduction in elk habitat effectiveness would result from implementation of action alternatives. In these areas long term habitat improvement might increase the prey base for gray wolf. Because of disturbance and displacement, there could be a minor effect on the habitat use patterns of prey species, but their population levels or availability as prey would not be affected within the analysis area. Other prey populations, such as small mammals, would not be affected. Creating early seral communities would improve habitat for prey species such as elk, deer, and moose, where security and cover is provided in the long term.

The temporary increase of human activity in the planning area associated with harvest and vegetative treatments could increase the possibility of human-wolf interactions. The construction and use of temporary roads and reconstructed roads could displace wolves and/or their prey. All current motorized access closure would be maintained as part of the proposed project. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts. Road decommissioning would help reduce human intrusion long-term.

Based on the nature and duration of the proposed project, the mortality risk for wolves would remain low. No known key wolf habitat areas, such as den sites, rendezvous sites, or whelping sites would be affected within or outside the project area.

Cumulative Effects (includes foreseeable future actions)

Cumulative effects will be addressed within the American River watershed.

Alternative A would have relatively little immediate cumulative effect on wolves or their habitats since no habitat-altering impacts would be directly added to the road density, timber harvesting, human disturbances, and other vegetative impacts imposed by past management. However, indirect effects of tree deaths and continued trend of fuel buildups, when added to existing cumulative effects would negatively affect wolf prey habitats particularly during post-wildfire recovery. An effects determination of “not likely to jeopardize the continue existence of the species or result in destruction or adverse modification of proposed critical habitat” is concluded.

All action alternatives would have moderate immediate cumulative effects because harvest would be directly added to the road density, harvesting, human disturbances, and other vegetation impacts imposed by past management. Longer term cumulative effects may be less impactive than Alternative A because of modest fuel reduction and staged regeneration of harvested areas in the event of wildfires for the entire American River watershed.

American River roads and trails increase human-wolf encounters. Human activities near active dens or rendezvous areas could have the greatest effect on reproducing wolves. Wolves often favor moist or wet meadows for homesites. These meadows are also valued for campsites and pack stock grazing. Current wolf population growth and pack formations in and around the upper South Fork Clearwater River indicate wolves can thrive even where human-wolf interactions occur regularly. Based on this, current actions do not appear to be preventing wolf recovery.

Reducing the exposure of gray wolves and ungulate prey to humans is a factor in maintaining high quality big game habitat and reducing the risk of incidental wolf mortality. The project area contains established human activities and development including roads, timber harvest, home sites, grazing, and recreational opportunities. In addition, the American River watershed receives hunting pressure for deer, elk, and moose, which not only affect the wolf prey base, but increases the number of wolf-human interactions. The most important cumulative effect to gray wolf recovery in Idaho is incidental mortalities from shooting, trapping, and vehicle-caused mortality. This probability increases with increased road access.

A minor amount of road decommissioning would take place under the proposed project, and exiting road access closures would remain in effect. Human access, available cover, and public attitudes largely determine mortality risk to wolves.

Other projects such as the NPNF American and Crooked River Project and private land logging in the area could affect ungulates, small mammals and their habitats. If the end result of these activities is the restoration of more stable vegetative patterns and natural or prescribed fires processes, these actions could help restore declining forage availability, productivity, and nutritional quality of important to big game species. Alternatively, if these actions result in a more fragmented landscape with poor interspersions of foraging and hiding cover, big game populations could decline, reducing the suitability of the area for gray wolves. Administrative uses of closed roads for reforestation or road-related work may affect wolf use of the area. These and other activities such as routine road maintenance, watershed improvements, trail reconstruction, and measures to control weeds are foreseeable and scheduled to occur. Across the analysis area, recreation uses, including hunting, will continue. A Forest Service livestock allotment occurs north of the project area, and grazing occurs on private and BLM lands in the American River watershed. There have been confirmed reports of wolves within the Eastside Project area. No geographic or manufactured barriers exist within the analysis area that would preclude wolf movements to adjacent populations.

The project proposal is consistent with the gray wolf management strategies identified in the South Fork Clearwater River Landscape Assessment (USDI-FS, 1998a), in that activities would help maintain ungulate populations and minimize risks of human-induced wolf mortality. It would be unlikely that individual wolves would be impacted by project activities, and cumulative effects on wolf populations are expected to be small to negligible at the project, watershed, and South Fork Clearwater Rive subbasin levels. The determination for the gray wolf would be "*not likely to jeopardize the continue existence of the species or result in destruction nor averse modification of proposed critical habitat*" is concluded for Alternatives B, C, and D.

Canada Lynx

Existing Condition

Canada lynx have been federally listed as a threatened species since March 2000. Although lynx have sometimes been portrayed as a late-successional forest species, lynx appear to be more closely associated with a mosaic of late- and early-successional states (Koehler and Aubry, 1994:86–89).

Suitable western mountain habitats for lynx are more fragmented and restricted in extent compared to Canada and Alaska habitats where high quality habitats are more prevalent. These habitat differences may be key to explaining why population strongholds are limited to Canada and Alaska boreal forests. Providing protected areas in optimal western mountains lynx habitat may be important for lynx persistence (Ruggiero et al., 1994) however, the American River watershed contains no large amounts of high quality or optimal boreal forest habitats.

Lynx typically occupy Idaho habitats occurring above 4,000 feet elevation. Lynx utilize Engelmann spruce, subalpine fir, or lodgepole pine habitats providing a mosaic of forest age classes. Lynx require cover for stalking and security, and usually do not cross openings wider than 300 feet (Koehler and Brittell, 1990). Forests that are about six years or older in 20 to 25 acre patches provide lynx foraging habitat. Koehler (1990) found that lynx prey almost exclusively on snowshoe hares. Forest wildfires and timber harvesting created American River lynx foraging habitat. Fire exclusion has halted fire-created lynx forage development. However, the onset of fire suppression coincided with the beginnings of active timber management. A large amount of the harvest units have revegetated to the point they no longer provide optimal lynx habitat. The ongoing insect epidemic is creating more foraging opportunities as lodgepole habitats revert to young grass/forb and shrub and seedling communities. Forest fires, usually following an insect event, will create abundant foraging habitat, but opening sizes may limit lynx use.

Lynx denning habitat is most often characterized as mature forests in moist or wet habitats. Denning sites can occur in a high density of logs, one to four feet above the ground (Koehler, 1990). Down logs and stumps are important for denning habitat because they provide cover for kittens. Timber stands used for denning are between one and five acres, and are connected by travel corridors through mature forest. Favored travel routes are forested areas along ridges and saddles.

No formal surveys for actual lynx occupation within the South Fork Clearwater River subbasin or the analysis area have been completed to date, but confirmed reports and unconfirmed sightings of lynx presence have been documented within the Nez Perce National Forest boundary. No recent lynx sightings have been confirmed. Lynx analysis unit (LAU) delineations and mapping of lynx habitat has been completed for the entire Cottonwood FO management area. Designation of LAUs and mapping of suitable habitat was coordinated with the Nez Perce National Forest according to Canada Lynx Conservation Assessment and Strategy (Ruediger et al., 2000), which commonly referred to as LCAS.

The Eastside Project contains no stands identified as providing suitable lynx habitats (refer to the updated lynx habitat map dated January, 2004). However, the project area does partially overlap into a LAU (#3020306) that may be indirectly or partially affected by some of the project actions. See Table 3.7.5 for existing habitat conditions.

Table 3.7.5 The No Action (Alternative A) Habitat Conditions and Acreages Within LAU Associated With Eastside Project

LAU #	% Denning	% Foraging	% Unsuitable	Total Habitat Acres	Drainage
3020306	18	81	<1	19764	American

The South Fork Clearwater River Landscape Assessment management theme for American River drainage recommend “producing early seral habitat” as very high priority, and identifies treatment objectives that include “creating forest openings by fire or timber harvest.” From the perspective of the landscape assessment, the goal to benefit lynx habitat would be to “create dense stands of deciduous brush and young conifers attractive to snowshoe hare” (USDA-FS, 1998a).

Despite substantial past harvesting in the analysis area, advance regeneration of trees and cover in plantations has maintained habitat connectivity and travel corridors as defined for lynx in the analysis area. Habitat management for lynx primarily addresses maintenance or improvement of vegetation structure for lynx and their prey.

Lynx are considered relatively tolerant of human presence and activities. Preliminary information (Ruediger et al., 2000:7–10) suggests that lynx may not avoid roads, except at high traffic volumes. Therefore, at this time, there is little compelling evidence to recommend management of road density to conserve lynx.

Several important landscape vegetation limitations must be followed when conducting timber harvest and fuel reductions in designated lynx habitats in order to comply with standards and guidelines outlined in the LCAS. LAUs must maintain at least 10 percent denning habitat, unsuitable acres cannot exceed the 30 percent maximum threshold of total lynx habitat within an LAU, and no more than 15 percent of the suitable lynx habitat can be converted to unsuitable habitat within a decade.

The LAU that includes the project area currently has more than 10 percent denning habitat and is not near the 30 percent maximum unsuitable habitat threshold. For this reason, since denning habitat is relatively abundant, and unsuitable habitat acres (before planned harvest), are well below LCAS thresholds, there is ample opportunity for creation of lynx foraging habitat while staying within all LCAS guidelines. The analysis criteria for lynx and their habitats will be relative amounts of suitable condition lynx habitats that are converted to early seral foraging habitat condition while meeting all LCAS measures. The BLM

Eastside Project is not proposing to modify any suitable lynx habitat. Primary use of the area would be secondary foraging by lynx and connectivity within and between LAUs and suitable habitat.

Environmental Effects

The primary analysis criteria for lynx would be related to desirable acres of mature forest within designated habitats converted to early seral foraging habitat for lynx. None of the alternatives will affect designated lynx habitats. Maintenance of connectivity between suitable lynx habitats and between LAUs is the primary analysis criteria that will be evaluated. Noxious weeds, road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to impact lynx or their habitats directly, regardless of alternative, because no treatments are proposed for lynx habitat in the analysis area.

Alternative A (No Action Alternative)
No vegetation treatments would occur with this alternative, and the overall existing condition would remain unchanged, at least in the short-term. The "no action" alternative neither affects lynx directly, nor converts any acres to early seral habitat. This alternative will have relatively little if any indirect effect to lynx or their habitats. With no action, early seral structure would continue succeeding to older stages and fires risks will increase. Eighteen (18) percent denning habitat would be maintained in LAU 3020306, which is above the 10 percent required minimum identified in LCAS (Ruediger et al., 2000).

At present most of the stands in the project area have a dead or dying overstory of lodgepole pine, with grand fir and spruce seedling regenerating in the understory. In some cases, these seedling and saplings have become dense enough and tall enough to provide habitat for snowshoe hares. With continued fire suppression and no vegetative treatments, seedling and sapling trees would eventually grow out of the reach of snowshoe hares, and self-pruning would reduce the amount of horizontal cover. The amount and distribution of available lynx foraging and snowshoe hare habitats would continue to decline. Open patches would decrease in size and in growth fills and matures in old openings. Stands with small to large-sized trees would continue to mature, providing potential denning and travel habitat for lynx. Given enough time, these stands could develop gaps and microsites that would provide suitable areas for hares and therefore potential foraging habitat for lynx, but overall, succession would result in the decline of the denning/foraging habitat mosaic important to lynx. The BLM project area does not involve mapped lynx habitat, consequently direct effects to lynx foraging habitat would be considered discountable; primary effects would occur to travel corridors within and between LAUs and indirect effects to lynx prey species.

As the mountain pine beetle epidemic continues, areas that currently provide cover will become too open to serve that function. As numerous dead trees fall to the ground, downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas. New, early seral patches would develop in those areas in which seedlings are able to establish themselves, and eventually these sites would develop shrub and tree growth sufficient to provide habitat for hares. In mixed conifer stands with a lodgepole pine component, the loss of beetle-killed trees would create micro-openings and gaps in the canopy that, through time, could provide potential foraging habitat. Those trees that fall to the ground would provide potential denning sites. The BLM project area does not involve mapped lynx denning habitat; consequently direct effects to lynx denning habitat would be considered discountable; primarily may involve some travel or incidental use within the LAU.

Common to All Action Alternatives
Because no BLM alternative will treat acres designated as lynx habitat, overall, no direct effects to foraging or denning habitat are expected to occur. Indirect effects are primarily related to treatments which may affect fragmentation or connectivity within or between LAUs or incidental foraging areas within the LAU. In all the action alternatives, treatments would not be implemented in RHCAs or in old growth. These stands would continue to provide potential travel habitat. Short term larger openings would

occur in stands that are dominated by lodgepole pine; however, effects to connectivity and travel for lynx are considered negligible.

Timber harvest and silvicultural prescriptions would move treated stands into a regenerating condition in the long term, thus increasing the amount of potential travel habitat available in each LAU, and potential incidental foraging areas within the LAU.

In mixed conifer stands, thinning treatments would retain large trees and improve growing conditions for those trees remaining after harvest. For stands with a relatively small lodgepole pine component, silvicultural prescriptions would be designed to maintain 30–50 percent canopy closure. Most large diameter logs would be left on site, and smaller diameter logs may be left in select areas in some units.

Alternatives B, C, and D would slightly improve habitat security compared to Alternative A, by reducing motorized access within the analysis area. Alternative C would have the largest reduction of motorized access.

Individual lynx may use the project area for travel or incidental foraging. The temporary increase in human activity as a result of project implementation would increase the possibility of human-lynx interactions and could disturb, displace, or disrupt individual lynx in the project area. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts. All temporary roads used for project implementation would be decommissioned after treatments are completed. No long-term adverse harassment or potential for mortality is anticipated to result from project implementation.

Alternatives B, C, and D
Alternatives B, C, and D, harvest 0 acres of lynx denning habitat and 0 acres of lynx foraging habitat, consequently, no suitable habitat in LAU 3020306 would be converted to unsuitable. All alternatives would result in negligible impacts to connectivity within and between suitable lynx habitat and LAUs. Indirect affects to designated suitable denning or foraging lynx habitat within the LAU are considered discountable. Riparian restoration and road decommissioning would provide long term benefits to connectivity within and between suitable lynx habitat and LAUs. Alternative C has the highest amount of riparian restoration.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis for lynx includes LAU 3020306 and connectivity within and to adjoining LAUs and suitable habitat.

Fire, wind, insects, and disease have played an important, historic role in maintaining the mosaic of forest successional stages that provide habitat for both snowshoe hare and lynx. With the advent of fire suppression, vegetative mosaics and species composition have been altered and may have reduced the quality and quantity of habitat for snowshoe hares. Denning habitat is becoming more extensive at the expense of foraging habitat. Timber harvest in the analysis area, while keeping pace with a typical fire regime in terms of cumulative acres of stand regeneration (USDA-FS, 1998a), has altered the distribution of lynx habitat, and has left numerous small (<40 acres), uniformly shaped patches. Suitable denning and travel habitat has been harvested or thinned across national forest, BLM lands, and private lands, generally leaving low amounts of snags and large downed wood. Overmature stands that have much structural diversity and numerous gaps and microsites, such as typically occur in old growth forests, are less available in the project area because of past timber harvest that targeted older, larger trees. Initially, openings created in the forest have a negative impact on both hares and lynx, through the reduction in cover and browse species for hares. Eventually, these areas produce good foraging and hunting habitat after about 15 years.

Road systems have increased human access and the potential for human-induced mortality from vehicles strikes or accidental shooting/trapping. Up until 1996, people were allowed to trap lynx in the project

area, potentially impacting population sizes or demographics. Firewood cutting along open roads has decreased downed logs important for lynx and their prey species. Groomed snowmobile routes overlap many of the watershed's roads and trails, and there is at least some snowmobile use of non-groomed trails. Snowmobile tracks can allow other predators access into areas they ordinarily could not use because of deep snow, and these predators could compete with lynx for snowshoe hare or other prey.

Private and public land timber harvest and road construction, fires suppression, livestock grazing, home development, and recreation activities are likely to continue. Cumulatively, these actions have and will continue to affect the distribution of lynx and lynx habitat across the landscape. Private and NPNF actions identified as occurring within the foreseeable future when considered with the Eastside Project would still not exceed established thresholds for foraging and denning. Table 3.7.6 below summarizes the NPNF selected alternative for the American and Crooked River Project FEIS (USDA-FS, 2005a), which would be within LCAS threshold guidance for denning and foraging habitats retained in suitable condition.

Table 3.7.6 NPNF American and Crooked River Project Summary of Effects on LAU 3020306 (American River)

LAU 3020306	Existing Conditions	FEIS Selected Alternative
Acres Denning Treated	0	47
% Denning Retained	18%	17%
Acres Foraging Treated	0	204
Total % Converted to Early Seral	0	1.3%
Total % Unsuitable in LAU	<1%	2%

The "no action" alternative would not add any measurable cumulative effects to lynx or their habitats since no habitat-altering impacts will be added to the road density, tree harvesting, human travel disturbances, and other vegetative impacts imposed by past and present management. The "no action" alternative would temporarily protect the integrity of forested land in the project area, but would contribute cumulatively to habitat imbalances for lynx in the long-term. This alternative meets all LCAS measures. The determination for lynx would be *"no effect."*

The project area occurs within a designated LAU for lynx; however, no acres of designated lynx habitat are modified by action alternatives. The primary effects from the action alternatives are indirect effects that may affect connectivity within and between suitable lynx habitat and LAUs, travel corridors, and indirect effects to security, incidental foraging areas, and denning habitats. Given the current condition of the habitat due to past fire impacts, harvests, roading, human disturbance, motorized travel and other land-disturbing activities, these alternatives add few positive or negative effects cumulatively to the habitat conditions for lynx.

All of the action alternatives would begin to address cumulative changes in patch and landscape mosaics by incrementally increasing the amount of early seral habitat in the project area while maintaining denning habitats, RHCAs, and old growth areas. The project would have few adverse effects at the project and watershed levels and might improve conditions for lynx through time. Across the range of the species, within the landscape level, and analysis area level, project effects would be expected to be negligible.

A determination of effect for lynx as a listed species would be "*may affect, but not likely to adversely affect*" for alternatives B, C, and D.

Bald Eagle

Existing Condition

Primary bald eagle use within the South Fork Clearwater River subbasin is for winter habitat. Within the analysis area, such winter use is primarily associated with the South Fork River corridor or incidental use of adjacent areas. Critical habitat niches for the bald eagle include nest sites, key communal or diurnal roost sites, or key foraging sites. None of the critical habitats are known to occur in the South Fork Clearwater River subbasin. Bald eagles primarily use the lower portions of the river corridor, primarily downstream from Mill Creek, due to the availability of ungulate carcasses and relatively ice-free river conditions during winter. If available, bald eagles will also use fish and waterfowl on wintering areas. Due to ice-up of the South fork Clearwater River at higher elevation in winter and lack of fish and waterfowl availability, relatively little or no use of the American River analysis area occurs by bald eagles during most winters. Sites most commonly used are approximately 30 miles downriver from the project area. However, during mild or "open" winters, bald eagles have been observed in the upper South Fork Clearwater River.

Monitoring of bald eagle populations for over 20 years within North Central Idaho indicates populations that are slightly increasing. The mid to upper reaches of the South Fork Clearwater River would not be expected to be heavy use areas because of ice-up conditions, consequently annual mid-winter counts for these reaches have been relatively low, compared to trend routes at lower elevations. Mid-winter trend counts for the mid- to upper-South Fork Clearwater River (Mt. Idaho Grade to the confluence of Red and American Rivers confluence) have averaged 2.2 bald eagles for the past five years (2001–2005).

Environmental Effects

There are no lakes in the analysis area large enough to support bald eagles. There are no known concentrated feeding or roosting sites in the analysis area. Bald eagles are regularly seen perched along the South Fork Clearwater River during the winter season. Bald eagles principally utilize ungulate carrion during winter occupation of the major river corridors, where ice-up conditions exists, and lack of waterfowl or fish exists. Increasing and maintaining early seral habitat conditions on ungulate winter ranges is a high priority; however, very little winter range occurs within the project area. Based on winter use patterns of bald eagles along the South Fork Clearwater River, to be effective, big game winter range improvements which may benefit eagles need to take place at elevations well below and downstream from the analysis area. Improvement of water quality and fish habitat would result in some indirect effects to the South Fork Clearwater River fish habitat. There is relatively little direct relationship between planned activities in the American River watershed and bald eagles or their habitats. Noxious weeds, road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to impact bald eagles or their habitats considerably regardless of alternative, because of the limited potential direct or indirect impacts to bald eagle habitats and forage species.

Alternative A (No Action Alternative)
This alternative will have no direct and few discountable indirect effects on bald eagles or their habitats. Indirect risks of high intensity, broad scale fires due to fuel-loading would remain and could indirectly impact downstream water quality and fish habitats. No restoration would be conducted for riparian and water quality improvements or improvement of big game forage. Ongoing restoration actions would continue for the South Fork Clearwater River subbasin, which is dependent on future funding. A determination of effect for bald eagles as a listed species would be "*no effect*" for Alternative A.

Alternatives B, C, and D
Action alternatives would have no direct impacts on bald eagles or their habitats. Downstream changes in water quality in the South Fork Clearwater River due to harvests, restoration actions, roads and other actions would have relatively minimal impact on bald eagle foraging habitats and forage species.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for sediment and substrate is the American River watershed and the upper South Fork Clearwater River to just downstream of the mouth of Crooked River.

The indirect and cumulative effects of planned activities on water quality and fish habitats downstream from the analysis area are expected to impose only minor, limited or negligible cumulative impacts on foraging habitats (i.e., potential secondary winter food sources–anadromous fishes), but the magnitude of these impacts are considered very limited.

Aquatic resources in the American River watershed and the South Fork Clearwater River have undergone substantial physical changes from human disturbances such as dredge mining, timber harvest, road construction, domestic livestock grazing, home construction and private land development, agriculture, fires, and fire suppression. It is generally accepted that water quality and habitat in the South Fork Clearwater River is in a degraded condition, both from sediment and temperature impacts (USDA-FS, 1998a; IDEQ et al., 2004). These conditions have likely affected bald eagle numbers and winter use of the South Fork.

Past timber harvest, fires, fire suppression, and mining activity have altered habitat characteristics in the analysis area by reducing the amount and distribution of large and medium trees, snags, and down wood, and by creating numerous, small patches across the landscape. These changes have affected bald eagle ungulate prey species. Prior to fire suppression and timber management, elk and deer populations were dependent upon natural disturbances to create openings that provided the early succession growth they favor for foraging. Elk population numbers in the project area and across Game Unit 15 (which includes the South Fork Clearwater River) are declining. Other projects may also modify ungulate habitat which could affect population numbers on big game winter ranges thus affecting overwintering bald eagles.

The project proposal is consistent with the bald eagle management strategies identified in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a) in that activities would encourage restoration of anadromous fisheries. It would be unlikely that individual bald eagles would be impacted by project activities, and bald eagle populations are expected to have negligible to discountable affects at the project, watershed, or subbasin levels.

A determination of effect for bald eagles as a listed species would be, "*may affect, but not likely to adversely affect*" for Alternatives B, C, and D.

3.7.4 Indicator 2–BLM Sensitive Species

Northern Goshawk

Existing Condition

In Idaho, Northern goshawks (*Accipiter gentilis*) are typically found in montane coniferous forest, where they occupy relatively large home ranges of 1,988 to 9,638 acres in size (Patla et al., 1995). In northern Idaho and western Montana, goshawks nest in stands or groups of tees in the mature to over-mature age classes principally on the mid to lower third of slopes. Douglas-fir and Western larch are preferred nest tree species (Hayward and Escano, 1989). Goshawks prey on a variety of medium-sized forest birds and small mammals. Pole stage or larger stands open enough to permit unimpeded flight are suitable for feeding (Hayward et al., 1990). However, foraging habitat may be as closely tied to prey availability as to particular habitat composition or structure (Patla et al., 1995).

Data from the SFLA is referenced to gain broader scale perspective on habitat availability within and around the project analysis area. Within the larger landscape of the South Fork Clearwater River subbasin, closed canopy old growth comprises some 24 percent of the subbasin coniferous forests, but historically this habitat would likely have accounted for only about 15 percent of the same area (USDA-FS, 1998a:104). Within the American River ERU, age class distributions are currently more favorable to

goshawk habitats than historically. The current amount of goshawk habitat is more prevalent than it was historically. In American River ERU, there is currently 205 percent as much suitable habitat as historically (USDA-FS, 1998b). This can be attributable to increases in more shade tolerant tree species, like grand fir, due to fire suppression and forest succession (USDA-FS, 1998a:83).

Current conditions of stands in the analysis area reflect more than 80 years of fire suppression. In the absence of fire, conifer densities have increased substantially over pre-settlement times. As a result, goshawk habitat is more prevalent in the analysis area now than historically. While overall habitat important to goshawk nesting is more prevalent now in the American River drainage, the distribution and connectivity of late seral and old growth stands is somewhat less effective due principally to past harvest and fire disturbance (USDA-FS, 2005a).

To avoid attracting nest predators, goshawks tend to remain relatively inconspicuous prior to and during early phases of nesting. As a result, active nest sites are difficult and very costly in time and resources to locate. Locating all alternate nests within a given pair's nesting territory may take five or more years of intensive, focused surveys, because each pair of goshawks typically alternate nest use from year to year to avoid chick predation by fishers, great-horned owls, and other predators. From two to as many as nine alternate nests may be used in each nesting territory by a given goshawk pair (Woodbridge and Detrich, 1994).

Pre-project field surveys of timber stands, watershed conditions, and wildlife habitat surveys by several BLM crews of resource specialists during the goshawk nesting and survey season of 2004 did not document any goshawk occurrences. No goshawk nests are known to occur within the project area currently; however, the sighting of a goshawk pair was recorded during July 2003 pre-project NPNF field surveys conducted for the American and Crooked River Project (USDA-FS, 2005a). The pair of goshawk was sighted on adjacent NPNF lands in the American River north of the Eastside Project area.

Goshawk sightings during June, July or August indicate the possibility of nest presence in the local vicinity. In the event active nests are discovered during project implementation within or immediately adjacent to planned harvest units, the nest trees and surrounding area of 10–15 acres would be removed from harvest.

The Habitat Conservation Assessment (HCA) and Strategy (CS) for the Northern goshawk in Idaho (Patla et al., 1995:3) cites that goshawks tend to use stand clusters greater than 61 ha (150 acres) dramatically higher than clusters less than 20 ha (50 acres) in size.

Regional differences exist over best management measures for goshawk habitats in various Forest Service regions, and are driven by responsible opposing viewpoints. Habitat management direction for the goshawk as such, has become region-specific in the western U.S. The USDA-FS, Southwest Region (R3) adopted goshawk nest site guidelines, which manage 2,428 ha (6,000-acre) areas around each nest site.

Much of the Southwest data suggest that extensive harvesting and canopy density reduction in the home range beyond the nest stand can negatively change nesting and hunting habitat structure resulting in reduced hunting effectiveness of goshawks, altered prey availability, and increased competition or predation by other raptors which result in nest losses and local declines in goshawk populations. Major differences exist in forest types, habitat productivities, availability of productive riparian zones, goshawk prey sizes, and prey species abundance between the contrasting precipitation and climate of the two regions. Currently, no guidelines for goshawk nest and habitat protection similar to those for the Forest Service Southwestern Region have been adopted within the Forest Service's Northern Region, Idaho Bureau of Land Management, or for the Eastside Project. Management recommendations proposed by Reynolds et al., (1992) were developed specifically for the southwestern United States. Thus, it would be inappropriate to apply these guidelines to the moister, intermountain west. Given that this project would not harvest old growth stands and that active or newly discovered goshawk nests would be protected, goshawks nests should be adequately protected.

This becomes particularly important given the extent of the current mountain pine beetle infestation and quickly diminishing live canopy cover within the Eastside Project analysis area. Most lodgepole pine in the area over six inches in diameter is now dead or predicted to be dead/near death within a very few years. Most of the existing canopy will thus disappear across thousands of acres in the analysis area. Harvesting some lodgepole pine stands will likely cause little measurable harm to goshawk foraging habitats around any nests. Harvest activities would help reduce fuel levels which in turn may help reduce eventual fire intensities that can threaten important old growth or mature forest stands.

Recent studies suggest that goshawks may not be as tied to old growth forests as previously understood. McGrath et al., (2003) indicate that old growth forest structures are not useful in predicting goshawk nesting habitat. In the northern Rockies, goshawks are often associated with mature forests, not necessarily old growth forests (Squires and Ruggerio, 1996; Clough, 2000).

The habitat information gathered and reviewed by the FWS indicates that changes have occurred in the distribution, amount, and structural characteristics of mature forests throughout much of the western United States. The primary change has been the reduction of mature forest cover by logging, although other factors such as fire suppression and catastrophic fire have also been implicated. While timber management has been demonstrated to affect goshawks at least at local levels (Crocker-Bedford, 1990), forest management practices, such as the use of controlled fire and selective thinning also may make habitats more suitable to goshawks by opening up dense understory vegetation, creating snags, down logs, and woody debris, and creating other conditions conducive to goshawks and their prey (Reynolds et al., 1992). The FWS found "no evidence that goshawk habitat is limiting the population, or that a significant curtailment of the species habitat or range is occurring. Goshawks remain widely distributed throughout their historic range in the western United States (U.S. Fish and Wildlife Service 1998).

For this analysis, goshawk nesting habitat was defined as mesic vegetation with large trees (greater than 10 inches in diameter at breast height or dbh) with closed canopies (greater than 60 percent). Foraging habitat consists of pole-sized trees (greater than 5 inches dbh) or larger with moderate and high closed canopies (greater than or equal to 25 percent). The following table shows the acres and percentage of each habitat for the American River watershed.

Table 3.7.7 Goshawk Habitat Acres within American River Watershed

Watershed	Nesting Habitat Acres (% Watershed)	Foraging Habitat Acres (% Watershed)
American River	17,107 (29%)	44,270 (76%)

By assuming an average home range size of 5,000 acres per bird (Hayward et al., 1990), an analytical index was developed to compare the effects of each alternative. Under the existing condition, 44,200 acres in American River could support about 9 goshawks. [Note: Because goshawks can forage in the stands they nest in, acres of nesting habitat are included in the foraging figures.] It is important to realize that this number is simply an analytical index and in no way attempts to measure actual densities or numbers of goshawks on the landscape. Goshawk home ranges can vary in size, and it is not known how much home range overlap might exist within or between goshawks or goshawk pairs.

FIA indicate that, overall, goshawk habitat is widely distributed across the Forest (this includes nesting and foraging habitat) (USDA-FS, 2005a). The total potential goshawk habitat represents approximately 38 percent of the forested lands forest-wide with a 90 percent confidence interval of 34 to 42 percent. Within the American River watershed, total goshawk habitat amounts to 69 percent of the forested lands. Table 3.7.8 displays the FIA data at three scales: Nez Perce National Forest; Subbasin (4th HUC); and watershed (5th HUC) (USDA-FS, 2005a). The amount and distribution of habitat is both a reflection of the capability and current condition of the landscape.

Table 3.7.8 Inventory/Analysis Data for Goshawk Foraging and Nesting Habitat[1]

Goshawk Habitat Use	Nez Perce Forest			South Fork Clearwater River			American River Watershed		
	CI Low	Mean	CI High	CI Low	Mean	CI High	CI Low	Mean	CI High
Goshawk Nesting Habitat	16	19	22	22	28	35	18	38	58
Goshawk Foraging Habitat	34	38	42	45	52	60	50	69	88

[1]Forest inventory and analysis data at three scale for percent goshawk foraging and nesting habitat, including 90 percent confidence intervals (CI low and CI high) (USDA-FS, 2005a).

Environmental Effects

Timber harvesting at or very near goshawk nest sites can directly disturb or displace birds, potentially impacting nest success and future nesting. All existing old growth stands and RHCAs have been protected in the Eastside Project area. Most trees harvested would be lodgepole pine in intermediate size classes. Some larger trees (various species), in mixed conifer stands are planned for harvest in all action alternatives. Goshawk-preferred nest species (larch, Douglas-fir) would be favored for retention in stands where they occur and may contribute as potential future nest trees.

All action alternatives of the Eastside Project implement general conservation strategies from the *Goshawk Habitat Conservation Assessment and Conservation Strategy for Idaho* (Patla et al. 1995). Protection of nest sites and surrounding forest vegetative conditions is done principally through nest site mitigation. All action alternatives would provide protection for a 10–15 acre, no-harvest buffer around each active nest discovered. No additional mitigation is deemed necessary to maintain goshawk population viability in the project and analysis area, because suitable habitat is 205 percent of historical amounts in the American River watershed (USDA-FS, 1998b).

Alternative A (No Action Alternative)
No direct effects to old growth stands, replacement old growth stands, or any mixed conifer stands will occur, thus existing old growth habitat patch sizes and connectivity will be maintained. Existing goshawk habitat would not be harvested under this alternative. In general, nesting habitat would increase and foraging habitat would decrease as forest succession continues to fill in understories and increase stand canopy closure. In predominantly lodgepole pine stands, additional trees would die as a result of the mountain pine beetle epidemic, and dead trees would eventually fall to the ground. This process would create openings and gaps that could be utilized as foraging habitat by goshawks. In lodgepole pine stands, the quality and amount of foraging habitat would be reduced if canopy cover is reduced substantially from dead and dying trees. High densities of downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas.

Areas with infrequent and very infrequent fire return intervals would proceed as they do naturally. This includes fuel buildup as stands mature and decline from age and outside agents such as beetles. As a result of this buildup, lethal, stand-replacing fires could become more prevalent (refer to fire effects analysis for additional details).

Fuel build-up resulting from fire suppression activities would continue, thereby increasing the likelihood of a stand-replacing fire. Stand-replacing fires could potentially reduce nesting habitat across the project area. However, the size and severity of the disturbance could either eliminate or create the various elements of goshawk habitat.

Alternative B, C, and D
The action alternatives could directly impact patches of mature mixed conifer habitats, but would produce no direct effects to existing old growth stands, or patch sizes. Old growth habitat connectivity would remain consistent within historical patterns by retention of riparian corridors. Relatively moderate levels of harvest of mixed conifers will be harvested.

Regeneration harvest and thinning can impact goshawks by removing suitable nesting habitat, although it can also create forest edges and in some cases smaller openings that goshawks could use for foraging. The proposed project design spreads potentially affected acres across the entire project area. As a result, most resident goshawks are likely to experience some habitat loss at a small or site-specific scale. Project activities near an active nest site could cause temporary avoidance or abandonment, depending on the length and intensity of activity.

Proposed treatments would break up the fuel patterns, which in turn could reduce the likelihood of severe fire effects within the project area and effects to goshawk habitat.

Table 3.7.9 shows the changes in goshawk habitat by alternative. Effects of the action alternatives would vary, with Alternative B and C being very similar. Alternative B would modify the greatest amount of nesting habitat. Alternative D would modify the least amount of nesting and foraging habitat.

Table 3.7.9 Estimated Acres of Northern Goshawk Habitat Modified by Each Action Alternative (American River Watershed)

American River	Alt A	Alt B	Alt C	Alt D	NPNF[1]
Acres (%) Nesting Habitat Treated	0	193 (1.6%)	182 (1.5%)	165 (1.5%)	384 (2.2%)
Acres (%) Nesting Habitat Treated and <60% Canopy Cover Maintained (Loss of Nesting Habitat)	0	-155 (-0.9%)	-144 (-0.8%)	-127 (-0.7%)	-384 (-2.2%)[2]
Acres (%) Foraging Habitat Treated	0	1,234 (2.9%)	1,223 (2.9%)	1,148 (2.6%)	995 (2.2%)
Acres (%) Foraging Habitat Treated and <25% Canopy Cover Maintained, (Loss of Foraging Habitat)	0	-770 (-1.7%)	-667 (-1.5%)	-667 (-1.5%)	-995 (-2.2%)[2]

1 Nez Perce National Forest (NPNF) selected alternative for American and Crooked River Project FEIS (USDA-FS, 2005a).
2 NPNF modified acres and loss of goshawk nesting or foraging habitat dependent on percent of canopy cover removed within each treatment stand.

Nesting Habitat: Changes in potential nesting habitat acres are identified by alternative in Table 3.7.9. Silvicultural treatments that encourage the development of large trees (greater than 21 inches dbh) over the project area and canopy cover over 60% would benefit goshawk nesting habitat. However, any harvest activity that would reduce canopy closure of mature stands below 60 percent would reduce the potential for those stands to be used as nesting habitat.

All alternatives would harvest less than 2 percent of potential nesting habitat (165–193 acres). Alternative D would modify the fewest acres of goshawk nesting habitat (less than one percent of the existing habitat in American River watershed), and Alternative B would modify the greatest acreage (less than 1.5 percent of existing habitat in American River watershed). No harvest activities would take place in old growth areas or RHCAs, so these stands would remain relatively intact and available for potential goshawk nest sites. Temporary roads would also reduce the amount of goshawk habitat.

Foraging Habitat: Changes in potential foraging habitat acres are outlined by alternative in Table 3.7.9. Alternative D would modify the fewest acres of goshawk foraging habitat (less than 3 percent of the existing habitat). Alternatives B and C would treat slightly more foraging habitat. However, Alternative C and D would have similar losses of foraging habitat because of adverse reductions in canopy cover, and would be followed by Alternative B. Using the Forest Service analytical index (USDA-FS, 2005a), under

Alternatives B, C, and D, enough goshawk habitat would remain in the project area to support about 9 goshawks, which is similar to current conditions in the American River watershed.

Harvesting would create openings across the project area. Goshawks could potentially use these newly created edges and openings as hunting areas. However, should the proposed harvest activities create large openings, particularly if the new units are adjacent to other past harvest units, the amount of foraging area for goshawks could decrease. Timber removal may affect the distribution of some goshawk prey species.

In mixed conifer stands, thinning understory trees such as dead, dying, and merchantable green lodgepole pine and other conifer species, would open up the lower layer of vegetation and create flyways through which goshawks could maneuver. Thinned stands could maintain or create more favorable conditions over time for goshawks as these stands develop structural diversity. Thinned, mixed conifer stands would be particularly useable if stands are managed for canopy closure values above 40 percent. Silvicultural prescriptions that retain many or all of the larger, wind-firm trees in Douglas-fir, and mixed xeric conifer stands, would maintain and improve these stands as potential goshawk foraging habitat.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for goshawk is the American River watershed.

The "no action" alternative would not further contribute to harvest-related fragmentation and/or losses of existing or replacement old-growth habitat stands. As a result of widespread, cumulative fuels buildup, lethal, stand-replacing fires could become more prevalent with attendant risks to old growth habitats (refer to fire effects analysis for additional details). Due to a measure of uncertainty in estimating intensity of future fire risks to limited habitat conditions considered important for goshawk nesting, there could be impacts to goshawk habitat with this alternative.

The Eastside Project action alternatives would result in habitat losses that add to cumulative losses of existing and potential future goshawk habitat related to previous harvests, roading, and post-disturbance harvest projects as well as reasonably foreseeable harvests on private and nearby Nez Perce National Forest lands in the analysis area. Implementation of the FS American and Crooked River Project selected Alternative D would modify an additional 384 acres of nesting habitat (2.2%) and 995 acres of foraging habitat (2.2%) within the American River watershed, which would result in additional cumulative losses to those identified for Eastside Project in see Table 3.7.9. The Eastside Project and FS American and Crooked River Project cumulatively may result in a loss of 2.9 to 3.2 percent of existing nesting habitat and 3.7 to 3.9 percent foraging habitat. As identified above, current conditions for suitable goshawk habitat are above historical levels.

Eastside Project Alternative D would have the least cumulative effect (followed by C and B) and would contribute modestly to harvest-related fragmentation at the project level, adding to cumulative landscape fragmentation, increased openings, and human-disturbance risks. In untreated areas, the results would be the same as Alternative A.

Timber harvest and road construction have reduced the amount and continuity of mature and old growth habitat across the analysis area. In addition, past actions frequently targeted medium and large trees and valuable ponderosa pine and western larch. These actions have left fewer appropriate stands and trees within stands that could be used by goshawks. At the same time, active fire suppression since the early 1900s has allowed succession to continue in those stands that have not been harvested. Relatively simple one- and two-story stands have transitioned to more complex multi-story stands with increased canopy closure and individual trees have grown larger. Some of these stands may now qualify as suitable goshawk nesting habitat. Increased fuel loads from fire suppression and the current mountain pine beetle epidemic increase the chance of stand-replacing fires, which could remove some stands of older forest habitats from the landscape. Other private lands projects in or near the project area may also alter the amount, distribution, and connectivity of older, dense-canopied stands.

Project activities would likely improve growing conditions for grasses, forbs, and shrubs, and seedling trees in harvest units, which may in turn improve habitat conditions for some goshawk prey. Similarly, other projects that open or remove canopy may create edges and clearings that provide foraging habitat for goshawks. New harvest units or silvicultural treatments that abut old units or treatment areas could create openings too large to be used by goshawks, thus decreasing the acres of suitable habitat. The mountain pine beetle epidemic is creating large openings in some areas within the American River watershed.

Although individual birds or pairs could be disturbed by project activities, none of the proposed alternatives should affect populations at the local or watershed level. Management practices proposed in the Eastside Project would result in negligible effects to Goshawk habitat at the watershed level.

Goshawks are relatively common and widely distributed across the Nez Perce National Forest (USDA-FS, 2005a). Based on population monitoring information, there are currently at least a dozen known goshawk nest territories (fourteen known nests) widely distributed throughout the Nez Perce National Forest (USDA-FS, 2005a). Based on formal population monitoring results, widely scattered incidental sightings, and inventoried habitat information, local goshawk population trends remain relatively stable on the Nez Perce National Forest (USDA-FS, 2004b).

The sensitive species determination for goshawk would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

Williamson's Sapsucker

Existing Condition

Williamson's sapsucker habitat use in Idaho is found in montane coniferous forests, especially fir and lodgepole pine (Groves et al., 1997). While conducting 2004 field surveys for the Eastside Project, Williamson's sapsucker were documented in the project area, and they occurred in mixed conifer and lodgepole stands (Craig Johnson, 2004 field notes).

Williamson's sapsuckers are primary excavators creating nest and roost sites for themselves and other cavity-dependent species in forested habitats. They forage by pecking, gleaning, and feeding at sap wells during the breeding season (Crockett and Hadow, 1975; Jackman, 1975; Bull et al., 1986). Ants may comprise 86% of the birds' food. They also eat white wood-boring larvae and moths of spruce budworms. In Colorado, upon first arriving on the breeding grounds, Williamson's sapsuckers fed primarily on the sap and phloem of live conifers (Stallcup, 1968, Crockett, 1975). Crockett (1975) observed each pair establishing four to five sap trees during the breeding season, noting that sap trees were significantly smaller in height and diameter compared to what was available.

They nest in cavities in standing snag/hollow trees; sometimes returning to the same tree, but not the same cavity, year after year (Groves et al., 1997). Williamson's sapsuckers seem to be severely restricted to large diameter trees and snags for their nest requirements, except when nesting in aspen. Bevis (1994) reported the mean dbh of nest trees as 92 cm (n=4); three were in live western larch and one was in a Douglas-fir snag. In Oregon, Bull et al. (1986) observed Williamson's sapsuckers nesting primarily in grand fir forest types, in large snags (mean dbh=70 cm). They nested in both dead (51%) and live tree (49%); mostly in western larch (62%). They are considered a poor excavator and the trees selected for nests had advanced heart rot (64% had broken tops) with most of the snags having died in the past three years.

For this analysis, Williamson's sapsucker nesting habitat was defined as forested stands with large trees (greater than 15 inches) and canopy cover greater than 60%. Foraging habitat consists of nesting habitat, plus pole-sized trees (greater than 5 inches dbh) or larger with canopy cover greater than 25 percent. The

following table shows the acres of each habitat and percentage of habitat within the American River watershed.

Table 3.7.10 Estimated Acres of Williamson's Sapsucker Nesting and Foraging Habitat

Watershed	Nesting Habitat Acres (% Watershed)	Foraging Habitat Acres (%Watershed)
American River	17,107 (29%)	44,270 (76%)

Environmental Effects

No existing old growth stands would be harvested under any alternative. An abundance of dead and dying lodgepole pine is present throughout the analysis area as foraging habitat and this will not change substantially, regardless of any action alternative. Therefore, the analysis criteria for Williamson's sapsucker is the degree to which each alternative maintains and protects mature mixed conifer stands preferred for future nesting habitat. The removal of dead, dying, and green trees would remove foraging and nesting sites and would constitute habitat losses. The net effects of harvest on Williamson's sapsucker would be relatively minor within the context of each alternative because of the limited areas treated. Noxious weeds, road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to impact Williamson's sapsucker or their habitats considerably regardless of alternative. An estimated 44–47 percent of total harvest acres would occur in mixed conifer stands for the action alternatives.

Alternative A (No Action Alternative)
Existing Williamson's sapsucker habitat would not be harvested under this alternative. No direct effects to old growth stands would occur, thus existing mature and old growth habitat patch sizes and connectivity would be maintained for nesting habitats. In general, nesting and foraging habitat would increase as forest succession continues to fill in understories and increase stand canopy closure. Indirect effects of the "no action" alternative may increase future risks to foraging habitat and some old growth or mature stands and a subsequent reduction of nesting habitat from more severe fires occurring with accumulation of fuels.

Alternatives B, C, and D
All action alternatives can impact Williamson's sapsuckers by removing suitable nesting habitat, as well as snags and down wood used for foraging. The proposed project design spreads potentially affected acres across most of the analysis area. As a result, most resident Williamson's sapsuckers would be likely to experience some habitat loss at a small or site-specific scale.

Table 3.7.11 Estimated Acres of Williamson's Sapsucker Nesting and Foraging Habitat, by Alternative

American River Watershed	Alt A	Alt B	Alt C	Alt D	NPNF[1]
Acres (%) nesting habitat treated	0	193 (1.1%)	182 (1.1%)	165 (0.9%)	384 (2.2%)
Acres (%) nesting habitat treated resulting in canopy cover <50% (loss of nesting habitat)	0	-155 (-0.9%)	-144 (-0.8%)	-127 (-0.7%)	-384 (-2.2%)[2]
Acres (%) foraging habitat treated	0	1234 (2.5%)	1223 (2.5%)	1148 (2.3%)	995 (2.2%)
Acres (%) foraging habitat treated resulting in canopy cover <25% (loss of foraging habitat)	0	-770 (-1.6%)	-667 (-1.4%)	-667 (-1.4%)	-995 (-2.2%)[2]

[1] Nez Perce National Forest (NPNF) selected alternative for American and Crooked River Project FEIS (USDA-FS, 2005a).
[2] NPNF modified acres and loss of Williamson's sapsucker nesting or foraging habitat dependent on existing conditions and percent of canopy cover removed within each treatment stand. No specific analysis was conducted by NPNF for Williamson's sapsucker.

Changes in potential nesting habitat acres are identified by alternative in Table 3.7.11. Silvicultural treatments that encourage the development of large trees (greater than 21 inches dbh) over the project area would benefit Williamson's sapsucker nesting habitat. However, any harvest activity that would reduce canopy closure below 50 percent would reduce the potential for those stands to be used as nesting habitat.

The action alternatives would harvest approximately one percent of the nesting habitat at the watershed scale. Alternatives D would modify the fewest acres of Williamson's sapsucker nesting habitat (less than one percent of the existing habitat in American River), and alternative B and C would modify the greatest acreage (less than one percent of existing habitat in American River). No harvest activities would take place in allocated old growth areas or RHCAs, so these stands would remain relatively intact and available for potential Williamson's sapsucker nesting habitat. The disturbance from road work and the edge effects created by the roads would probably not be of sufficient magnitude to change the suitability of these stands for nesting Williamson's sapsuckers.

Changes in potential foraging habitat acres are identified by alternative in Table 3.7.11 above. Alternatives D would modify the fewest acres of Williamson's sapsucker foraging habitat, and alternative B and C would modify the greatest acreage. All action alternatives would be expected to modify approximately 2.5 percent of the existing habitat in the American River watershed.

In mixed conifer or other vegetation types where lodgepole pine is a component of the stand, thinning prescriptions that leave greater than 25 percent canopy closure with adequate snags and down wood, such treatments would continue to provide foraging suitable foraging habitat for Williamson's sapsuckers. Thinned stands could maintain or create more favorable conditions over time for Williamson's sapsuckers as these stands develop structural diversity. Silvicultural prescriptions that retain many or all of the larger (greater than 20 inches), wind-firm trees in Douglas-fir and mixed conifer stands, would maintain and improve these stands as potential Williamson's sapsucker foraging and nesting habitat.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for Williamson's sapsucker is the American River watershed.

The "no action" alternative would allow stands to transition to higher fire hazard conditions which would be cumulative to effects from past fire exclusion, roading effects, loss of large diameter trees, and other human-caused impacts on habitat quality. Harvests planned for nearby private or NPNF lands would add cumulatively to habitat losses and prior impacts. This alternative would indirectly result in slightly greater cumulative risks of fire damage or losses to some individual stands of existing old growth and/or mature mixed conifer stands.

Timber harvest and road construction have reduced the amount and continuity of mature and old growth habitat across the analysis area. In addition, past actions frequently targeted medium and large trees and valuable ponderosa pine and western larch snags. These actions have left fewer suitable stands, and trees within stands, that could be used by Williamson's sapsuckers. Past harvest left few snags or legacy trees, and little down wood. As these older harvest units have begun to mature, they are devoid of the structures that could be utilized by Williamson's sapsuckers. At the same time, active fire suppression since the early 1900s has allowed succession to continue in those stands that have not been harvested. Relatively simple one- and two-story stands have transitioned to more complex multi-story stands with increased canopy closure and individual trees have grown larger. Some of these stands now qualify as suitable Williamson's sapsucker habitat. Increased fuel loads from fire suppression and the current mountain pine beetle epidemic increases the chance of stand-replacing fires that could potentially remove stands or acres of older forest habitats from the landscape. Fires would create additional snags, but it would take many years before a new forest would mature to levels where burnt stands could be used by Williamson's sapsuckers. Other private and NPNF projects within the analysis area may also alter the amount, distribution, and connectivity of older, dense-canopied stands.

Implementation of the NPNF American and Crooked River Project selected Alternative D would modify an additional 384 acres of nesting habitat (2.2%) and 995 acres of foraging habitat (2.2%) within the American River watershed, which would result in additional cumulative losses to those identified in Table 3.7.11 above. The Eastside Project and FS American and Crooked River Project cumulatively may result in a loss of 2.9 to 3.1 percent of existing nesting habitat and 3.6 to 3.8 percent foraging habitat.

The proposed project and other projects proposed in the area could open or remove additional forest canopy cover. When new units abut old harvest units and stands undergoing beetle kill, the number and/or size of the openings could be too large to be used by Williamson's sapsuckers. The mountain pine beetle epidemic is creating many, large openings across the landscape. Within the American River watershed lodgepole pine dominant stand cover comprises approximately 15% (see Section 3.3 Vegetation).

Although individual birds or pairs could be disturbed by project activities, none of the proposed alternatives should affect populations at the local or watershed level.

The sensitive species determination for Williamson's sapsucker would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

Olive-sided Flycatcher

Existing Condition

Olive-sided flycatchers are found in forests and woodlands (especially in burned-over areas with standing dead tress) such as subalpine coniferous forests, mixed forests, and borders of lakes and streams (Groves et al., 1997). They generally breed in montane and boreal forests in the mountain west of North America, as well as throughout the boreal forests of Canada (Kaufman, 1996). Olive-sided flycatchers are most often associated with forest openings, forest edges near natural (i.e., meadows, wetlands, canyons, rivers) or man-made openings, or open/semi-open stands with a low percentage of canopy closure (Kaufman 1996; Altman, 1997). Hutto and Young (1999) found olive-sided flycatchers were more abundant in early post-fire habitats than in any other major cover type. They had similar occurrence in seed tree cover types, and were only slightly less common in clear-cut and shelterwood cover types. They occur more frequently in disturbed than in undisturbed forests in the northern Rocky Mountains. In Douglas-fir forests of west-central Idaho, olive-sided flycatchers were found to be more abundant in forest types created by logging methods such as diameter-cut and single tree selection that retained residual medium and large trees (moderate to high canopy height) and low canopy closure (Medin 1985; Medin and Booth 1989). In northwestern Montana, Tobalske et al. (1991) found olive-sided flycatchers to be more abundant in logged (clear-cut and partial cut) than in unlogged forest.

Olive-sided flycatchers have been classified as common in spruce and aspen forest types, uncommon in mixed conifer, ponderosa pine, pine-oak, and cedar-hemlock forest types, and rare in lodgepole pine and pinyon-juniper (Hejl et al., 1995). In the northern Rockies, Hutto (1995) found that among undisturbed types, olive-sided flycatchers occurred most often in spruce-fir, marsh-wetland, and mixed conifer types, with some occurrence in riparian shrub, cedar hemlock, Douglas-fir, lodgepole pine, and ponderosa pine types. Although olive-sided flycatchers are more common in disturbed, early successional types, they appear to require residual large snags and/or live trees for foraging and singing perches (Altman, 1997).

For this analysis, olive-sided flycatcher nesting habitat was defined as forested stands with trees greater than 10 inches dbh and canopy cover 10–25%. Foraging habitat consists of shrublands, all seedling/sapling stands (early seral), and all other forest stands with a canopy cover less than 25%. The following table shows the acres of each habitat and percentage of habitat within the American River watershed.

Table 3.7.12 Estimated Acres of Olive-sided Flycatcher Nesting and Foraging Habitat

Watershed	Nesting Habitat Acres (% Watershed)	Foraging Habitat Acres (%Watershed)
American River	5000	9000

Environmental Effects

Re-creation of landscape condition (patch size, openings, and amount of edge) within the range of natural variation should benefit olive-sided flycatchers (Montana Partners in Flight, 2000). This may involve the creation of more edge in areas and openings where fire suppression has reduced the heterogeneity of the forest, reduced the amount of edge, and increased the average patch size or it may involve finding ways to reduce "fragmentation" (i.e., increase average patch size, decrease the amount of edge) of forests in managed lands.

All action alternatives should increase suitable habitat for olive-sided flycatcher with the implementation of forest management practices that approximate the structural conditions created by historic fire regimes, both at a stand and at the landscape scale. The action alternatives would benefit olive-sided flycatcher with project design that incorporates the following measures:

- Logging methods that retain medium to large trees with relatively open canopy closure, as well as treatments that create forest edge will benefit olive-sided flycatchers.
- Retention of forested edge habitat around riparian and wetland features will also benefit olive-sided flycatcher habitat.
- Reintroduction of fire may also benefit olive-sided flycatchers by creating post-fire habitats that were historically more common.
- Retention of snags and large trees post harvest within regeneration methods such as seed tree harvests will benefit olive-sided flycatchers by retaining important foraging and singing perches.
- Partial harvests which retain trees of varying heights to provide nesting sites as well as trees near or above the canopy height of the surrounding forest to provide flying space and height for foraging will benefit olive-sided flycatchers.
- Post-harvest broadcast burning, especially when it fits with the desired silvicultural regime, will potentially create ecological conditions most similar to historical olive-sided flycatcher habitat.

Alternative A (No Action Alternative)
The "no action" alternative would have no direct effect on olive-sided flycatcher or its habitat. This alternative would indirectly leave stands unharvested. This would maintain all predominantly lodgepole pine stands at risk for future wildfire impacts, which in turn could potentially become beneficial to olive-sided flycatchers with the creation of post-fire habitats.

As forest succession and fire suppression occur in overstocked stands, trees become more susceptible to attack from insects and disease. Infestations that kill trees and the resultant increase in early seral habitats or lower canopy cover (e.g., 5–25%) would result in increases of olive-sided flycatcher habitat. As the insect and disease outbreak advances, standing and down dead material would increase, which in turn increases the risk of stand-replacing fires, which would also benefit olive-sided flycatcher with the creation of post-fire habitats. Benefits to olive-sided flycatcher would be dependent on the size and edge affects created and residual trees remaining in the area. Without a fire event, the insect outbreak would eventually peak and subside. Grand fir and other more shade tolerant species that currently exist in the understory of stands with dead and dying trees would continue to grow, perhaps eventually causing the long-term loss of the early seral conditions and low canopy cover preferred by olive-sided flycatchers. Under the "no action" alternative, the existing level of patchiness in the watershed would persist until a stand-replacing fire or other management action(s) take place.

Alternatives B, C, and D
Treatments that include green and dead tree harvest to improve forest health and reduce the incidence of insects and disease increase suitable nesting and foraging habitat for olive-sided flycatchers. Not only would the habitat they are using be modified, it would result in increases in suitable habitat under all alternatives. The changes in nesting and foraging habitat acres are identified in Table 3.7.13 by alternative.

Table 3.7.13 Estimated Acres of Olive-sided Flycatcher Nesting and Foraging Habitat by Alternative

American River Watershed	Alt A	Alt B	Alt C	Alt D	NPNF[1]
Acres (%) existing nesting habitat treated	0	60 (1.2%)	60 (1.2%)	33 (0.7%)	0
Acres (%) nesting habitat after treatments	0	219 (+4.4%)	235 (+4.7%)	206 (4.1%)	863 (+17.3%)
Acres (%) existing foraging habitat treated	0	60 (0.7%)	60 (0.7%)	33 (0.4%)	0
Acres (%) foraging habitat after treatments	0	788 (+8.7%)	726 (+8.1%)	698 (+7.7%)	354 (+3.9%)

[1]Nez Perce National Forest (NPNF) selected alternative for American and Crooked River Project (USDA-FS, 2005a).
[2]NPNF modified acres and loss of olive-sided flycatcher nesting or foraging habitat dependent on existing conditions and percent of canopy cover removed within each treatment stand. No specific analysis was conducted by NPNF for olive-sided flycatcher.

Alternative B would result in the largest increase in olive-sided flycatcher habitat for nesting and foraging, followed by Alternatives C and D. Under all action alternatives it is expected that adequate residual large snags and/or live trees for foraging and singing perches will be maintained across the project area. Research has found that tall canopy height, low canopy cover, and clearcuts have been beneficial to olive-sided flycatchers. The silvicultural treatments under each alternative would result in an increase in suitable habitats. The relative amounts of dead and dying lodgepole pine in stands that would remain unharvested will also contribute to canopy cover openings and early seral habitats preferred by olive-sided flycatchers.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for olive-sided flycatcher is the American River watershed.

The “no action” alternative could in effect, have positive cumulative effects from fire effects on olive-sided flycatcher habitat availability. Absence of fuel reduction and lodgepole pine harvest, would add cumulatively to overall risks of eventual fire spread, which could create post-fire and early seral habitats preferred by olive-sided flycatchers. In addition, dead and dying lodgepole stands would create openings and early seral habitats which also would contribute suitable habitat. Successional advancement for some stands would result in mid-aged and mature stands with high canopy cover, resulting in loss of suitable nesting and foraging habitats.

The action alternatives would result in habitat increases. Such increases add moderately to cumulative increases of existing and potential future olive-sided flycatcher habitat related to previous harvests and post-disturbance harvest projects as well as reasonably foreseeable harvests on private and nearby NPNF in the analysis area.

Implementation of the FS American and Crooked River Project selected Alternative D would reduce canopy cover on an additional 1,217 acres of timbered stands, which potentially could increase nesting habitat by an additional 17.3 percent and foraging habitat by 3.9 percent within the American River watershed, which would result in additional cumulative increases in olive-sided flycatcher habitat to those identified in Table 3.7.13 above. The Eastside Project and FS American and Crooked River Project

cumulatively may result in an increase of 21.4 to 22.9 percent of existing nesting habitat and 11.6 to 12.6 percent foraging habitat.

Increases of existing and future foraging and nesting habitat opportunities would result from this project, the increase would be relatively moderate in the American River watershed. The relative acres proposed for mechanical harvest are only a small portion of the total acres that are dead and dying, which would also provide potential suitable habitat for olive-sided flycatcher. These acres may burn by wildfires and become high quality post-fire habitat in the future, therefore the relative amount of anticipated olive-sided flycatcher habitat predicted to be increased from management treatments is relatively minor within the analysis area and relatively inconsequential. The mountain pine beetle epidemic has created many thousands of acres of potential future olive-sided flycatcher habitat in the upper South Fork of the Clearwater River subbasin.

Activities that reduce the potential for wildfire and insect outbreaks reduce habitat for olive-sided flycatchers; however, some treatments would create suitable habitat. Projects within the upper South Fork Clearwater drainages all target fuel loading and bug-infested trees in some capacity. Ongoing activities such as post and pole gathering, firewood cutting, road construction/maintenance, and fire suppression also affect habitats that could be utilized by olive-sided flycatchers. Past timber harvest activities have created a patchy landscape across the watershed, which has likely resulted in more suitable habitat than would occur in unlogged habitats. However, advancement of forest succession will result in these logged areas becoming unsuitable as trees mature and canopy cover increases.

Across the range of the species, especially the Interior Columbia River Basin, moderate or strong declines in unburned habitats potentially used by olive-sided flycatchers have occurred. However, timber harvest activities have created additional suitable habitats. The natural pattern of beetle outbreaks has been altered through silvicultural and fire management practices. Silvicultural practices directed at maximizing wood production by harvesting trees before they are susceptible to bark beetle attacks and salvage logging of beetle-infested, fire-killed, and wind-killed trees reduced the occurrence of beetles in some areas. Fire management policies have lengthened fire return intervals and allowed more frequent occurrences of beetles. Impacts of the Eastside Project and other past, present, and reasonably foreseeable future actions in and around the American River watershed appear negligible. With continued management emphasis on returning fire (both natural and prescribed) to the landscape and silvicultural treatments favoring more open canopy cover, openings, and early seral conditions, habitat conditions for the olive-sided flycatcher will improve.

The sensitive species determination for olive-side flycatcher would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

Fisher

Existing Condition

Fishers are wide-ranging forest predators that prefer late seral, mesic (moist) forest habitats (Idaho Department of Fish and Game, 1995:9). Fishers are known to occur within the South Fork Clearwater River Subbasin.

Current distribution of fishers in North America is substantially fragmented compared to their historical (pre-European) distribution. Across the species' range, fisher populations declined in the early twentieth century, probably due to a combination of over trapping, predator poisoning, and habitat loss from settlement, logging and forest fires (Heinemeyer, 1994). Fishers and their habitat use were studied by Jones (1991) in the adjacent Newsome Creek watershed and surrounding areas near Elk City during the late 1980s. Jones concluded that over-trapping and historic habitat loss due to extensive fires in 1910 and 1934 were most likely responsible for the historical decline of fishers in Idaho.

No fisher trapping is currently allowed in Idaho, but animals are occasionally caught incidental to marten, coyote, and bobcat trapping. Trapping pressure within the American River watershed and South Fork Clearwater River Subbasin is currently limited due to low trapper interest (USDA-FS, 1998b; USDA-FS, 2004a).

Habitat conditions and relative amounts and larger blocks of old growth and late seral habitats preferred by fishers are prevalent in the American River. Currently, 51 percent of the American River drainage supports late seral habitat (USDA-FS, 1998a:141). However, developed portions of the American River drainage have been impacted and fragmented to varying levels by past timber harvesting and roading activities.

Overall however, fisher habitat has increased over historical conditions by approximately 188 percent within the South Fork Clearwater River subbasin. This can be attributable to increases in more shade tolerant tree species, like subalpine fir and grand fir, due to fire suppression and forest succession (USDA-FS, 1998a:83).

Suitable fisher habitat in American River drainage is currently 233 percent of historic amounts (USDA-FS, 1998b). Conserving the integrity of late seral habitats near the upper end of their historic range of variability would benefit fishers (USDA-FS, 1998a:140–141 and 148).

Fishers are believed to use selected suitable habitat portions of the American River watershed. Local trends in fisher populations remain stable based on (USDA-FS, 2005a):

- Population monitoring results,
- Incidental sightings,
- ICDC database records, and
- Local downtrends in the two of the most commonly recognized threats to fisher populations in the western U.S. (trapping pressure and clearcutting of late successional timber).

(FS 15th Annual Monitoring and Evaluation Report Draft; 2002 Fisher/pine marten monitoring data–Item 10 Population Trends of Indicator Species, Nez Perce National Forest, USDA-FS, 2004d).

The size of a male fisher's home range is larger than that of a female. Fisher home ranges in north-central Idaho were 2 to 15 times larger than other reported fisher home ranges, and averaged 82.6 km^2 (20,400 acres) for males and 40.8 km^2 (10,080 acres) for females (Jones, 1991:103). Even when home range size estimates were standardized across multiple studies, those in Idaho remained much larger than estimates from other geographic areas (Heinemeyer and Jones, 1994).

For this analysis, fisher summer habitat was defined as large trees (greater than 15 inches dbh) in mixed conifer and mixed subalpine fir forests. Mesic lodgepole pine was also determined to be considered summer habitat where diameters are greater than 10 inches. Fisher use appears in stands with greater than 40 percent canopy cover, but the NPNF dataset did not allow for selection for this. Instead, moderate to high canopy closure was selected (greater than or equal to 25 percent). Winter habitat was defined as summer habitat plus pole-sized trees (greater than 10 inches dbh) with greater than 25 percent canopy cover and drier lodgepole pine habitat types. The following table shows the acres of summer and winter fisher habitat for the American River watershed.

Table 3.7.14 Estimated Acres of Fisher Habitat

Watershed	Summer Habitat Acres (% watershed)	Winter Habitat Acres (% watershed)
American River	38,326 (65%)	40,651 (69%)

By assuming an average home range size of acres per female fisher (Jones, 1991), an analytical index was developed to compare the effects of each alternative. Under the existing condition, 40,600 acres of habitat could support about 4 fisher females in the American River watershed. It is important to realize that this

number is simply an analytical index and in no way attempts to measure actual densities or numbers of fisher on the landscape.

The results of the FIA indicate that, overall, fisher habitat is widely distributed across the South Fork Clearwater River subbasin and American River watershed (this includes summer and winter habitat). Within the American River watershed, total fisher habitat (represented by winter habitat as summer habitat is included in the calculations) amounts to 53 percent of the forested lands. The following table displays the FIA data at two scales:

1. Subbasin (4th HUC)
2. Watershed (5th HUC).

The amount and distribution of habitat is both a reflection of the capability and current condition of the landscape.

Table 3.7.15 Data at Two Scales for Percent Fisher Summer and Winter Habitat[1]

Fisher Habitat	South Fork Clearwater River			American River Watershed		
	CI Low	Mean	CI High	CI Low	Mean	CI High
Fisher Summer Habitat	20	26	33	13	28	45
Fisher Winter Habitat	35	43	51	32	53	75

[1]Forest inventory and analysis data at two scales for percent fisher summer and winter habitat, including 90 percent confidence intervals (CI low and CI high).

Environmental Effects

The Habitat Conservation Assessment for Fisher in Idaho suggests that although fisher trapping seasons are closed in Idaho, incidental trapping mortality may limit populations in the state (Idaho Department of Fish and Game, 1995:6). None of the alternatives will harvest in existing old growth timber. In addition, protection of RHCAs (riparian habitat conservation areas), would provide for maintenance of mature, old growth, and potential old growth stands within these areas and help maintain patch sizes and connectivity. A fundamental aim of the project is removal of fuel-loading from dead and dying lodgepole pine. Most of the lodgepole pine of 6 inches or greater diameter in the project area will no longer contribute to forest canopy cover irrespective of alternative harvest plans. Effects of each alternative on fishers and their habitats should also factor in the reduced risks (if any), for subsequent habitat losses due to future fire impacts.

Noxious weeds, watershed restoration actions, and post-harvest slash treatments using prescribed fire are not expected to impact fishers or their habitats considerably, regardless of alternative. Road decommissioning would be expected to help reduce motorized access on existing roads, contributing to reductions in fisher mortality risks from trapping. Based on best available information, the analysis criteria for fisher will be the extent to which each alternative:

1. Conserves or protects the integrity of late seral habitats,
2. The amount of habitat modified by each alternative, and
3. The degree to which each alternative provides security by limiting mortality risks from incidental trapping, because densities of accessible roads and trails facilitates human access.

Alternative A (No Action Alternative)
This “no action” alternative would have no immediate, direct negative or positive impacts on the fisher or its habitat. As local stands mature and decline with their attendant fuel-buildups, lethal, more severe fire risks would become more prevalent. Such risks would increase the chances of late seral habitat losses to wildfires. No direct or indirect changes in access would occur, so security would not improve. Existing road access levels that facilitate potential trapping for other furbearers would remain unchanged.

Existing fisher habitat would not be harvested under this alternative. In general, mature, high-canopied habitat would increase and small-tree winter habitat would decrease as forest succession continues to fill in understories and increase stand canopy closure. In predominantly lodgepole pine stands, additional trees would die as a result of the mountain pine beetle epidemic and dead trees would eventually fall to the ground. This process would create suitable habitat and niches for at least some of the small mammal species fisher prey upon. Fishers do not forage in openings; therefore, areas with significant fallen lodgepole pine would only provide habitat along the edges of these newly opened areas. High densities of downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas and extend the length of time it would take for new small tree and mature habitats to develop. In RHCAs, trees killed by insects and other successional processes would fall to the ground and into streams enhancing structural diversity in these areas.

Fuel build-up resulting from fire suppression activities would continue, thereby increasing the likelihood of a stand-replacing fire. Stand-replacing fires could potentially reduce mature and old growth habitat across the project area, depending on the size and severity of the disturbance. Similarly, fuel loads along streams and RHCAs would continue to increase and may expose these environments to intense fires. Stands of dead and dying lodgepole pine are particularly vulnerable to stand-replacing fires; small tree lodgepole pine winter habitat would likely be lost in a fire event. An increase of large logs on the ground due to fire or insect epidemics could provide denning structures and cover for fisher and several prey species, but these areas are likely to be avoided until the living canopy cover again exceeds 40 percent.

Alternatives B, C, and D

Treatments that include green and dead tree harvest to improve forest health and reduce the incidence of insects and disease would affect both summer habitat and winter habitat for fishers. The changes in habitat acres (overlap exists between summer and winter habitats) are outlined in Table 3.7.16 by alternative. Alternative D would modify the fewest acres of fisher summer (629 acres) and winter habitat (632 acres), and alternative B would modify the greatest acreage of summer (687 acres) and winter habitat (690 acres) in the American River watershed. All action alternatives are very similar for effects at a watershed level, and would harvest and modify less than 2 percent of the summer and winter habitat for fishers.

Using the NPNF analytical index, under alternatives B, C, and D, enough fisher habitat would remain in the project area to support about 3.9 female fishers in the American River watershed. This would be a slight reduction from the existing condition.

Table 3.7.16 Estimated Acres of Fisher Habitat in the American River Watershed by Alternative

Fisher Habitat	Alt A	Alt B	Alt C	Alt D	NPNF1
Acres (%) summer habitat treated	0	687 (1.8%)	678 (1.8%)	629 (1.6%)	246 (0.6%)
Acres (%) winter habitat treated	0	690 (1.7%)	682 (1.7%)	632 (1.6%)	262 (0.6%)

[1] Nez Perce National Forest (NPNF) selected alternative for American and Crooked River Project FEIS (USDA-FS, 2005a).

In the Northern Rockies, fishers evolved under a disturbance regime that created numerous openings in a matrix of mature forested habitats. Removing downed woody material and canopy cover in stands used by fisher and their prey could reduce suitable habitat in the short-term. Fishers do not forage in openings and would avoid using newly harvested units except perhaps along the edges of those units. However, the conversion of some percentage of older age class lodgepole pine and mixed conifer habitats to younger age classes could promote a diversity of prey species and thus have long-term benefits for fisher populations. At localized levels, it would also reduce the probability of fire spreading to high quality fisher habitats within the watershed. Tree planting and site preparation, such as the removal of dead and downed wood through burning, would accelerate regeneration of green canopy cover.

None of the action alternatives would harvest trees in RHCAs. Connectivity along riparian habitat corridors would remain intact for all action alternatives. As with the "no action" alternative, trees killed by insects and other successional processes would fall to the ground and into streams enhancing structural diversity in these areas. However, fuel loads along streams and RHCAs would continue to increase and may expose these environments to intense fires.

The temporary increase of human activity in the project area associated with harvest and vegetative treatments could increase the possibility of human-fisher interactions. By design, all current access closures would be maintained as part of the proposed project.

Action alternatives would not harvest in any existing old growth timber. Moderate harvest levels would have limited direct impacts on fisher habitat due to increased overall habitat fragmentation. Treated stands would provide moderate levels of on-site fuel reduction.

Security would improve slightly under all alternatives. Alternative C would improve security slightly more than the other alternatives with a reduction in motorized access, followed by Alternatives B and D.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for fisher is the American River watershed.

Risks of fire-spread losses in old growth or other late seral stands would become cumulative to past and present effects of fire exclusion in the analysis area. Whether these effects would extend outside the project or analysis area is uncertain. The "no action" alternative would have no certain cumulative effects on the fisher or its habitat other than fire and security risks, which would eventually become additive to the past effects of roading, logging, incidental trapping risks, fire exclusion and other human disturbances of normal ecosystem processes and forest pattern.

The action alternatives would add moderately to forest fragmentation at the level; however, this would result in negligible cumulative effects compared to other past, present, and other foreseeable harvest activities in the American River watershed analysis area. Other projects include the American and Crooked River Project and private land timber harvest. It would reduce fuels at relatively moderate levels, potentially contributing to less fire risks to old growth and late seral habitats. The action alternatives would also slightly reduce potential levels of human access, thereby helping to reduce mortality risks from trapping.

Implementation of the FS American and Crooked River Project selected Alternative D would modify an additional 246 acres of summer habitat and 262 acres of winter habitat. The Eastside Project and FS American and Crooked River Project cumulatively may modify 2.2 to 2.4 percent of summer habitat and 2.2 to 2.3 percent of winter habitat (see Table 3.7.16).

Past insect outbreaks, fires, fire suppression, and timber harvest have left a mosaic of habitats on the landscape, but they are not characteristic of the patterns that occurred historically under a more natural disturbance regime. Most harvest units are simple, uniformly-shaped, small- to medium-sized patches (greater than 40 acres), without snags or large fire-resistant trees. Gone in these areas are the important snag, down wood, and residual large tree components that provide the structural diversity preferred by fishers once a stand regenerates. Past activities in developed portions of the watershed may have altered the availability of denning habitat, forested connectivity, and prey habitat for fisher. The loss of medium and large trees from timber harvest has reduced the older forest component that is important to fisher year-round. Across the analysis area, open roads facilitate access for trappers and firewood cutters, potentially decreasing fisher populations and the downed logs important for fisher and their prey species. However, at the watershed analysis level, current suitable fisher habitat is more abundant than historic levels.

Within the analysis area, private land logging and the American and Crooked River Project target dead, dying, and merchantable green lodgepole pine, and other tree species in some capacity. Cumulatively, the

loss of suitable habitat for fishers could affect fisher populations in the project area and in the American River watershed. Adding to this situation is the fact that many additional stands of small tree lodgepole pine and mixed conifers that are not proposed for timber harvest or silvicultural treatments are being altered or lost by a more "natural" process of bug kill, decay, and fire. At the project and watershed levels, fisher populations could be affected however, the effects of past, present, and reasonably foreseeable future actions appear small to negligible.

The sensitive species determination for fisher would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

Wolverine

Existing Condition

The wolverine is an uncommon, wide-ranging carnivore that typically occurs at low densities across its range. Home ranges average approximately 100,000 acres. Within the western U.S., they occur principally in remote, high-elevation mountain basins and cirques, particularly during the breeding season (Rowland et al., 2003). The Conservation Strategy for Wolverine (*Gulo gulo*) in Idaho (Copeland and Hudak, 1995) defined wolverine habitat as areas associated with a component of seclusion or separation from human influence. Wolverines are relatively intolerant of human disturbance requiring large tracts of remote mountainous habitat (Hornocker and Hash, 1981). Habitat of this nature is most easily defined by existing tracts of set-aside or defined refugia such as RARE II land or designated wilderness.

Wolverine have been observed on the Nez Perce National Forest. Most observations have been within or adjacent to designated wilderness areas in relatively remote, isolated landscapes. The edge of the Gospel-Hump Wilderness is several miles southwest of the project area. Central-Idaho wolverines are known to commonly cross distances of 20 kilometers (12.4 miles), negotiating road systems and active timber sales, to reach insular subalpine habitats (Copeland and Hudak, 1995).

In Idaho, female wolverines use high-elevation cirque basins for natal sites, while making daily forays into lower montane habitats to forage (Copeland and Hudak, 1995). The analysis area (American River watershed) occurs approximately 20 mile northeast of the high elevation Gospel-Hump Wilderness. Absence of high elevation cirque basins and boulder talus within the project area, as well as extensive previous development, roading, harvest, and other human activities conducted in the project area make it unsuitable as breeding or denning habitat; however wolverine may occasionally traverse through the analysis area in search of food. Wolverines are opportunistic scavengers and ungulate carrion is considered an important food source. Activities that decrease ungulate populations may negatively affect wolverines (Copeland and Hudak, 1995).

Incidental trapping mortality is a potentially important factor in managing wolverine populations. Wolverine trapping is not allowed in Idaho, but animals are occasionally caught by accident by coyote and bobcat trappers. Within the analysis area, trapping pressure and risks to wolverine are relatively low due to low trapper interest (USDA-FS, 1998b).

The analysis area is well developed, substantially roaded and contains large amounts of ongoing vehicular and human disturbances. The American River ERU holds no areas of low human disturbance and is not considered quality habitat; however it may contribute foraging areas and overall habitat potentially capable of supporting wolverines (USDA-FS, 1998b).

Environmental Effects

The analysis area lacks seclusion from human influence, and the character of extensive roadless habitat security preferred for natal denning. No high elevation cirque basins occur in the analysis area either. Noxious weed effects can indirectly impact overall elk habitat quality, which may indirectly affect long-term availability of carrion for wolverines where weeds may dominate native vegetation, but these are not considered major impacts. Watershed restoration actions and post-harvest slash treatments using fire are not expected to impact wolverine or their habitat considerably regardless of alternative. Road decommissioning will help reduce human-wolverine conflict potentials.

Sites planned for harvests are well outside wilderness or Forest Service RARE II areas considered suitable as wolverine habitats (USDA-FS, 2005a). While wolverines may occasionally traverse through or across the American River analysis area, which is in proximity to three major, high elevation wilderness areas (Gospel-Hump and Selway-Bitterroot, Frank Church River of No Return), it is unlikely that wolverines would find the analysis area habitats attractive except perhaps as a travel corridor. Harvest, roading, watershed restoration actions and other similar project activities in all action alternatives would hold the potential to disturb or displace wolverine that may be traveling through the project area, but given the wide-ranging nature of the animal and lack of seclusion from human intrusion in the project area, this is unlikely.

Productivity of habitats and related ungulate carrion availability are important aspects of wolverine habitat management. For these reasons, the analysis criteria for wolverine will be impacts related to ungulate (elk) summer habitat effectiveness.

Alternative A (No Action Alternative)
No road decommissioning would occur under this alternative, and the current amount of wolverine habitat would be maintained. However, any stand replacing fires that occur in the project area might reduce the amount of subalpine fir and spruce forests available to wolverines. Subalpine cirque habitats would not be affected by this alternative, as they do not exist in the analysis area. Summer elk habitat is declining due to succession and the mountain pine beetle epidemic, and moose winter range may be increasing because of succession (see “Elk” and “Moose” discussions later in this section). Any effects these habitat changes have on ungulate populations could affect wolverines, as big game carrion is an important wolverine food resource during winter.

The “no action” alternative would have no meaningful direct effects on current elk habitat effectiveness. Although the longer term indirect effects of allowing unabated fuel buildups in the analysis area could eventually result in a more extensive imbalance of cover and forage for elk due to eventual large-scale wildfires, the net impacts to wolverine, given their extremely large home ranges, would likely be relatively immeasurable or nil.

Alternatives B, C, and D
Action alternatives would provide improved wolverine habitat, due to a slight reduction in roads open to motorized vehicle use over Alternative A. Big game security would be slightly improved, as well, through road decommissioning. However, a slight reduction in overall EHE would occur, primarily attributed to size and distribution of forage and cover areas. Refer to the discussion on elk.

None of the action alternatives would harvest trees in RHCAs except for individual trees that would be removed during temporary road construction, road reconstruction, or while creating cable corridors. Connectivity along forested drainage bottoms would remain intact for all action alternatives, as would potential wolverine habitat inside RHCAs. However, fuel loads along streams and RHCAs would continue to increase and may expose these environments to intense fires.

Proposed harvest activities would affect summer elk habitat in the project area. For details on how this analysis was conducted and the conclusions that were drawn, see the “Elk” section discussed later in this

section. Project activities would also affect moose habitat. Moose winter range is the most limiting aspect of moose ecology in the project area, no harvest of important moose winter range is proposed under the action alternatives (see the "Moose" section for additional details). If elk or moose populations decline as a result of proposed activities, wolverines may also be affected because of their reliance on ungulate carrion in the winter.

Alternatives B, C, and D would modestly improve habitat security compared to Alternative A by reducing motorized access particularly in the analysis area. Alternative C would slightly improve habitat security, compared to Alternatives B and C.

The temporary increase of human activity in the planning area associated with harvest and vegetative treatments could increase the possibility of human-wolverine interactions short-term and/or cause wolverines to avoid regions within the project area. As mitigation, all current access closures for public motorized vehicle use would continue as part of the proposed project. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts. Road decommissioning would help reduce human intrusion long-term.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for wolverine is the American River watershed.

Given all past development actions that have previously impacted overall wolverine foraging habitats including roading, logging, recreation activities, fire exclusion and others, and considering the very large size of wolverine home ranges, Alternative A would have no measurable cumulative effects. The sensitive species determination for wolverine would be "no impact."

The action alternatives would add additional impacts to the developed nature of the area, but overall effects relative to elk habitats would be very slightly reduced.

Past timber harvest, fire, fire suppression, and mining activity altered habitat characteristics in the project area by reducing the amount and distribution of large and medium trees, snags, and down wood, and by creating numerous, small patches across the landscape. These changes have affected wolverine prey species such as small mammals and ungulates. Prior to fire suppression and timber management, elk and deer populations were dependent upon natural disturbances to create openings that provided the early successional growth they favor for foraging. Larger, more connected tracts of mature and old growth forest provided suitable winter range for moose. Elk EHE and moose winter range would slightly decrease under action alternatives. The network of edges that the project would create could be beneficial to some small mammal prey species.

Road construction associated with past management activities has provided people relatively easy access into the area and has reduced the security and isolation the watershed once provided for wolverines. Human developments; hiking trails; pack trails and outfitter activity; and ATV and snowmobile use within the drainage have had far-reaching effects. These activities have increased human access into once remote areas. Roads that access high-elevation areas probably have reduced habitat quality the most. Snowmobile use may also have had effects on winter prey species by providing pathways for other predators to access a limited winter wolverine prey base. With the exception of constructing a new permanent road and vehicle bridge for additional access for the American River subdivision (Alternatives C and D), and relocating an existing road out of the American River riparian area and relocating the road to a toeslope area (Alternatives B and C), all other roads constructed under this project proposal would exist only temporarily on the landscape.

Other projects such as the American and Crooked River Project and private land logging in or near the American River watershed may also modify ungulate and small mammal habitat, as well as the large tree subalpine fir habitat used by wolverines. The project proposal is consistent with the wolverine management strategies identified in the South Fork Clearwater River Landscape Assessment (USDA-FS,

1998a). Activities will not occur around wolverine denning habitat, no new campsites or mine sites are proposed through this project, and the project does not target coniferous riparian forests or old growth mixed conifer, subalpine fir, or grand fir forests. A limited amount of mature timber would be harvested through the Eastside Project. Individual wolverines could be impacted at the project and watershed level, but this can be considered negligible.

The sensitive species determination for wolverine would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for Alternatives B, C, and D.

Western Toad

Existing Condition

The western toad is found in a variety of habitats such as springs, streams, meadows, woodlands, ponds, lakes, reservoirs, and slow-moving rivers and streams (Groves et al., 1997). Several western toad occurrences were documented within the general project area and the American River watershed while conducting field surveys during 2004 and 2005, overall, they appear to be rare and not very abundant within the American River drainage (Craig Johnson, 2004/2005 field notes). The western toad will breed in a large variety of natural and artificial aquatic habitats, from the shallow margins of lakes and ponds to roads side ditches. It does not seem to matter if the sites have tree or shrub canopy cover, coarse woody debris, or emergent vegetation. Adult females may lay their eggs at depths of 5 centimeters to 2 meters (depths over one meter are rare) in the same location within sites each year. Outside the breeding season, western toads spend up to 90% of their time in terrestrial habitats. Adult toads can be found in forested areas, wet shrublands, clearcuts, and meadows. They appear to favor dense shrub cover, perhaps because it provides protection from desiccation and predators. Hibernation sites generally are deep enough to prevent freezing, and moist enough to prevent desiccation.

Environmental Effects

The primary analysis criteria for western toad are protection, enhancement, and maintenance of riparian and aquatic habitats, which is critical to reproduction. Western toads also use upland habitats the majority of the time, consequently upland treatments would have direct and indirect effects on western toads.

Alternative A (No Action Alternative)
This "no action" alternative would have no immediate, direct negative or positive impacts on the western toad or its habitat. As local stands mature and decline with their attendant fuel-buildups, lethal, stand-replacing fire risks would become more prevalent. Such risks would increase the chances of western toad mortality and habitat losses to wildfire. Western toad habitat effects from fire caused loss of shrubs, which provide security cover would result in toads being more susceptible to predation. Successional advancement would improve some riparian habitats.

Alternatives B, C, and D
All action alternatives would have direct and indirect affects on associated riparian and aquatic habitats. Such actions include riparian restoration, decommissioning of roads and fords, road construction and bridge construction within riparian areas. Short term negligible adverse affects would occur from soil and vegetation disturbance within riparian areas or adjacent to aquatic habitats. Long term benefits would occur to toad habitat with re-vegetation occurring. No timber harvest or fuels treatments are proposed to occur in RHCAs, which would provide for the primary protection of reproduction habitat associated with streams, ponds, spring, and seeps.

Upland actions such as road construction, road decommissioning, timber harvest, fuels reduction actions, and post-harvest slash treatments would be expected to have discountable direct and negligible indirect effect on western toad reproductive habitat. However, action alternatives do treat the upland areas to varying degrees, which may place toads at some direct risk for harm to individuals that may be present,

including minor potential indirect impacts on riparian habitat conditions from changes due to off-site generated silt and water quality impacts.

Implementing the watershed improvement projects associated with the action alternatives would cause a temporary increase in sediment short-term, but there would also be a long-term reduction in sediment. It is not expected that increases in sediment levels would adversely affect western toads, but it is reasonable to think that improvements to overall watershed quality and, particularly riparian habitats, would be beneficial to reproduction for the western toad.

Salvaging dead and dying trees and merchantable green trees would help reduce the risk of high-intensity, large-scale fires in the project area. Fuel loading within RHCAs would continue under all action alternatives and could expose toads and toad habitat to intense fires however, by reducing fuel loads outside of RHCAs, fires might not be as destructive to moist environments as under the "no action" alternative.

Proposed harvest and underburning activities are likely to alter existing non-breeding habitat for western toads for the short-term. Regeneration harvest with underburning removes overstory trees and ground cover, resulting in warmer and drier exposed soils. Intermediate harvest and burning would retain most of the larger overstory trees, leaving ground-level habitat more protected, with better daytime refugia sites for toads. Based on this species' ability to occupy a wide variety of habitats, western toad use could still occur, although at lower levels. As vegetation recovered within a few years, habitat would become increasingly suitable and use would be expected to increase. If adult western toads were present, individual mortality could occur during harvest or underburning from heat or consumed woody material, or by vehicles or machinery used for logging or roadwork.

Assessing the relatively small risk of potential effects to toads while using upland habitats, Alternative B has the most acres of proposed treatments, Alternative C has slightly less, and Alternative D has the least. Alternative B has the most miles of temporary roads, followed by Alternative D, and Alternative C has the least. Alternative C has the highest number of roads proposed for decommissioning within riparian habitats, followed by alternative B and D. Decommissioning roads within floodplains and riparian habitats would result in moderate benefits to reproduction habitats within localized areas. Decommissioned roads in riparian areas would improve as vegetation becomes established on these roads and riparian habitats improve. Table 3.7.17 summarizes the above information by alternative.

Table 3.7.17 Proposed Timber Harvest/Fuels Treatments, Temporary Road Construction, Road Decommissioning, and Riparian Restoration

Indicator	Alt A	Alt B	Alt C	Alt D
Total Acres Treated	0	1,293	1,284	1,171
Total Miles Temporary Road Construction (Miles Temporary Road Construction Within RHCAs)	0 (0.0)	15.1 (0.0)	10.5 (0.0)	10.7 (0.1)
Total Miles New Permanent Road Construction (Miles New Permanent Roads Within RHCAs)	0 (0.0)	0.6 (0.0)	1.1 (0.2)	0.6 (0.2)
New Bridge Construction	0	0	1	1
Total Miles of Decommissioned Roads (Miles of Decommissioned Roads Within Riparian Areas)	0 (0)	1.9 (1.1)	3.0 (2.0)	1.5 (1.1)
Stream Crossing (Fords) Obliteration and Restoration	0	2	3	3
Miles of Riparian Restoration	0	4.8	4.8	4.8
Total Acres Mine Site Reclamation	0	0.5	0.5	0.5

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for western toad is the American River watershed.

The "no action" alternative would have no cumulative effects on the toad or its habitat cumulative to past harvest, roading, human disturbance, recreation, minerals or other activities. With continuation of other ongoing BLM and NPNF restoration actions within the watershed, improved management of riparian and aquatic habitats resulting from PACFISH (1995) and federal listing of fish within the watershed, continued long term improving riparian and aquatic trends would be expected to occur; however, natural riparian recovery would be slow in dredge mined areas. The sensitive species determination for western toads would be "no impact."

Action alternatives would have localized direct and indirect cumulative effects on riparian, aquatic, and upland habitats which may be utilized by the western toad, in addition to those produced from past mining, roading, timber harvest, residential development, livestock grazing, recreation, public access, fire exclusion and other habitat impacts. The long-term outcome would be improved and restored riparian habitats.

Timber harvest and salvage logging, grazing, insect epidemics, fires, fire suppression, mining, and road construction and maintenance can cumulatively affect western toads through soil compaction, changes in vegetative cover, altering stream channels, or by changing the quantity and quality of water flowing into wet meadows. Past harvest practices that involved removing forest vegetation along streams and wetlands left these sites vulnerable to hydrologic and vegetative changes. Although fires aren't as common in this species' habitats, water quality and quantity varies after large fires upstream and could affect local toad populations. Fire suppression has created denser forests, which tend to burn hotter, and hotter fires tend to be more destructive. Whether these potential fire effects would extend outside the project or analysis area is uncertain. Livestock grazing is likely to continue on NPNF and BLM allotments and on private lands, and has past effects. BLM has fenced its riparian areas in Elk Creek and additional areas on private lands. Beaver dams also provide a flux of habitat availability; past beaver trapping may have affected habitat availability where beavers may not have recolonized.

For western toads, regeneration harvest with underburning removes overstory trees and ground cover, resulting in warmer and drier exposed soils. Regeneration harvests have been proposed for this project and various other projects in the American River drainage. Cumulatively, potential upland toad habitat could be impacted. Individual toads could be killed from the vegetative changes, prescribed fires, motor vehicles, and heavy machinery associated with these proposed actions.

Past, present, and future actions can affect western toad habitat in the project area as well as across American River drainage. Although individuals or localized populations can be affected, none of the proposed alternatives should affect populations of western toads at the project or watershed level.

The sensitive species determination for western toads would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

Common Garter Snake

Existing Condition

Common Garter Snake inhabit virtually any type of wet or moist habitat throughout its range, but regional populations exhibit different preferences (Groves et al., 1997). This species is most common in wet meadows and along water courses, but it can be found far from water in open valleys and in deep coniferous forests (Nussbaum et al., 1983). This species preys chiefly on earthworms, frogs, toads, salamanders, and fishes, less regularly on slugs, leeches, small mammals and birds, but rarely on insects, spiders, and small snakes (Groves et al., 1997). It hibernates underground, or in or under surface cover, and at times, with other snake species. One common garter snake was documented within the project area

during the 2004 field season, the common garter snake is not commonly observed in the area, while the western terrestrial garter snake is fairly common (Craig Johnson, 2004 field notes).

Environmental Effects

The primary analysis criteria for the common garter snake are protection, enhancement, and maintenance of meadows, riparian areas, and aquatic habitats. The common garter snake typically is associated with riparian and aquatic habitats, but will also use terrestrial habitats such as coniferous forests; consequently upland treatments could have direct and indirect effects on common garter snakes and habitats.

Alternative A (No Action Alternative)
This "no action" alternative would have no immediate, direct negative or positive impacts on the common garter snake or its habitat. As local stands mature and decline with their associated fuel buildups, more severe localized risks would occur. Such risks may increase the chances of common garter snake mortality and habitat losses due to wildfires, particularly if such fires affected riparian and aquatic habitats. Successional advancement would improve some riparian habitats.

Alternatives B, C, and D
All action alternatives would have direct and indirect effects on the common garter snakes, particularly actions affecting riparian and aquatic habitats. Such actions include riparian restoration, decommissioning of roads, and obliteration and restoration of stream crossings (fords), road construction, and bridge construction. Short term negligible adverse affects would occur from soil and vegetation disturbance within riparian areas or adjacent to aquatic habitats. Long term benefits would occur to common garter snake habitats occurring in riparian areas and stream bottoms. No timber harvest or fuels treatments are proposed to occur in RHCAs, which would provide for the primary protection of primary habitats associated with wet meadows, riparian areas, streams, ponds, spring, and seeps.

Upland actions associated with the project would be expected to place common garter snake at some indirect risk for harm to individuals that may be present during treatments and loss of habitats. Indirect effects may occur from upland treatments that affect water quality or habitat for prey species.

Assessment of the relatively small risk of potential effects to common garter snakes utilizing riparian, aquatic, and upland habitats would be similar to what is described for the western toad above and is summarized in Table 3.7.17. All action alternatives identify restoration actions which would result in long term beneficial effects to riparian and aquatic habitat within the project area.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for common garter snake is the American River watershed.

The "no action" alternative would have no measurable direct or indirect effects on the common garter snake or its preferred habitats. However, cumulative effects on the common garter snake or its habitat from past timber harvest, roading, human disturbance, recreation, mining or other activities would occur. With continuation of other ongoing BLM and NPNF restoration actions within the watershed, improved management of riparian and aquatic habitats resulting from PACFISH (1995) and federal listing of fish within the watershed, continued long term improving riparian and aquatic trends would be expected to occur. The sensitive species determination for the common garter snake would be "*no impact*" for Alternative A.

The action alternatives would have localized direct and indirect cumulative effects on riparian, aquatic, and upland habitats which may be utilized by the common garter snake, in addition to those produced from past mining, roading, timber harvest, residential development, livestock grazing, recreation, public access, fire exclusion and other habitat impacts. All action alternatives identify various riparian restoration actions, which will support upward trends for riparian and aquatic habitats. Cumulative effects

identified for the western toad would also be expected for the common garter snake and preferred habitats.

The sensitive species determination for common garter snake would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

Idaho Giant Salamander

Existing Condition

Idaho giant salamander larvae usually inhabit clear, cold streams, but are also found in mountain lakes and ponds. Adults are found under rocks and logs in humid forests, near mountain streams, or on rocky shores of mountain lakes (Groves et al., 1997). The occurrence of Idaho giant salamander has been documented in Queen, Whitaker, and Telephone Creeks, American River and E. Fork American River in the general project area (Craig Johnson, 2004/2005/2006 field notes). Larvae feed on a wide variety of aquatic invertebrates as well as some small vertebrates (e.g., fishes, tadpoles, or other larval salamanders). Adults eat terrestrial invertebrates, small snakes, shrews, mice, and salamanders (Groves et al., 1997). The salamander hibernates/aestivates. They usually reach sexual maturity (in both larval and terrestrial forms) at sizes greater than 115 millimeters (snout to vent length) (Groves et al., 1997). Breeding occurs in spring and fall.

Environmental Effects

The primary analysis criteria for the Idaho giant salamander are protection, enhancement, and maintenance of riparian areas, and stream habitats. The Idaho giant salamander is primarily associated with the streams and riparian habitats. Management actions that affect riparian and stream habitats will have direct and indirect effects on Idaho giant salamanders. Indirect effects from upland actions can also affect water quality and occupied habitats used by Idaho giant salamanders.

Alternative A (No Action Alternative)
This "no action" alternative would have no immediate, direct negative or positive impacts on the Idaho giant salamander or its habitat. Existing riparian conditions and trends would be expected to continue as early and mid-age stands would advance to more mature timber stands along some stream reaches. Some dredge mined areas would continue a slow rate of recovery and succession advancement along some stream reaches. As some riparian stands mature and decline with their associated fuel-buildups, more severe localized fire risks may occur. Such risks may increase the chances of Idaho giant salamander mortality and habitat losses due to wildfires, particularly if such fires affected large percentages of a drainage and its associated riparian and aquatic habitats.

Alternatives B, C, and D
All action alternatives would have direct and indirect affects on the Idaho giant salamander, particularly actions affects affecting riparian and aquatic habitats. Such actions include riparian restoration, decommissioning of roads, restoration of stream crossings (fords), road construction, and bridge construction. Short term negligible adverse affects would occur from soil and vegetation disturbance within riparian areas or adjacent to aquatic habitats. Long term benefits would occur to Idaho giant salamander habitats in riparian areas and stream bottoms. No timber harvest or fuels treatments are proposed to occur in RHCAs, which would provide for the primary protection of primary habitats associated with riparian areas and streams.

Upland actions such as road construction, road decommissioning, timber harvest, fuels reduction actions, and post-harvest slash treatments would be expected to have minimal direct and minimal indirect effect on Idaho giant salamander habitat. However, action alternatives do treat the upland areas to varying degrees, which may place Idaho giant salamanders at some direct and indirect risk for harm to individuals that may be present during treatments and loss of habitats, particularly treatments, temporary roads and

new roads occurring within or near riparian habitats. Indirect effects may occur from upland treatments that affect water quality or provide habitat for Idaho giant salamander prey species.

Assessment of the relatively small risk of potential effects to Idaho giant salamanders utilizing riparian and stream habitats would be similar to what is described for the western toad above and is summarized in Table 3.7.12. All action alternatives identify restoration actions which would result in long term beneficial effects to riparian and aquatic habitat within the project area.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for Idaho giant salamander is the American River watershed.

The "no action" alternative would have no measurable direct or indirect effects on the Idaho giant salamander or its preferred habitats. However, cumulative effects on the Idaho giant salamander or its habitat from past timber harvest, roading, human disturbance, livestock grazing, recreation, mining or other activities would occur. Long term improving riparian and aquatic trends would be expected to occur with continuation of other ongoing or planned BLM and NPNF restoration actions within the watershed. In addition, improvements are also the result of improved management of riparian and aquatic habitats resulting from PACFISH (1995) and management actions implemented for listed fish within the watershed. The sensitive species determination for Idaho giant salamander would be "*no impact*" for Alternative A.

The action alternatives would have localized direct and indirect cumulative effects on riparian, aquatic, and upland habitats which may be utilized by Idaho giant salamanders, in addition to those produced from past mining, roading, timber harvest, residential development, livestock grazing, recreation, public access, fire exclusion and other habitat impacts. All action alternatives identify various riparian restoration actions, which will support long term upward trends for riparian and aquatic habitats. Cumulative effects identified for the western toad (Section 3.7.4.6) would also be expected to be similar for the Idaho giant salamander and preferred habitats.

The sensitive species determination for the Idaho giant salamander would be "*may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species*" for alternatives B, C, and D.

3.7.5 Indicator 3–Other Species of interest

Elk

Existing Condition

Historically, elk were likely somewhat widespread but sparsely populated in most areas but fairly common in the South Fork Clearwater River Subbasin's coniferous forests. Early in the twentieth century, when large wildfires created extensive forage areas, habitat conditions favored elk population increases. In recent decades, elk populations have stabilized and begun to decline because of forest successional advancement on winter ranges and greater hunting mortality (USDA-FS, 1998b). Elk habitat is categorized into summer and winter range. At the larger scale, winter range is considered a major habitat limiting factor for elk populations in the South Fork Clearwater River Subbasin. Winter habitat conditions relative to vegetation have become unbalanced due to domination by conifers within some winter range areas in the subbasin. For this assessment, elk winter range is defined as habitat that is available even in the harshest winters. Winter range is essentially absent in the project area of the American River watershed.

The analysis area is primarily used by elk as late spring, summer, fall, and early winter range. Localized areas within the American River watershed provide winter and spring ranges and may be used during winters with low snow depths. Elk are a wildlife indicator of a diverse array of habitat types and forest

successional stages. In some areas, unusually high densities of conifers, compounded by an accumulation of ladder fuel vegetation, have progressively shaded out and discouraged the growth of forage plants required for overall elk health and productivity.

The quality of summer elk habitat and whether the habitat is capable of sustaining or increasing elk populations is rated through the use of the *Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho* (EHE) model (Leege, 1984). When all habitat factors are in optimum abundance and distribution, habitat would be rated 100% of potential elk use. The percentage value refers only to habitat quality and not to actual elk use. The primary factors decreasing habitat quality are: 1) road density and roads open to vehicle use, 2) size and distribution of hiding and thermal cover, and 3) size and distribution of forage areas.

Environmental Effects

Direct disturbances from harvest actions, roading, watershed restoration actions and other similar activities will temporarily disturb or displace elk in all action alternatives, but these impacts would be limited in duration. Elk can avoid such disturbances by using unlogged and unroaded areas, and utilize topography and vegetation as visual barriers. Noxious weeds that could pioneer burned sites would negatively impact elk foraging areas by displacing desirable plants, but this would not be expected to be sufficiently extensive or widespread enough to be of major significance under any action alternative.

Noxious weeds can reduce available forage for elk and degrade long term habitat quality where infestations become severe. Road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to negatively impact elk or their habitats considerably in the long term, regardless of alternative.

EHE (Leege, 1984) was used to analyze units for potential elk use within a designated Elk Analysis Unit, (EAU) which included the Eastside Project area. In evaluating potential elk use, this habitat suitability index model factors in several variables affecting elk use including open roads, livestock densities, and other factors such as cover, forage, and security areas. Summary results for EHE are listed in Table 3.7.18.

During field reviews and harvest site inventories for the Eastside Project, a limited number of unauthorized and undocumented ATV trail segments created by unknown users were discovered. No formal inventory of the numbers and extent of unauthorized ATV trails in the analysis area currently exists and thus is uncertain. Unauthorized trail segments were incorporated into the roads/trails analysis portion of the elk modeling results listed if they were mapped and uses were deemed measurable.

Motorized travel prevention effectiveness of each road decommissioning action may vary slightly. Effectiveness of motorized travel restrictions on decommissioned roads will relate to the site-by-site conditions after decommissioning, relying specifically on road prism recontouring in combination with slash and/or existing vegetative barriers and camouflage or concealment of roadway entrances.

Alternative A (No Action Alternative)
Elk summer habitat effectiveness throughout the analysis area would experience no changes attributed to BLM management actions, some increases in cover would occur with forest successional development in some localized areas. Early seral advancement to mid-age and mature stands would result in a decrease in suitable forage areas, while elk security and cover would increase. As deadfall from fuel buildups continued, the attractiveness of some of the lodgepole dominant stands in the area may decline in value due to perceived travel impairments and predator escapement difficulties. This alternative would have the greatest fuel buildup, risks for more severe fires and, consequently, the post-fire conditions which would result in early seral habitats and improved forage conditions. Whether these effects would extend outside the project or analysis area is uncertain.

There would be no short-term changes to summer elk habitat under this alternative, and road decommissioning would not occur. Summer elk habitat potential would be maintained as depicted by the existing condition, at least short-term. As a result of fire suppression, succession will continue. Open patch sizes will continue to decrease as ingrowth fills and matures in old openings; conifers will encroach in grasslands. This process decreases the nutritional value and availability of transitional and summer forage. If wildfires were to occur in the area, forage areas could be replenished, but existing cover would decrease. As the mountain pine beetle epidemic continues, areas that currently provide cover will become too open to serve that function. As numerous dead trees fall to the ground, debris in certain areas may become too deep for elk to move through. Downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas.

Alternatives B, C, and D

Alternatives B, C, and D would slightly improve some elk habitat conditions long term in the Eastside Project EAU, due mostly to modest reductions in open motorized road and trail access and improved forage production. Moderate levels of harvest, followed predominantly with prescribed fire to remove logging slash, would help stimulate regeneration of nutritious forage plants important to elk nutrition. However, overall a slight reduction in overall EHE would occur with implementation of the action alternatives, primarily attributed to size and distribution of forage and cover areas.

Overall, Alternative C would impact EHE the least, compared to the other action alternative because it decommissions more road miles. This is due to reductions in motorized access levels on roadways resulting from road decommissioning.

Table 3.7.18 shows the new EHE numbers, which were calculated as a measure of the effects of each action alternative on summer elk habitat.

Temporary road construction across FS lands would occur in the American River EAU (Alternatives B and C) and Queen Creek EAU (Alternatives B and D). The temporary roads in American River EAU were included in the selected FS selective alternative (see Table 3.7.19). Alternative B has the highest amount of proposed temporary roads crossing FS lands, including 1.89 miles in the American River EAU (Number 58122) and 0.26 mile in the Queen Creek EAU (Number 58131), see Table 3.7.19 for a summary of existing EHE and long term EHE. Alternative C has 1.89 miles of temporary road in FS American River EAU. Alternative D has 0.26 mile of temporary road construction in FS Queen Creek EAU.

By removing dead material and conducting some burns, browse species could be rejuvenated and resprouting would occur.

Table 3.7.18 Percent Elk Habitat Effectiveness (EHE) for the Eastside Project EAU and Alternatives

Elk Analysis Unit	Alt A (Existing)	Alt B	Alt C	Alt D
Eastside Township EAU (Long Term)	40	37	37	36
Eastside Township EAU (Short Term) Project Implementation	40	32[1]	32[1]	31[1]

[1] Prediction of short term EHE that would occur with all temporary roads constructed and timber harvest and fuel reduction related activity occurring at the same time. All timber harvest related roads are temporary and would be decommissioned and obliterated after timber harvest and fuel treatments are completed.

As vegetative treatments are implemented in the project area, human-elk interactions are likely to increase. To minimize this impact, existing access restrictions will be maintained within the analysis area. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts. In the long-term, road densities would decrease as roads are decommissioned. Weed treatments that reduce weed competition within elk forage areas would be beneficial to elk, although weed treatment is not a component of this project. Moist sites, such as wet

meadows, ponds, seeps, and springs, are important to elk and would be protected by RHCA buffers as part of project implementation.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for elk is the American River watershed and NPNF EAUs 58121, 58122, 58131, and 58161; and the BLM Eastside Project EAU.

The "no action" alternative would add cumulatively to fuel loading effects caused by past fire exclusion and the current mountain pine beetle epidemic, but overall net effects on elk or their habitat would be relatively minor. Allowing continued fuel buildups in the analysis area would have little effect initially, but eventual negative impact on elk habitat conditions (jack-strawed stands, movement barriers) would be cumulative to previous roading, public vehicular travel in the area, harvest activities, and other human-induced disturbances and activities on elk habitat security. Other recent and foreseeable harvests on nearby private, and the American and Crooked River Project, and BLM lands would also help create additional forage resources for elk.

Moderate reductions in fuel buildups in the project area would reduce the potential for movement barriers (jack-strawed stands). However, in untreated areas the potential for jack-strawed stands to create movement barriers would be cumulative to previous roading, public vehicular travel in the area, harvest activities, and other human-induced disturbances and activities on elk habitat security. Other recent and foreseeable harvests on nearby private, NPNF lands (American and Crooked River Project) and BLM lands would also help create additional forage resources for elk, but would also add to security weaknesses and cover losses. Overall cumulative effects would be similar to Alternative A.

Past fires, fire suppression, and timber harvest across the analysis area have resulted in a complex matrix of forested interior habitat, edge, ecotones, and openings in various stages of succession. Past timber harvest converted hiding and thermal cover into seedling stands, some of which have progressed to sapling hiding cover. Past timber harvest also narrowed or severed forested connections. Tree harvest has removed hiding and screening cover along open and closed roads, and human population and access have dramatically increased over historical conditions. The Eastside Project EAU includes a large percentage of private lands, which are more roaded, have higher levels of timber harvest, and more home development than EAUs occurring on adjacent NPNF lands. EHE is slightly downward within the Eastside Project EAU from BLM action alternatives; however, future private land logging and roading would be expected to result in some additional declines to EHE within this EAU. Numerous recreational opportunities across the project and watershed analysis area, including big game hunting, can cause displacement or mortality of elk.

The BLM EAU is located along the eastside of the Elk City township and includes BLM and private lands only (see Table 3.7.18 above). The FS American and Crooked River Project (USDA-FS, 2005a) analysis included EHE assessment for four EAUs within the American River watershed, three of which border the Elk City township on the east side. These FS EAUs do not include any BLM or private lands within the Elk City township. Table 3.7.19 identifies the EAU and EHE analysis for the American and Crooked River Project selected alternative. It would result in improvements in all EAUs in the long term. However, short term logging related and human interactions would be expected to reduce EHE during the duration of the project.

Table 3.7.19 Forest Service Percent Elk Habitat Effectiveness by EAU for American and Crooked River Project FEIS Selected Alternative

FS Elk Analysis Unit and Number	Forest Plan Objective (%)	Existing EHE	Selected Alternative Long Term EHE[1]
Marten Meadows–58121	75	84	92
American River–58122[2]	50	72	81

Queen Creek–58131[2]	50	77	80
Kirks Fork–58161[2]	75	83	88

[1] Nez Perce National Forest (NPNF) selected alternative for American and Crooked River Project FEIS (USDA-FS, 2005a).
[2] FS EAU adjacent to BLM Eastside Project and east side of Elk City township, these EAUs do not include BLM or private lands within Elk City township.

Shiras Moose

Existing Condition

Shiras moose are widely distributed in suitable habitat in Idaho and are relatively common in the South Fork Clearwater Subbasin, including the Elk City township and Eastside Project area. Moose populations have greatly expanded across Idaho since the 1960s, and most populations are currently stable or increasing (USDA-FS, 1998b). Good quality winter range habitat is characterized by mature to old growth grand fir, with an understory of Pacific yew. Riparian habitats and mesic meadows along American River have been adversely impacted by dredge mining, roads, and human development. Dredge ponds created by historic mining are commonly used by moose for forage areas and summer relief from heat and insects.

Based on local research, favored moose foraging areas include lakes, creeks, mesic meadows, 5–40 year old timber harvest units, and burned forest (Pierce and Peek, 1984). The most limiting habitat feature for moose in the South Fork subbasin is the availability of high-quality winter range (USDA-FS, 1998a). This winter moose habitat is important to moose for both cover and forage. Moose habitat in the American River ERU is now 306 percent of historic levels (USDA-FS, 1998b). This can be attributable to increases in more shade tolerant tree species, like subalpine fir and grand fir, due to fire suppression and forest succession (USDA-FS, 1998a:83). The American River ERU contains an abundance of high quality moose winter habitat (approximately 21,391 acres) (USDA-FS, 1998b).

Maintaining high quality moose habitat in quantities that are well beyond the historic levels would not be practical, especially for a species which is increasing and is a relative habitat generalist (USDA-FS, 1998b). In addition, attempting to maintain such conditions would likely be unsustainable over the longer term, given increasing fuel loadings and the known fire disturbance patterns in the analysis area. Fire hazard will increase as more stands in the area transition from low or moderate hazard to high. The American River watershed has not been identified as a high priority area to manage for moose conservation (USDA-FS, 2005a).

Environmental Effects

Noxious weeds, road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to impact moose or their habitats considerably regardless of alternative.

Primary analysis criteria for moose would include acres of mature and old growth grand fir stands with Pacific yew understory identified for harvest. No stands meeting this criterion are identified for harvest. Actions that directly or indirectly affect riparian habitats and mesic meadows in the analysis area would affect moose habitat quality.

Alternative A (No Action Alternative)
Overall, the existing condition would not change under this alternative. The “no action” alternative would not harvest important moose winter habitats. The road decommissioning and riparian restoration actions associated with this project would not take place. The “no action” alternative would have uncertain indirect effects of encouraging continued fuel loading throughout the areas, which may indirectly increase future fire-loss risks of some stands of moose winter habitat. Whether these effects would extend outside the project or analysis area is uncertain. Continued fire suppression activities would result in a decline in younger stands and openings used by moose during summer. Conifer-shrub and mountain shrub cover

types would decline in amount and distribution, as would the size of open patches as ingrowth fills and matures in old openings. Mature and old growth forests with a Pacific yew understory would remain intact barring a wildfire. Considering current moose habitat prevalence and moose populations in the analysis area, this would not likely be considered a major negative impact.

Alternatives B, C, and D
No harvest of important moose winter habitat would occur. Indirect effects to important moose winter range from wildland fire would be negligible in the American River watershed because of the amount of treatment acres relative to the location of important moose winter range.

Alternatives B, C, and D would modestly improve habitat security compared to Alternative A by reducing motorized access in portions of the analysis area. Alternative C would improve habitat security to the highest level and positive effects would occur primarily along some segments of American River that would not have motorized vehicle access. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts.

All action alternatives identify various riparian restoration actions, which will support long term upward trends for riparian and aquatic habitats. Refer to the previous Table 3.7.17 for a summary of riparian restoration actions for each Alternative which would prove beneficial for moose.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for shiras moose is the American River watershed.

The "no action" alternative would have no major cumulative effects on moose or their important winter habitats. This action, along with past and present fire exclusion, along with other habitat intrusions such as roading, harvesting, public recreation activities and other impacts on the land would further modify habitat outside its historic norm, but would not be likely to affect moose considerably.

Past timber harvest has resulted in the loss of medium and large trees as well as some grand fir/Pacific yew moose winter range. Active fire suppression since the early 1900s has allowed succession to continue, and this has resulted in an increase in the amount of moose winter range available in the area in recent time. The long-term effect of fire suppression could increase the likelihood of stand-replacing fire, which in turn could result in the loss of Pacific yew, a fire-intolerant species.

Road construction has resulted in increased access into the project area and reduced security for moose. Human disturbance, as it relates to wildlife security and human-induced mortality, is the past, present, and reasonably foreseeable action with the greatest effect on moose in the planning area (USDA-FS, 2005a). All action alternatives would decommission roads and continue current access restrictions for public motorized vehicle use.

The Eastside Project would not treat any important moose winter range; therefore, there would be no cumulative impact to this habitat feature.

Modifications to moose summer habitat would be less impactive to individuals and populations, as summer habitat is not limiting in the project area and because present and future actions would tend to modify rather than remove summer habitat. At the watershed level, past, present, and reasonably foreseeable future actions would have negligible effects.

Black-backed Woodpecker

Existing Condition

Black-backed woodpeckers inhabit boreal forests throughout North America, including Idaho. Suitable habitats may be found in lodgepole pine, ponderosa pine, Douglas-fir, and mixed conifer forests, especially those experiencing insect infestations. Optimal habitat is provided by sites experiencing destructive insect infestations, such as bark beetles or recent (less than 5 year old) burned-over forests.

Black-backed woodpeckers evolved with and have become dependent on natural landscape disturbances, particularly fire but also areas experiencing insect infestations. They are also relatively nomadic, displaying "irruptive dispersal" in response to habitat changes, and will move to large areas where fire-killed dead and/or dying trees are infected with bark and wood-boring beetles. As a result, the species displays extensive dispersal capabilities. The most expansive mountain pine beetle outbreak documented within the Northern Region of the Forest Service occurred on the Nez Perce National Forest where nearly 117,000 acres were identified as infested in 2003 alone (USDA-FS, 2004d:54). Similarly, the project area and surrounding drainages are currently predominantly infested with mountain pine beetle, and with pockets of other insect damage. Areas impacted by the mountain pine beetle infestation within and around the project area now total at least 250,000 acres conservatively. These sites provide the specialized habitat conditions required for nesting and feeding by this bird. In addition, recent wildfires have occurred adjacent to the American River drainage (Slims Fire on the Selway-American River divide to the north). Pockets of crown fires or areas with stand-replacing fires have created high quality habitat for this species for the next few years.

After stand-replacing fires, forests consist almost entirely of standing dead snags. Starting immediately after the fire, these snags are colonized by wood-boring beetles, which attract woodpeckers. Black-backed woodpeckers seem to depend on one- to six-year-old burns, and their numbers may peak two to three years after fires (Hejl and McFadzen, 1999; Murphy and Lenhausen, 1998). Black-backed woodpeckers will also forage in stands undergoing bark beetle outbreaks, but density estimates in these stands are substantially lower than in post-fire forests (Powell, 2000). Black-backed woodpeckers move to stands and trees following active beetles, and abandon sites in which the trees have died. Home range sizes are relatively small, averaging about 300 acres per bird (range: 175–810 acres) (Dixon and Saab, 2000). Goggans et al. (1988) state that black-backed woodpeckers' home range size may be related to the proportion of the range that is unlogged; the largest home range in their study had the smallest proportion of unlogged habitat.

In the study conducted by Goggans et al. (1988), all nests were located in lodgepole pine trees, and live as well as dead trees were used for nests. Smaller trees were utilized; the mean size of nest trees was 11 inches dbh, and mean stem size of nesting stands was eight inches dbh. Bull et al. (1986) found black-backed woodpecker nests in both ponderosa pines (67 percent) and lodgepole pines (27 percent). Mean dbh of nest trees was 15 inches, and 60 percent of these trees were dead. These researchers noted that black-backed woodpecker selection of smaller trees is unusual, as most woodpecker species nest in larger dead trees.

Until the recently expanded mountain pine beetle epidemic, it was acknowledged that as a whole, suitable habitat for black-backed woodpeckers had likely declined more for this bird than for any other wildlife species. In the American River watershed, black-backed woodpecker habitat was only 88 percent of historic levels (USDA-FS, 1998b). This can be attributable to decreases in large patches of fire-killed trees due to fire suppression (USDA-FS, 1998a:84). However, the very wide extent and magnitude of the mountain pine beetle epidemic has substantially changed these circumstances.

Based on the extent and progression of the current mountain pine beetle epidemic in the American River drainage and surrounding areas, extent of the beetle epidemic has created many thousands of new acres of suitable black-backed woodpecker habitat. In addition, lethal severity fires are a probable outcome throughout much of the American River watershed in the years ahead.

For this analysis, black-backed woodpecker foraging and nesting habitat was defined as lodgepole pine or mixed xeric conifer forest with a lodgepole pine component with pole and larger sized trees (trees greater than 5 inches dbh) of any canopy closure (10–100 percent). Table 3.7.20 shows the acres and percent of habitat for the American River watershed.

Table 3.7.20 Estimated Acres of Black-Backed Woodpecker Habitat

Watershed	Habitat Acres (% Watershed)
American River	19,014 (32%)

By assuming a home range size of 600 acres per pair, an index was developed to compare the effects of each alternative. Under the existing condition, 19,014 acres of habitat could support about 32 black-backed woodpecker pairs. It is important to realize that this number is simply an analytical index and in no way attempts to measure actual densities or numbers of black-backed woodpeckers on the landscape. Black-backed woodpecker home ranges can vary in size according to the amount of logged habitat and the continuity or disconnectedness of that habitat. It is also not known how much home range overlap might exist within or between black-backed woodpecker pairs.

Environmental Effects

Noxious weeds, road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to impact black-backed woodpeckers or their habitats considerably (regardless of alternative). The removal of dead, dying, and green trees would remove foraging and nesting sites, and would constitute habitat losses. The net effects of harvest on black-backed woodpeckers would be relatively minor within the context of each alternative and landscape acres under beetle attack. Based on available information, the analysis criteria for black-backed woodpecker will be the relative amounts of lodgepole pine retained after harvest that will likely remain in place or available to subsequently burn and become highly suitable for use.

Alternative A (No Action Alternative)
The "no action" alternative would have no direct effect on black-backed woodpecker or its habitat. This alternative would leave stands unharvested. As forest succession and fire suppression occur in overstocked stands, trees become more susceptible to attack from insects and disease. This increases the amount of foraging and nesting resources available to black-backed woodpeckers. As the insect and disease outbreak advances, standing and down dead material would increase, which in turn increases the risk of stand-replacing fires. If a fire event were to occur, wood-boring beetle populations would spike causing a concurrent spike in black-backed woodpeckers for one to six years post burn. Without a fire event, the insect outbreak would eventually peak and subside. Grand fir and other more shade tolerant species that currently exist in the understory of stands with dead and dying trees would continue to grow, perhaps eventually causing the long-term loss of the early seral tree species black-backed woodpeckers prefer (e.g., lodgepole pine and ponderosa pine). The risk of losing early seral species does not seem as high as the risk of stand-replacing fires in the American River watershed. Under the "no action" alternative, the existing level of patchiness in the watershed would persist until a stand-replacing fire or other management action(s) take place.

Alternatives B, C, and D
Treatments that include green and dead tree harvest to improve forest health and reduce the incidence of insects and disease would reduce habitat for black-backed woodpeckers. Not only would the habitat they are using be modified, the patchiness of the remaining habitat would increase. The changes in habitat acres are outlined in Table 3.7.21 by alternative.

Table 3.7.21 Estimated Acres of Black-Backed Woodpecker Habitat Modified by Action Alternative within American River Watershed

American River	Alt A	Alt B	Alt C	Alt D	NPNF[1]
Acres (%) Habitat Treated	0	984 (5.2%)	975 (5.1%)	866 (4.5%)	518 (2.7%)

[1]Nez Perce National Forest (NPNF) selected alternative for American and Crooked River Project FEIS (USDA-FS, 2005a).

While Alternative B results in greatest loss of future foraging and nesting habitat opportunities, the loss would still be relatively minor and inconsequential, similar to other alternatives. The relative amounts of dead and dying lodgepole pine in stands that would remain unharvested in the American River watershed dwarfs the harvested acres many fold.

Alternative D would modify the fewest acres (866 acres) of black-backed woodpecker habitat of the existing habitat in American River, and alternative B would modify the greatest acreage (984 acres), all action alternatives would modify approximately 5 percent of existing habitat within the American River watershed. Using an analytical index, under alternatives B, C, and D, enough foraging and nesting habitat would remain in the project area to support 30 pairs of black-backed woodpeckers in the American River drainage.

Scientific literature shows that the amount of logged versus unlogged habitat on the landscape, both pre- and post-fire, affects black-backed woodpecker distribution and home range size. Approximately 15 percent of the American River drainage has been harvested, with the majority occurring in the last 50 years, the project area does exhibit patchiness. Additional green and dead tree harvest from any of the action alternatives will add to the patchiness of the landscape.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis for blackbacked woodpecker will focus on the American River watershed.

The “no action” alternative would in effect, have positive cumulative effects on black-backed woodpecker habitat availability. Absence of fuel reduction and lodgepole pine harvest, would add cumulatively to overall risks of eventual fire spread, but potential maximization retention of habitat creation for black-backed woodpeckers occur in the American River watershed. Ultimately, this alternative would serve the local habitat needs of black-backed woodpeckers best and the impacts would be positive.

Action alternatives would result in habitat losses. Such losses add moderately to cumulative losses of existing and potential future black-backed woodpecker habitat related to previous harvests, roading, and post-disturbance harvest projects as well as reasonably foreseeable harvests on private and nearby Nez Perce National Forest lands in the analysis area. While losses of existing and future foraging and nesting habitat opportunities would result from this project, the loss would be relatively minor and inconsequential in the American River drainage. The relative acres proposed for mechanical harvest are only a very small portion of the total acres that are dead and dying. These acres are likely to burn by wildfires and become high quality habitat in the future, therefore the relative amount of anticipated black-backed woodpecker habitat predicted to be lost to harvest is relatively minor within the analysis area and relatively inconsequential. The mountain pine beetle epidemic has created many thousands of acres of highly suitable black-backed woodpecker habitat, making habitat losses to both harvest and reduced fire incidence relatively minor.

Activities that reduce the potential for wildfire and insect outbreaks reduce habitat for black-backed woodpeckers, which in turn affect black-backed population levels. Projects within the upper South Fork Clearwater drainages all target fuel loading and bug-infested trees in some capacity. Ongoing activities such as post and pole gathering, firewood cutting, road maintenance, and fire suppression also affect habitats that could be utilized by black-backed woodpeckers. Past timber harvest activities have created a patchy landscape across the watershed, which has likely resulted in larger black-backed woodpecker home ranges than would be the case in unlogged habitats. Larger home ranges affect the energy reserves of animals, as they must travel greater distances for their daily needs. Many past timber activities left few snags on the landscape that could be utilized for black-backed foraging, nesting, or drumming sites. At the project and watershed level, black-backed woodpecker populations could decline as a result of past, present, and reasonably foreseeable future actions.

Implementation of the FS American and Crooked River Project selected Alternative D would modify an additional 518 acres (2.7%) of black-backed woodpecker habitat. The Eastside Project and FS American and Crooked River Project cumulatively would modify 7.2 to 7.9 percent of black-backed woodpecker habitat within the American River watershed, refer to Table 3.7.21 above.

The South Fork Landscape Assessment (USDA-FS, 1998a) states that, "When pre-burn harvest is used, approximately 50 percent of the trees should be retained for burning with preference given to larger size classes." The planned harvest of up to approximately 1,300 acres in the Eastside Project would remove less than 0.5 percent of the total landscape affected by the current mountain pine beetles infestation within the South Fork Clearwater River subbasin and on the Nez Perce National Forest. Planned BLM and FS harvests would impact about 4.3 percent of the American River watershed, leaving conservatively more than 80 percent of the landscape (accounting for harvest-related reduced fire intensities) potentially available to be influenced by fires.

Across the range of the species, especially the Interior Columbia River Basin, moderate or strong declines in unburned habitats used by black-backed woodpeckers have occurred. The natural pattern of beetle outbreaks has been altered through silvicultural and fire management practices. Silvicultural practices directed at maximizing wood production by harvesting trees before they are susceptible to bark beetle attacks and salvage logging of beetle-infested, fire-killed, and wind-killed trees reduced the occurrence of beetles in some areas. Fire management policies have lengthened natural fire regimes and allowed more frequent occurrences of beetles. However, the effects of most of these past actions and events are imbedded in the existing condition described above. Impacts of the Eastside Project and other past, present, and reasonably foreseeable future actions in and around the American River watershed appear negligible. With a management emphasis on returning fire (both natural and prescribed) to the landscape, prospects for this species appear brighter.

Neotropical Migratory Birds

Neotropical migratory birds use all the habitats within the project area during the breeding season. In their Idaho Bird Conservation Plan, Idaho Partners in Flight (2000) identified several high priority species that use lodgepole pine habitats. Idaho Partners in Flight did not identify any high priority species that use lodgepole pine forests as their primary breeding habitat, but this is likely an artifact of the data collected. Those species that are thought or known to occur in the project area and are identified as high priority species by Idaho Partners in Flight are listed in Table 3.7.22 by primary breeding habitat.

Table 3.7.22 Idaho Partners in Flight High Priority Species Potentially Occurring in the Project and Analysis Area

Habitat Type	Species
High-elevation Mixed Conifer	Three-toed woodpecker (moderate conservation priority), olive-sided flycatcher, Hammond's flycatcher
Lodgepole Pine	Ruffed grouse, black-backed woodpecker, varied thrush
Low-elevation Mixed Conifer	Sharp-shinned hawk, northern goshawk, black-backed woodpecker, brown creeper, varied thrush, Townsend's warbler, western tanager
Ponderosa Pine	Flammulated owl, white-headed woodpecker
Mountain Brush	Lazuli bunting (moderate conservation priority)
Grassland	Western meadowlark
Non-Riverine Wetlands (Marshes, Lakes, Ponds)	Cinnamon teal, redhead, sandhille crane, killdeer, American avocet
Riparian	Rufous hummingbird, willow flycatcher, black-billed magpie, American dipper, yellow warbler, MacGillivray's warbler

Neotropical migrant songbirds utilize coniferous forest habitats of the U.S. during the summer breeding season, but migrate to southern latitudes to spend winters as far south as Mexico and South America. Tropical deforestation and other environmental effects related to wintering grounds are thought to be largely responsible for declines in some Neotropical migrant species that summer in forests of the Eastern U.S.

Fragmentation of nesting habitat is also theorized to increase rates of migrant bird nest predation and brood parasitism by other species. Small, isolated forest patches, particularly in forests of the eastern U.S. are considered at greatest risk. In contrast, natural fire regimes and topographic diversity in the western U.S. combined in the past to produce a temporally dynamic, naturally fragmented landscape compared with the previously extensive and relatively homogenous eastern deciduous forests. Timber harvest and fire suppression activity have nevertheless altered the natural landscape of western forests (Dobkin, 1994).

Despite these changes, Neotropical migrant bird populations in the western U.S. are recognized as faring better than eastern North American populations. A comprehensive review of Breeding Bird Survey data from 1966–85 found that Western Neotropical migrants as a group were not declining overall. However, the review found evidence of widespread declines among 19 songbird species of native grassland and shrub steppe habitats (Dobkin, 1994). None of these habitats are represented within the Eastside Project analysis area.

A three-year study by the USDA Forest Service's Northern Region Landbird Monitoring Program (Hutto and Young, 1999:69), concluded that some landbird species are relatively restricted in their habitat distribution to only one or two naturally occurring cover types that are themselves restricted in spatial content, or at least less extensive than they were historically. Of the potential cover types in the Eastside Project area, providing adequate amounts of the following were considered important to maintaining neotropical migrant bird population diversity and viability in the long term:

1. Post fire standing dead forests;
2. Relative uncut older forest; and
3. Riparian environments

Within the Eastside Project area, riparian areas (RHCAs) would receive protection from harvest through the application of PACFISH standards designed for fish habitat protection (PACFISH). An abundance of uncut standing forest acreage will be retained after the project (regardless of alternative), as potential future post-fire standing dead forest.

Environmental Effects

Noxious weeds, road decommissioning, watershed restoration actions, and post-harvest slash treatments using fire are not expected to impact Neotropical migratory birds or their habitats considerably, regardless of alternative. The removal of dead, dying, and green trees would remove foraging and nesting sites and would constitute habitat losses. The net effects of harvest on migratory birds would be relatively minor within the context of each alternative and landscape acres under beetle attack.

Alternative A (No Action Alternative)
Overall, this alternative would leave bird habitats across the project area to continue with relatively natural processes. Areas with heavy tree mortality and blowdown would provide structural diversity, downfall trees, and a few long-standing snags. As beetle-killed trees fall to the ground, downed logs and shading from snags could delay regeneration in those stands with particularly heavy mortality. The probability of more severe wildfire would increase, particularly in areas with heavy fuel loads and in adjacent stands. Mature mixed conifer, subalpine fir, and grand fir forests could potentially be lost in fire event, as could areas of old growth. Live vegetation that provides cover, foraging, and nesting habitat could be reduced across the project area. Post-fire, there would be an initial shift in species composition

to invader species and those adapted to early successional communities. Within time, there would be a gradual return of those species adapted to mid-seral, mature, and late successional forests. Whether these effects would extend outside the project or analysis area is uncertain.

Watershed improvement projects would not be implemented under this alternative. Riparian forest and shrub environments are important for a variety of bird species, and the current lack of large woody debris and streamside shade/shrub could be diminishing the habitat quality of these areas for birds. As succession continues, large woody debris would be expected to fall into streams and riparian areas and stream shading should increase.

Alternatives B, C, and D

All action alternatives would alter migratory bird habitat through the direct removal of nesting and/or foraging habitat (trees) by various levels of timber harvest. Timber harvest would create openings and edges that could be used by a variety of bird species. Prescribed fire, natural regeneration and/or seed planting, and other silvicultural prescriptions could accelerate regeneration of canopy cover in harvest units. By leaving large, wind-firm live trees and snags, and pockets of down wood, feeding and nesting habitats for songbirds could be maintained. By reducing fuel loads and creating openings across the landscape, the risk of stand-replacing fire would diminish locally.

Of the harvest treatments in the Eastside Project, approximately 80% would be considered relatively intense regeneration harvests. The remaining harvests would be variations of partial-cut or thinning aimed at removing lodgepole and other components but favoring retention and perpetuation of fire-adapted species. Each harvest type will change habitat resulting in habitat reductions or habitat enhancements, depending on the bird species considered. Some Neotropical migrants will be harmed to some measure, while others will benefit. Harvested units that remove virtually all canopy and tree boles typically leave no residual nesting habitat for most species, but often create openings and herbaceous ground cover used by aerial insect foraging species. Impacts of partial cut harvesting on Neotropical migratory birds in conifer forests of the Northern Rockies in one study (Young and Hutto, 2002), found that 5 bird species (brown creeper, winter wren, golden-crowned kinglet, varied thrush, and Townsend's warbler), were more abundant in uncut forest stands in at least one year, and 15 species were more abundant in partially cut stands. Many of the bird species that were more abundant in the partial-cut stands, such as the hairy woodpecker, mountain chickadee, yellow-rumped warbler, and western tanager, are open-forest species that might be expected to be more common in thinned conifer forests than anywhere else. In the body of the referenced study, concern was expressed that brown-headed cowbirds are much more likely to occur in partially cut than in uncut forests and the presence of this nest parasite may create unsuitable environments for other nesting birds.

Few studies have examined habitat and landscape factors affecting the distribution of Brown-headed cowbirds, a nest-parasitic native bird. Using data from a region-wide monitoring program conducted across the USDA Forest Service's Northern Region (including the Nez Perce National Forest), Young and Hutto (1999) concluded that the presence of clearcuts does not draw cowbirds into forested regions. The density of potential host species (cattle or other livestock) was one of the most important local-scale correlates of cowbird presence. In this study, cowbirds were so strongly associated with proximity of agricultural areas that the authors concluded that many areas of the forested mountains are probably still safe from parasitism pressure.

Watershed improvement projects that improve overall water quality would benefit many Neotropical and other migratory birds. No timber harvest or salvage is planned in RHCAs, so these habitats would remain available to birds. Similarly, seeps, springs, and wet areas would be buffered with no timber harvest, leaving these areas intact for songbirds.

Timber removal would result in the potential loss of nesting and foraging habitat currently being used by a variety of Neotropical and other migratory bird species. Given the status of the mountain pine beetle epidemic in the project area, many nesting and foraging opportunities would continue to exist. Individual

birds or local populations could be impacted by timber cutting should harvest occur during the breeding season. Indirect effects would be the temporary displacement of individuals or potential losses of nests and/or young of some birds in those areas where concentrated mechanical and/or human activities are occurring in order to implement the prescribed treatment and for road construction or decommissioning. This displacement is expected to last as long as the disturbance, after which affected individuals would resume use of the area(s) affected. These effects would not be of sufficient magnitude to risk loss of any individual bird species in the local landscape because harvested acres would be only a very small percentage of the forested area within the analysis area.

Snag retention would meet or exceed guidelines, and no old growth stands would be harvested.

Any existing old growth would not experience direct impacts from harvest as presented in the action alternatives. Some species that utilize old growth for nesting would utilize mature or large tree stands, and would experience a slight loss of nesting habitat from action alternatives. Indirect reductions in fuels and intermediate aged stands at moderate levels would occur. Unharvested stands with lodgepole pine that is in the process of dying would be relatively poor nesting habitat for some Neotropical migrant birds, because of declining live canopy cover. A review of ground and shrub-level nesting birds from the USDA Forest Service's Northern Region Songbird Monitoring Program (Hutto, 1995), was conducted by the Forest Service on a project that included forest stand treatments adjacent to the Eastside Project (USDA-FS, 2005a). Prescription fire applied to reduce post-harvest slash, if applied during the spring nesting period, would potentially impact nests of only 2 species (MacGillivray's warbler and Dark-eyed junco) of the approximately 35 bird species documented to inhabit the lodgepole pine and mixed-conifer cover types in the project area (USDA-FS, 2005a). Both species inhabit a wide variety of forest cover types, and monitoring of spring burns on the Forest to date has not found evidence of such losses. In the long term, thinning and harvest treatments will tend to create more nesting habitat conditions suitable for these birds. It is recognized that treatments would also occur in areas not dominated by lodgepole pine.

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for neo-tropical migrants is the American River watershed.

Past and present actions have impacted or altered migratory bird habitat in the project area and surrounding watersheds. These actions include grazing, dredging, mining, firewood cutting, timber harvest, fire suppression, road construction and maintenance, winter trail grooming, dispersed and developed recreation, administrative facilities maintenance, and home site construction. Timber harvest has added successional diversity across an otherwise rather homogeneous landscape that has grown out of 60 years of fire suppression. Patch sizes are smaller and snags, down wood, and legacy trees are fewer than in a fire-impacted landscape. All of these past and present effects have contributed to the current species distribution and population sizes of Neotropical and other migratory birds.

Action alternatives, in combination with past, present, and reasonably foreseeable projects would also affect bird species by potentially removing important foraging and nesting habitat and through the creation of early successional and/or thinned areas that might benefit certain bird species. The removal of dead, dying, and green trees would remove foraging and nesting sites and would constitute habitat losses, but the extent of the impacts will be limited in context of each alternative due to limited areas involved. Woodpecker populations and secondary cavity-nesters in particular are likely to be affected by the removal of dead and dying trees and fuel reduction projects. Harvests that occur during the nesting period would increase the likelihood of direct mortality to nestlings and could disturb mating and nesting behaviors.

The action alternatives, in combination with past, present and reasonably foreseeable future actions including fire exclusion in the overall landscape, will cumulatively add some fragmentation effects to the forested landscape but the net impacts to bird species would be relatively minor, given historical impacts of fire regimes, overall insect-driven disturbance, and tree death throughout the analysis area. At the

project and watershed level, the cumulative effects of the proposed project may affect individuals or local populations of some bird species.

3.7.6 Wildlife Habitat Associations and Guilds

Common to All Alternatives

Cumulative effects analyses for wildlife species and habitats are summarized for habitat fragmentation/connectivity, snags and large down wood, and four generalized species habitat guilds based on predominant habitat associations or dependency relationships, (i.e., riparian/aquatic dependent, fire/early seral dependent, late seral/old-growth associated, and security dependent). Some species may align with more than one guild. Cumulative effects take into account the Eastside Project as well as past, present, and potentially foreseeable future actions (see complete listing referenced in Table 3.0.1).

Table 3.7.23 Wildlife Habitat Associations and Guilds

Habitat Associations and Guilds	Wildlife Species–Dependency Associations
Habitat Fragmentation and Connectivity	All species
Snags and Large Down Wood	black-backed woodpecker, Williamson's sapsucker
Riparian/Aquatic Dependent	western toad, common garter snake, Idaho giant salamander, bald eagle
Fire/Early Seral Dependent	lynx, wolf, bald eagle, black-backed woodpecker, olive-sided flycatcher
Late Seral/Old-Growth Associated	northern goshawk, Williamson's sapsucker, fisher, Shiras moose, Neotropical migrant birds
Security Dependent	wolverine, elk, fisher

Collectively, all cumulative impacts would be scattered across the entire project area and the American River watershed, which is located within a much larger landscape. Past harvesting and fire effects patterns have impacted habitats with overall cumulative habitat fragmentation, changes in patch size and dynamics, increased roading and related human disturbance impacts, increased edge effects, and reductions in old growth habitat abundance as illustrated and referenced in the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a). Within this larger perspective for the entire watershed, the cumulative effects, when combined with Alternatives A, B, C, or D, would not be expected to yield adverse effects on any species or habitats that would threaten the population viability of any species discussed in Section 3.7 (Wildlife).

Habitat Fragmentation and Connectivity

Fragmentation and connectivity of wildlife habitats can be viewed as positive and negative. Habitats have historically been fragmented by wildfire, insect and disease and other disturbance processes. These can be viewed as positive influences on the landscape, providing and maintaining a diversity of wildlife habitats. However, fragmentation of habitats having long fire intervals and large patch sizes may negatively influence the wildlife species preferring large patches of undisturbed habitats.

Habitat connectivity can have positive and negative considerations. Connectivity is important for some wildlife species to move on the landscape. However, habitats that have not been connected due to fire history, natural barriers, etc. that are allowed to become connected (through fire exclusion for example) may allow wildlife, plants, insects and disease to interact in negative ways. Invasive wildlife species and noxious weeds increase their ranges by using these artificial connections on the landscape. These connections may influence how insects and disease interact with and affect habitats.

Native wildlife species have adapted to a landscape with a high degree of fragmentation, abundant edge and a variety of patch sizes, the result of natural processes and topography. This situation within the upper South Fork Clearwater River subbasin and American River drainage landscapes has not been appreciably altered by any past actions on the landscape except for perhaps high volume road systems and fire exclusion or in heavily developed areas. Highway 14 parallels the South Fork Clearwater River and lower American River, and other roads and trail open for motorized use affect wildlife habitat use within the analysis area. Other than these high volume roads, fire exclusion has created the greatest effects by allowing development of dense multi-canopied forests that have created conditions not preferred by species such as goshawks and flammulated owls. Effects of fragmentation on wildlife dispersal or movement between various habitat elements (water, forage, winter/summer range, breeding areas) have not affected the viability of any wildlife species within the American River analysis area (USDA-FS, 2005a).

Snags and Large Down Wood

Snags, broken-topped live trees, downed logs, and other woody material are required by a wide variety of species for nesting, denning, roosting, perching, breeding, and cover. The number, species, size, and distribution of available snags strongly affect snag-dependent wildlife (Bull et al., 1997). Although smaller creatures can use many sizes of dead trees, larger birds and mammals require larger snags and down logs. In the American River area, large western larch, ponderosa pine, and Douglas-fir snags are most valuable.

Downed trees and other woody material are also important for many species (Bull, 2002). Downed logs and stumps provide resting and denning for species hunting below the snow in winter (Buskirk and Ruggiero, 1994) and are used as travel cover. Pine marten and lynx dens are associated with down logs. Amphibians and reptiles use large woody debris for shelter and breeding sites (Bull et al., 1997). Down wood also provides habitat for insects and other invertebrates that form an important forage base for larger species. Large diameter logs provide long-term habitat structures.

The current mountain pine beetle epidemic has killed up to 50–60% of the lodgepole pine trees in portions of the American River watershed. The mountain pine beetle generally kills trees six inches in diameter at breast height and larger and prefers lodgepole pine trees. At epidemic levels, the beetle may affect smaller trees and other tree species. This is evident in the American River drainage.

There are abundant small to medium sized lodgepole pine snags in the American River drainage. Currently 15% of the area is lodgepole pine dominated habitats in the American River watershed. Additionally, 25–40% of the area is mixed conifer habitats with lodgepole pine as a component (USDA-FS, 2005a). Most of these areas have been affected by the mountain pine beetle. Surrounding watersheds have also been affected by the epidemic. Lodgepole pine snags are not preferred by many wildlife species, possibly because of small diameter and in many cases in American River lodgepole pine trees form a subdominant tree layer under larger diameter and taller grand-fir, Douglas-fir, ponderosa pine, and western larch, all of which are preferred snag species over lodgepole pine.

Riparian and Aquatic Associated Species

The stream channel in the American River watershed are predominately low to moderate gradient B and C channel types, with higher gradient channels in the mountain uplands. The American River watershed has a large amount of mid to upper elevation alluvial valleys, and these features are spread more evenly throughout the watershed than is typical of the subbasin. The lower to mid reaches of the larger streams are composed predominately of C channel types.

The riparian plant communities within the analysis area are comprised of early seral to late seral plant communities. The riparian vegetation includes overstory trees of grand fir, Engelmann spruce, lodgepole pine, subalpine fir, and Douglas-fir. Common understory shrubs include alder, Drummond's willow, red-

osier dogwood. Common herbaceous plants include arrowleaf groundsel, twisted stalk, blue joint, mountain brome, redtop, reed canary grass, water sedge, small-fruited bulrush. Typical riparian plant communities include conifer dominated overstory such as grand fir and Engelmann spruce, with understory shrubs, sedges/grasses, and forbs. Large sedge meadows are found in the lower Elk Creek drainage, and stringer sedge meadows, and shrub/sedge complexes also occur along lower gradient streams.

Most of the larger streams and riparian areas have been impacted to varying degrees, primarily by dredge mining, roads, timber harvest, livestock grazing, and home construction. These disturbed riparian habitats have also been infested by nonnative vegetation. Dredge mining has left some stream reaches lacking in trees and shrubs, and natural re-vegetation/succession has been curtailed and recovery has been slow.

Riparian habitats provide an important habitat or critical habitat component for most wildlife species. These areas provide important riparian/aquatic habitats for dependent species such as amphibians. Riparian habitat reserves also provide important old growth or potential old growth stands. Riparian corridors also provide connectivity and travel corridors for a variety of wildlife.

Fire/Early Seral and Late Seral/Old-Growth Associated Species

In the American River watershed approximately 15% has had historic timber harvest activity, the FS (USDA-FS, 2005a) documented that 83 percent of historical was done during the 1950s–1980s, with the remaining 17 percent being done during the 1990s–current time. The effects have impacted late seral/old growth species and security dependent species the most; however many intermediate-aged stands have since moved into late-seral or old growth conditions as well. Some species such as early seral associates, have in fact, benefited substantially from the harvests. Other species guilds were impacted moderately.

The fire history of the American River watershed added further to past impacts. Historical fire-related impacts in both drainages occurred before the 1950's when most harvest impacts began. Fire impacts in the American River watershed added over 59,000 acres of disturbance since 1878, with highest impact years being 1889 (36 percent of all acres), 1910 (18 percent of all acres), and 1919 (41 percent of all acres). Cumulatively, these impacts resulted in greatest negative effects for late seral/old growth associated and security-dependent species, with moderate or lesser effects on ponderosa pine dependent, aquatic. Fire/early seral–dependent species subsequently benefited from these harvest and fire disturbances.

The project area and proposed Eastside Project treatments occur in VRU 6, which comprises 36,340 acres and 62 percent of the American River watershed. Table 3.7.24 summarizes natural/historic disturbance regimes by size class for this VRU and existing conditions.

Table 3.7.24 VRU 6 Natural/Historic and Existing Conditions in the American River Drainage

Size Class	Natural/Historic Disturbance Regimes[1]	Available Size Class Data Used For Analysis	Alt A Current Acres (%)
Non-Forest	5–10%	Non-Forest & Shrub Dominated	3,005 (8.6%)
Seedling/Sapling (<5 inch dbh)	10–30%	Seedling/Sapling (<5 inch dbh)	10 (<0.5%)
Pole (5–9 inch dbh) and	30–45%	Small Tree (5–9.9 inch dbh)	4,178 (12%)
Small Tree (9–14 inch dbh)		Medium Trees (10–14.9 inch dbh)	11,988 (34.4%)
Medium Tree 14–21 inch dbh	20–40%	Large (15+ inch dbh)	15,659 (44.9%)

Size Class	Natural/Historic Disturbance Regimes[1]	Available Size Class Data Used For Analysis	Alt A Current Acres (%)
Large Tree >21 inch dbh	5–20%		

[1]Source–*South Fork Clearwater River Landscape Assessment Volume 1*–page 96 (USDA-FS, 1998a)

The FS completed a cumulative effects analysis of large tree patch statistics and changes in large tree stand retention for the American and Crooked River Project (USDA-FS, 2005a). It includes the American River watershed and was done roughly on summary of decadal intervals (1948, 1970, 1990, 2004). Large tree stands were identified through aerial photo interpretation techniques using approximations of 10–15 trees per acre in the 18–21 inch size classes, so this assessment was of moderate accuracy. Tracking cumulative changes by individual project became impossible since most project development impacts spanned time intervals up to 10 years and multiple project impacts sometimes overlapped one another. A summary of cumulative changes in patch size/shape statistics changes over time are listed below in Table 3.7.25.

Table 3.7.25 Average Patch Size and Shape of Large Trees[1]

Year	Average Patch Size	Patch Shape (1.00=perfect circle)
1948	219.09	1.97
1970	168.54	1.97
1990	160.78	2.08
2004	158.38	2.11

[1]Source: USDA-FS, 2005a

Patch shape definition equals the perimeter to area ratio. A Number higher than 1.00 indicate increased edge effects and fragmentation. As shown by the above table, as the patch size of large trees decreases, edge increases.

Security Dependent Species

Cumulative effects of past incremental road development in the analysis area include variable progressive increases in wildlife effects such as direct habitat loss, disturbance, displacement, vehicular-induced and human-induced direct and indirect mortalities, increased habitat fragmentation, noxious weed spread, and other similar effects. Existing and planned road decommissioning and access restrictions have mitigated some negative effects over time. The analysis of progressive road-density related effects on wildlife through time are displayed by elk summer habitat analysis conducted for the Eastside Project EAU (see previous Table 3.7.18). The Eastside Project EAU includes BLM and private lands and the existing EHE is 40%. The primary impact on EHE results from existing roads open to motorized use, specifically primary and secondary roads that go through areas with no hiding or security cover for elk. The actions alternatives would result in a long term 36% to 37% EHE. Adjacent EAUs on NPNF lands do not include private or BLM lands. They have existing EHE ranges of 77% to 84%. After implementation of the preferred alternative for the American and Crooked River Project (USDA-FS, 2005a), the long term EHE for the NPNF EAUs would range from 80% to 92% (see Table 3.7.19).

In most areas 60 to 80 percent of the total roads had been developed by the mid-1980s. At this time, principally due to concerns over EHE, road closure and access restriction programs had begun to be implemented to reduce impacts on elk behavior. Although these mitigations have reduced vehicular and human disturbances, vulnerability to hunting, and similar impacts on other wildlife, some impacts on

habitats and species still remain in place. Alternative A would not decommission any roads, thus existing cumulative impacts would remain.

Alternative A (No Action Alternative)
Habitat Fragmentation and Connectivity–The mountain pine beetle would continue affecting wildlife habitats, especially at the American River watershed scale and the South Fork Clearwater River Sub-basin scale. Canopy gaps in mixed conifer habitat would create areas where shrubs, forbs, and grasses would respond to available sunlight and moisture. Following this response, tree regeneration (primarily shade tolerant species such as grand fir and Douglas-fir) would occur. Areas dominated by lodgepole pine would have larger openings, but the predicted cycle of forage development followed by tree regeneration would be the same.

Snags and Large Down Wood–No new activities are proposed with this alternative. Many snags would be available for wildlife use. Snags used for nesting would remain at existing levels. Down wood would be abundant, providing high quality habitat for pine marten and fisher in areas of mixed conifer habitats. Abundant down large wood would favor small mammal populations. Small mammals are important prey species for forest carnivores.

Snag habitat would continue to be affected by natural events such as wind and fire. Insects and disease would continue functioning in the area. Refer to Section 3.3 (Vegetation) for more information on insects and disease. Wildfire would provide post-fire snag habitats for species like the black-backed woodpecker, but also eliminates live tree habitats important to many wildlife species, particularly old growth associated species. The size of such an event would depend on fire suppression effectiveness and weather conditions. Whether these effects would extend outside the project or analysis area is uncertain.

In the absence of windstorms or wildland fire, many areas dominated by dead and dying trees would gradually deteriorate, with few trees or snags standing after 10–50 years. In some of the mixed conifer areas large western larch, ponderosa pine, Douglas-fir, and grand fir would provide green trees to provide long-term snag habitat. In mixed conifer areas containing western larch and ponderosa pine, shading from down logs, standing snags, and live canopy cover would be a disadvantage to natural regeneration of these preferred species. Grand fir and lodgepole pine would regenerate.

Access management affects snag habitat availability due to firewood cutting, often within 200 feet along open roads. Although there is abundant firewood gathering opportunity in American River for lodgepole pine, many people prefer Douglas-fir and western larch snags for firewood. This alternative does not change current access management.

As forest succession and fire suppression occur in overstocked stands, trees become more susceptible to attack from insects and disease. This increases the amount of resources available to wildlife species. As the insect and disease outbreak advances, standing and down dead material would increase which in turn increases the risk of stand-replacing fires. If a fire event were to occur, wood-boring beetle populations would spike possibly causing a coincident spike in some wildlife species. Without a fire event, the insect outbreak would eventually peak and subside. Grand fir and other more shade tolerant species that currently exist in the understory of stands with dead and dying trees would continue to grow, perhaps eventually causing the long-term loss of the early seral tree species (e.g., lodgepole pine, ponderosa pine, and western larch). The risk of losing early-seral tree species does not seem as high as the risk of stand-replacing fires in the American River watershed. Under the “no action” alternative, the existing level of patchiness in the watershed would persist until a stand-replacing fire or other management action(s) take place.

Riparian/Aquatic Dependent–This alternative would likely have no measurable cumulative impacts on habitats or species. Existing conditions and trends would be expected to continue for riparian habitats. Some dredge mined areas would continue a slow rate of recovery and successional advancement along some stream reaches. As some riparian stands mature and decline with their associated fuel-buildups,

more severe localized fire risks may occur. Such risks may increase the chances of mortality to riparian dependent species, particularly species that are not so mobile (e.g., salamanders, frogs, western toad) and habitat losses due to wildfires, particularly if such fires affected large percentages of a drainage, and associated riparian and aquatic habitats. Whether these effects would extend outside the project or analysis area is uncertain.

Fire/Early Seral Dependent–This alternative would allow cumulative fuel-loading to occur unabated. Cumulative effects would initially be harmful to some species because fire would be discouraged initially, but eventually the accumulations and continuity of fuels may encourage larger acreages to burn and regenerate which would result in outcomes beneficial for most fire/early seral species to mixed degrees. Whether these effects would extend outside the project or analysis area is uncertain. Some of these species also require interspersions of live cover with early seral habitat, so benefits to some species would be limited. Due to the magnitude and landscape acreages affected by the mountain pine beetle infestations, past and future harvests in the analysis area and on BLM and private lands in the area would likely have limited influence on overall effects to most of these species.

Late Seral/Old-Growth Associated–This alternative would initially add no direct impacts on late seral or old growth habitats initially protecting habitat integrity, but would allow highest levels of cumulative fuel-loading to occur. Cumulative effects would include uncertain future risks for fire losses of late seral and old growth habitats in patterns and patch sizes at scales that may be outside historical norms. The effects may potentially be negative for some species in some places. Whether these effects would extend outside the project or analysis area is uncertain.

Security Dependent–This alternative would have no measurable cumulative impacts on critical habitats for species requiring remote, undeveloped areas, but would allow moderately high open road densities, access, and human intrusion effects in some portions of the analysis area. Current risk levels of wildlife disturbance, displacement and potential mortality would remain unchanged in developed areas.

Alternatives B, C, and D

Habitat Fragmentation and Connectivity–Most of the habitats in the American River watershed would respond similarly to what is described under Alternative A above. In parts of the American River watershed, openings are currently being created as lodgepole pine trees succumb to the mountain pine beetle. The primary differences between habitat treatment and no habitat treatment are in terms of the timing of when openings would be created and the amount of vertical and horizontal habitat structure. Treatments would cause openings sooner than allowing the openings to occur through natural attrition of the dead lodgepole. The long-term result is similar, openings in forest canopy from loss of lodgepole pine would occur under all alternatives, including the no action alternative. Fuels reduction activities would alter the amount of horizontal and vertical habitat structure or habitat complexity in treated areas verses untreated areas.

Fragmentation of habitats used by small bodied, relatively immobile, and relatively small home range species may be affected by the proposed actions in treatment areas. Affects to mobile, wide-ranging species would be less affected. Species using complex vertical and horizontal habitat structure would experience simplification of habitat in treated areas. This “simplification” would be proportional to the total acre treated, with Alternatives B treating the most acreage, Alternative C treating slightly less, and Alternative D treating the least.

All action alternatives identify road decommissioning and riparian restoration actions which would indirectly and directly result in small levels of reduction in habitat fragmentation and improve connectivity. Such actions would allow for less potential for disturbance in localized areas with a reduction in motorized vehicle use and reduction in “open” road densities. Riparian area restoration would allow for long term improvements to riparian corridors which are utilized for travel and connectivity between suitable habitats for a large number of wildlife species.

Snags and Large Down Wood–Most of the habitats in American River watershed would respond similarly to what is described under Alternative A above. In parts of the American River watershed, openings are currently being created as lodgepole pine trees succumb to the mountain pine beetle. The primary differences between habitat treatment and no habitat treatment are in terms of the timing of when openings would be created and the amount of vertical and horizontal habitat structure. Treatments would cause openings sooner than allowing the openings to occur through natural attrition of the dead lodgepole. The long-term result is similar, openings in forest canopy from loss of lodgepole pine would occur under all alternatives, including the no action alternative. Fuels reduction activities would alter the amount of horizontal and vertical habitat structure or habitat complexity in treated areas verses untreated areas.

Treatments that include green and dead tree harvest to improve forest health, reduce the incidence of insects and disease, or reduced fuel buildup would reduce habitat for many snag dependent species. Not only would the habitat they are using be modified, it would also increase the patchiness of the remaining habitat.

Numbers of snags are expected to decrease with the action alternatives as snags would be lost as hazard trees and through damage by logging operations. Many snags felled during harvest activities for safety reasons are often ones in an advanced state of decay. Felling these snags can also provide down woody material and subsequent nesting, resting, cover, and foraging areas for a variety of wildlife species. Some snags will be created from the burning of harvesting slash where fuel loads are concentrated. Snags can also be created during harvest activities by trees being damaged or the tops snapping off. However, more snags are generally lost than created during harvest operations when compared to fire. It is important that sufficient amounts and size classes of snags are left in clumps or as individuals to meet the needs of snag dependent wildlife species and to add diversity to the landscape.

Public firewood gathering and reduction of snags potentially used for roosting can be expected to occur along roads. However, this is not expected to result in the loss of species viability for snag dependent species since snags would still be present in unmanaged stands away from roads. In addition, with the obliteration of existing roads, the impacts of snag losses along roads would be lessened.

Alternative D would modify the fewest acres of snag habitat and alternative B would modify the greatest acreage. Alternative C would modify slightly less than Alternative B, and is very similar. Standards for snag retention would be met or exceeded by implementing the snag management protocol, which is being incorporated into the silvicultural prescriptions.

Riparian/Aquatic Dependent–Action alternatives would protect moist riparian-zone habitats used for feeding, resting, and/or reproduction, but watershed restoration actions would initially add modest levels of sediment to streams impacted by past activities in the drainages, elevating impacts related to sediment and water quality. The effects would be relatively minimal in terms of impacts to aquatic wildlife species and their habitats.

Fire/Early Seral Dependent–Action alternatives, along with past and planned future harvests, would remove relatively moderate acreage amounts of habitat components (standing dead trees) deemed important to feeding and nesting for at least one species. For black-backed woodpecker, the overall effects would be minimal given the overall acreage now dead or dying. Action alternatives would have the initial effect of potentially reducing local fire intensity risks where fuels are removed, resulting in uncertain levels of both positive and negative effects to various species of this guild. Overall, habitat quality would improve for some early seral dependent species such as the olive-sided flycatcher under all action alternatives.

Implementation of the action alternatives would create early seral habitat, with Alternative B creating the most seedling/sapling and small tree stands (1,074 acres), followed by Alternative C (1,049 acres), and Alternative D (965 acres). Stand treatments are primarily occurring in mid-age stands, followed to a lesser extent in large tree stands (mature stands).

Late Seral/Old-Growth Associated–Action alternatives would protect all existing old growth stands. Future risks of late seral and old growth habitat losses to fire would remain except possibly within or near harvested sites.

The majority of stands treated under all action alternatives are mid-aged stands. Approximately 15 percent of the mid-aged stands are dominant lodgepole pine stands within the American River watershed, and are primarily dead or dying trees. These lodgepole pine stands do not provide late seral or old growth habitat.

Security Dependent–All action alternatives identify a limited amount of roads proposed for decommissioning. Alternative C would have the highest net amount of roads proposed for decommissioning at 1.9 miles, followed by Alternative B (1.3 miles), and Alternative D (0.9 mile).

New permanent road construction is proposed under action alternatives B, C and D. Relocation of two segments of road out of the riparian area (American River subdivision road), would result in approximately 0.6 mile of new road in a toeslope area, while 0.53 mile of riparian road would be decommissioned under Alternatives B and C. A new road totaling 0.6 mile and a vehicle bridge across American River would be constructed under alternatives C and D. This road would provide additional access from the north for residents living along American River in a subdivision.

Although temporary road construction would occur in order to access some harvest units, these temporary roads would be decommissioned and would not contribute to long-term motorized access and security reduction. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts. Short term disturbance and displacement to wildlife would occur during project implementation and associated use of temporary roads. Alternative B has the highest amount of proposed temporary roads (15.1 miles), followed by Alternative D (10.7 miles), and Alternative C has the least amount (10.5 miles).

All action alternatives identify the conversion of roads to ATV trails, level of motorized use would decrease slightly on these primitive roads. However, such would still be open to ATV use. Alternative D identifies 2.6 mile of road would be converted to ATV trails, followed by Alternative B and C, which would be similar (1.3 miles).

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for habitat guilds and associations is the American River watershed.

Habitat Fragmentation and Connectivity–The cumulative effects of proposed actions under all action alternatives would not be beyond the scope of what is currently occurring as a result of the mountain pine beetle epidemic. The epidemic has affected large areas in the in the South Fork Clearwater Sub-basin and approximately 9,000 acres (15%) in the American River watershed. Proposed Eastside Project alternatives would reduce fuels on 2.0 to 2.2 percent of American River watershed, approximately 61% to 62% percent of alternative treatment stands have a dominant cover type of lodgepole pine and have already been affected by the mountain pine beetle. Cumulatively, the FS Crooked and American River project would reduce fuels on an additional 2.0 percent of the American River watershed. Due to the relative proportion of proposed treatments compared to the amount of habitat modified by the mountain pine beetle, the long-term habitat modifications resulting from the epidemic are not appreciably different than the long-term habitat modifications in action alternatives.

The FS American and Crooked River Project selected alternative identifies that 8.41 miles of road would be decommissioned within the American River watershed. The BLM Eastside Project action alternatives identify a net total (minus new permanent roads) of 0.9 to 1.9 miles of road would be decommissioned. The BLM and Framing Our Community are cooperatively proposing to decommission approximately 1.0 mile of BLM road in the Buffalo Gulch watershed, a tributary drainage in the Lower American River.

Late Seral/Old-Growth Associated–Action alternatives would protect all existing old growth stands. Future risks of late seral and old growth habitat losses to fire would remain except possibly within or near harvested sites.

The majority of stands treated under all action alternatives are mid-aged stands. Approximately 15 percent of the mid-aged stands are dominant lodgepole pine stands within the American River watershed, and are primarily dead or dying trees. These lodgepole pine stands do not provide late seral or old growth habitat.

Security Dependent–All action alternatives identify a limited amount of roads proposed for decommissioning. Alternative C would have the highest net amount of roads proposed for decommissioning at 1.9 miles, followed by Alternative B (1.3 miles), and Alternative D (0.9 mile).

New permanent road construction is proposed under action alternatives B, C and D. Relocation of two segments of road out of the riparian area (American River subdivision road), would result in approximately 0.6 mile of new road in a toeslope area, while 0.53 mile of riparian road would be decommissioned under Alternatives B and C. A new road totaling 0.6 mile and a vehicle bridge across American River would be constructed under alternatives C and D. This road would provide additional access from the north for residents living along American River in a subdivision.

Although temporary road construction would occur in order to access some harvest units, these temporary roads would be decommissioned and would not contribute to long-term motorized access and security reduction. Temporary roads would be closed (when not being used for project implementation) to public motorized vehicle use, reducing potential human impacts. Short term disturbance and displacement to wildlife would occur during project implementation and associated use of temporary roads. Alternative B has the highest amount of proposed temporary roads (15.1 miles), followed by Alternative D (10.7 miles), and Alternative C has the least amount (10.5 miles).

All action alternatives identify the conversion of roads to ATV trails, level of motorized use would decrease slightly on these primitive roads. However, such would still be open to ATV use. Alternative D identifies 2.6 mile of road would be converted to ATV trails, followed by Alternative B and C, which would be similar (1.3 miles).

Cumulative Effects (includes foreseeable future actions)

The cumulative effects analysis area for habitat guilds and associations is the American River watershed.

Habitat Fragmentation and Connectivity–The cumulative effects of proposed actions under all action alternatives would not be beyond the scope of what is currently occurring as a result of the mountain pine beetle epidemic. The epidemic has affected large areas in the in the South Fork Clearwater Sub-basin and approximately 9,000 acres (15%) in the American River watershed. Proposed Eastside Project alternatives would reduce fuels on 2.0 to 2.2 percent of American River watershed, approximately 61% to 62% percent of alternative treatment stands have a dominant cover type of lodgepole pine and have already been affected by the mountain pine beetle. Cumulatively, the FS Crooked and American River project would reduce fuels on an additional 2.0 percent of the American River watershed. Due to the relative proportion of proposed treatments compared to the amount of habitat modified by the mountain pine beetle, the long-term habitat modifications resulting from the epidemic are not appreciably different than the long-term habitat modifications in action alternatives.

The FS American and Crooked River Project selected alternative identifies that 8.41 miles of road would be decommissioned within the American River watershed. The BLM Eastside Project action alternatives identify a net total (minus new permanent roads) of 0.9 to 1.9 miles of road would be decommissioned. The BLM and Framing Our Community are cooperatively proposing to decommission approximately 1.0 mile of BLM road in the Buffalo Gulch watershed, a tributary drainage in the Lower American River.

At the landscape level, inventoried NPNF roadless areas and wilderness areas remain available and function as habitat linkages/corridors at American River drainage and subbasin scales. Highway 14 would continue to alter habitat use along the South Fork Clearwater River. Action alternatives do not alter current use of these highways nor do they alter wildlife movements or habitat use to a degree that would alter existing mortality risk associated with these highways.

Snags and Large Down Wood–Throughout the West, densities of large-diameter snags (>21 inch dbh) have been reduced in roaded areas with a history of timber sales (Hann et al., 1997; Hessburg et al., 1999; Quigley et al., 1996). Fire suppression efforts, salvage of insect-infested trees, firewood harvest, and harvest of dead and dying lodgepole have reduced the habitat potential for species relying on dead and downed wood.

Action alternatives continue the cycle of salvaging dead and dying lodgepole in response to insect activities in the American River drainage. The action alternatives would provide for long-term snag retention. Relative to the American River watershed, the activities proposed in the Eastside Project would likely be undetectable.

Some actions would have minor or negligible effects on snags and downed wood habitat. These include precommercial thinning, tree planting, Christmas tree harvesting, noxious weed treatment, and soil restoration efforts. Road maintenance and the construction and maintenance of trails would cause some hazard trees to be felled and fallen trees to be cleared from travel ways. These effects would be cumulative to those discussed above and the effects of most of these past actions and events are described as part of the existing conditions described previously.

Snags would continually be lost during harvest activities for safety reasons, as well as firewood cutting. Snags are also constantly being lost and created resulting from natural wildland fires and other natural disturbances. Some of these snags fall and provide much needed ground structure and habitat. With fire suppression and succession, the density of snags may have increased, but the size of the snags has decreased, which may not be beneficial to many wildlife species that depend on or prefer large-diameter snags and logs.

Approximately 15 percent of the American River watershed has been harvested, including regeneration cuts or clear-cuts, with little provision for maintenance of soil wood or snags to recruit soil wood. Minor amounts of extensive snag patches are present on the landscape, except for small-diameter snags associated with recent lodgepole pine mortality. The current small dead trees benefit small woodpecker species and may provide some foraging opportunities, but are considered short-term because many are expected to fall in five years.

Increased fuel loads from fire suppression and the current mountain pine beetle epidemic increase the chance of stand-replacing fires, which could remove acres of already existing snags across the landscape. Fires would also create additional snags. Other projects in or near the project area may also alter the amount and distribution of snags within the American River drainage and adjacent watersheds.

The mountain pine beetle epidemic is creating many acres of snag habitat. However, the aforementioned projects will remove a majority of the high-risk trees and create areas practically devoid of snags or down wood within a given area, especially when the new units are adjacent to old units.

Activities that reduce the potential for wildfire and insect outbreaks reduce habitat for many snag dependent species, which in turn affects population levels. Projects within and adjacent to American River watershed all target fuel loading and bug-infested trees in some capacity. Other ongoing activities such as post and pole gathering, firewood cutting, road maintenance, and fire suppression also affect habitats that could be utilized by wildlife species. Past timber harvest activities have created a patchy landscape across the watershed, which has likely resulted in larger wildlife home ranges than would be the case in unlogged habitats. Larger home ranges affect the energy reserves of wildlife species as they must travel greater distances for their daily needs. Many past timber activities left few snags on the

landscape that could be utilized for foraging, nesting/resting, or drumming sites. At the project level, snag dependent wildlife populations could decline as a result of past, present, and reasonably foreseeable future actions.

The natural pattern of beetle outbreaks has been altered through silvicultural and fire management practices. Silvicultural practices directed at maximizing wood production by harvesting trees before they are susceptible to bark beetle attacks and salvage logging of beetle-infested, fire-killed, and wind-killed trees reduced the occurrence of beetles in some areas. Fire management policies have lengthened fire return intervals and allowed more frequent occurrences of beetles. The effects of most of these past actions and events are reflected in the existing condition described in this document. At the level of any given wildlife species, impacts of the Eastside Project proposal and other past, present, and reasonably foreseeable future actions in and around these watersheds appear negligible.

Riparian/Aquatic Dependent–The "no action" alternative would have no cumulative effects on riparian/aquatic dependent species or its habitat cumulative to past harvest, roading, human disturbance, recreation, minerals or other activities. With continuation of other ongoing BLM and NPNF restoration actions within the watershed, improved management of riparian and aquatic habitats resulting from PACFISH (1995) and federal listing of fish within the watershed, continued long term improving riparian and aquatic trends would be expected to occur.

Action alternatives would have localized direct and indirect cumulative beneficial effects on riparian and aquatic habitats which may be utilized by dependent species, in addition to those produced from past mining, roading, timber harvest, residential development, livestock grazing, recreation, public access, fire exclusion and other habitat impacts.

Timber harvest and salvage logging, grazing, insect epidemics, fires, fire suppression, mining, and road construction and maintenance can cumulatively affect riparian/aquatic habitats and dependent species through soil compaction, changes in vegetative cover, altering stream channels, or by changing the quantity and quality of water flowing into wet meadows. Past harvest practices that involved removing forest vegetation along streams and wetlands left these sites vulnerable to hydrologic and vegetative changes. Although historical fires often burned riparian habitats at lower severity, advanced succession and increased fuel loading would increase risk for more severe fires within riparian habitats, which may affect dependent species habitats, water quality and quantity. Fire suppression has created denser forests, which tend to burn hotter, and hotter fires tend to be more destructive. Livestock grazing is likely to continue on NPNF and BLM allotments and on private lands.

Fire/Early Seral Dependent–The "no action" alternative would in effect, have positive cumulative effects on post-fire and early seral dependent species habitat availability. Absence of fuel reduction and principally lodgepole pine harvest, would add cumulatively to overall risks of eventual fire spread, but potential maximization retention of habitat creation for wildlife such as black-backed woodpeckers would occur in the drainage.

Action alternative treatments would cause openings sooner than allowing the openings to occur through natural attrition of the dead lodgepole. The long-term result is similar, openings in forest canopy from loss of lodgepole pine would occur under all alternatives, including the no action alternative. Fuels reduction activities would alter the amount of horizontal and vertical habitat structure or habitat complexity in treated areas verses untreated areas.

Action alternatives would result in post-fire habitat losses; however, they would create early seral habitats. Such losses add moderately to cumulative losses of existing and potential future black-backed woodpecker habitat related to previous harvests, roading, and post-disturbance harvest projects as well as reasonably foreseeable harvests on private and nearby NPNF lands in the analysis area. While losses of existing and future post-fire habitat opportunities would result from this project, the loss would be relatively minor and inconsequential in the American River drainage. The action alternative treatment

acres proposed for mechanical harvest are only a very small portion of the total acres that are dead and dying. These acres potentially could burn by wildfires and become high quality habitat in the future, therefore the relative amount of anticipated post-fire habitat predicted to be lost to harvest is relatively minor within the analysis area and relatively inconsequential. The mountain pine beetle epidemic has created openings in the forest canopy; created early seral habitat, created more snags, and has occurred on thousands of acres.

Activities that reduce the potential for wildfire and insect outbreaks reduce habitat for post-fire or early seral dependent species, which in turn affect population levels for early seral habitat dependent species. Projects within the upper South Fork Clearwater drainages all target fuel loading and bug-infested trees in some capacity. Past timber harvest activities have created a patchy landscape across the watershed, which has likely resulted in greater early seral habitat, which has improved forage for elk, deer, and moose.

Past, present, and foreseeable future fuel treatments and timber harvest on BLM lands, private lands, and NPNF lands have created or would continue to create early seral habitat in the American River watershed. The NPNF American and Crooked River project is a large fuels project proposal which is adjacent to the Eastside Project area, implementation of this project would provide additional early seral habitats. Forest successional advancement would reduce the value of early seral habitats to dependent species with growth of trees from early seral to mature stands, and associated increased canopy cover.

Late Seral/Old-Growth Associated–Cumulative impacts would be scattered across the entire project area and the American River watershed. Past harvesting and fire effects patterns have impacted habitats with overall cumulative habitat fragmentation, changes in patch size and dynamics, increased roading and related human disturbance impacts, increased edge effects, and reductions in old growth habitat abundance as illustrated and referenced by Map 12 of the South Fork Clearwater River Landscape Assessment (USDA-FS, 1998a). In the American River watershed, most of the nearly 6,000 acres of historical harvest (83 percent) was done during the 1950s–80s with the remaining 17 percent being done during the 1990s–current time. The effects have impacted late seral/old growth species and security dependent species the most; however many intermediate-aged stands have since moved into late-seral or old growth conditions as well.

Past timber harvest, wildfire, fire suppression, and mining activity have altered habitat characteristics in the project area by reducing the amount and distribution of large and medium trees, snags, and down wood, and by creating numerous, small patches across the landscape.

Timber harvest and road construction have reduced the amount and continuity of mature and old growth habitat across the analysis area. In addition, past actions frequently targeted medium and large trees and valuable ponderosa pine and western larch snags. These actions have left fewer appropriate stands, and trees within stands, that could be used by species that require mature or old growth forest conditions. Past harvest left few snags or legacy trees, and little down wood. As these older harvest units have begun to mature, they are devoid of the structures that could be utilized by species that require old growth conditions.

No alternatives fragment old growth with harvest or roadways within any existing old growth, thus short-term habitat integrity is protected in all alternatives. Nesting and denning habitat components provided by old growth will remain protected from harvest related activities in all alternatives. Some clusters of planned project harvest units, in conjunction with the interruption of fuels created by previous harvest units, may impart some measure of fire risk reduction to old growth patches. If old growth habitats in the American River watershed are partially lost to stand replacing fires in the near future, old growth conditions would still remain well distributed across the Forest Service lands in the subbasin in the remaining watersheds and habitat for old growth associated species, as well as other wildlife species, would be managed to maintain viable populations of wildlife species (USDA-FS, 2005a).

Security Dependent–Roads are a major factor cumulatively influencing wildlife habitat and use patterns, particularly for species preferring remoteness or are hunted/trapped. Without roads, human use of the American River watershed would be very limited. Wildlife habitats and wildlife use patterns would be dictated by natural processes (weather, fire, insects and disease). Human disturbance to wildlife species would likely be similar to that of large wilderness areas.

Road decommissioning would not occur under Alternative A, therefore cumulative effects of roads in American River would continue. Under all action alternatives, a limited amount of road decommissioning is proposed.

Research focusing on the influence of open roads on wildlife species in the 1970's and 1980's revealed the effects of roads on big game species (Leege, 1984). In the 1980s and 1990s, road construction was mitigated by implementing road restrictions. The focus recently has been to decommission roads, thus reversing the cumulative effects of human access into wildlife habitats. This action alternatives decommissions a limited amount of roads within the American River watershed.

Cumulative effects of past incremental road development in the analysis area include variable progressive increases in wildlife effects such as direct habitat loss; disturbance; displacement; vehicle-induced mortality; human hunting and trapping mortality; habitat fragmentation; edge effects; and noxious weed spread.

3.7.7 Irreversible, Irretrievable Effects (All Terrestrial Species)

None of the alternatives described and analyzed would implement actions or activities that would result in an irreversible or irretrievable commitment of resources harmful to populations of any resident or migratory wildlife species. In addition, no alternative would result in irreversible or irretrievable commitment of species or habitat resources that foreclose the formulation or implementation of reasonable and prudent alternatives that would violate Endangered Species Act Section 7 (a) (2) leading to jeopardy. None of the alternatives would threaten species subpopulation viability at the local level.

3.8 Roads

3.8.1 Introduction

3.8.1.1 Scope of the Analysis

The focus of this analysis is the transportation system, which consists of both the road and trail systems, within the Eastside Project area. Several proposed temporary roads on the NPNF are included in this project. Originally, the NPNF included temporary roads that BLM needs for the Eastside Project, in their American and Crooked River Project. The NPNF FEIS for their project was appealed and the roads that BLM needs were dropped from the American and Crooked River Project. This information was a factor in the formulation of alternative D. An additional temporary road across the NPNF that was not included in the American and Crooked River Project is included in the Eastside Project. The NPNF is now a Cooperating Agency in the Eastside Project and will determine whether to authorize BLM to construct and use roads across their land based on this analysis.

BLM needs to use three roads across private land to access treatment areas in the Eastside Project. The current state of the transportation system is presented, followed by discussions of the changes resulting from the three action alternatives.

Several indicators are used for roads to track the effects on the transportation system including; ***Road Decommissioning, Road Conversion, Miles of Road (Permanent and Temporary), and Bridges.*** The indicator for trails, ***Miles of trails,*** includes both summer trails and winter snowmobile trails.

3.8.1.2 Regulatory Framework

North Idaho Timber Management FEIS
The North Idaho Timber Management FEIS Appendix 2-4 (USDI-BLM, 1981b) contains guidance related to roads. The primary goal is to provide an adequate and useable road system while protecting the environment. Specific guidelines to road planning and road design include:

- Cooperating with other land owners. Plans would be made to serve tributary areas of drainages or ownership blocks so that only the minimum amount of road necessary to meet management objectives would be planned.
- Temporary or permanent closures will be considered for all dead end roads or roads with an expected use period of 5 years or less.

Nez Perce Forest Plan as Amended
A stable and cost efficient transportation system will have been provided through construction, reconstruction, maintenance, or transportation system management (USDA FS, 1987a – II-1, Goal 12).

PACFISH standards and guidelines have been incorporated into the Eastside Project. See Fisheries Section 3.6 for details.

3.8.1.3 Management Factors

There are several factors that were considered in the development of the road and access alternatives.

- Minimize new road construction and major reconstruction for timber harvest purposes within RHCAs.
- Minimize the amount of permanent road for timber harvest; use temporary roads as much as possible.
- Place roads on mid- and upper-slopes as much as possible to reduce the amount of project produced sediment entering reaches of the American River watershed.
- Avoid live water crossings.

- Avoid crossing multiple small parcels of privately owned property.
- Minimze the amount of monies invested in permanent road upgrade.
- Relocate permanent roads along the American River away from the river where possible.
- Decommission roads not needed for administrative purposes.
- Close live water fords.

Permanent Road Construction: Permanent construction is a major activity involving the use of heavy equipment. There can be movement of earth to substantial depth to clear, align and cut and fill a new roadway and includes preparing a sub base, and surfacing the road. It can include significant drainage work including ditching, and the installation of live water crossings. Some new permanent roads will be open for public use only on a seasonal basis during and after the project is complete. Seasonal closure will be accomplished through installment of gates at each end of the new road.

Temporary Road Construction: Temporary construction is an activity involving the use of heavy equipment. There will be the movement of earth to clear, align and cut and fill a new roadway and includes preparing temporary running surface wide enough for the safe passage of trucks and equipment. It includes drainage work (sufficient enough to carry water off the running surface and can include the installation of relief culverts). Temporary roads would be constructed where needed for access to treatment areas. All temporary roads would be decommissioned no later than three years after initial construction. Refer to Chapter 2 for information regarding design measures for reducing the effects of temporary road construction.

Road Decommissioning, Conversion to Other Use: The physical process, or method, of decommissioning (referred to as management activity/ decommissioning level in Appendix J) depends on the condition of the road template, the magnitude of the side slope on which the road is located, the proximity of the road to streams, and cost. This process can range from simply abandoning the road to removing the road template completely, including removal of drainage structures and re-contouring the landscape. In general, the preferred method is to remove the road template and recontour the landscape. This method is most effective in removing the road as a source of sediment and restoring the natural hydrologic function of the watershed. It is, however, the most costly method. If the road is located on relatively flat terrain, is not close to a stream, and is substantially overgrown with vegetation, abandonment may be a better option.

In addition to the two decommissioning methods just discussed, there is a category used in Appendix J to describe an intermediate level of decommissioning. This category, called **Varied** (for varied treatments), can include removal of drainage structures, decompaction of the roadbed, and can include limited amounts of re-contouring. Seed and fertilizer would be applied to reestablish vegetative cover.

Unauthorized use of decommissioned roads was a concern expressed during public scoping. Decommissioned roads will generally be camouflaged so they are no longer recognizable as a road. This will make unauthorized uses less likely. For roads already overgrown with substantial vegetation, unauthorized use is not generally a problem.

Roads proposed for conversion to another use would include a change in the road prism and a corresponding change in the type of use. This conversion is proposed primarily for watershed restoration for fisheries, although other wildlife species will benefit (see Section 3.7 Wildlife). The running surface of converted roads would be reduced to an approximate width of 55 inches. This would be accomplished through limited amounts of re-contouring, installing barriers (usually large boulders) along road shoulders, decompaction of the roadbed, or a combination of all three. On altered roadbeds, seed and fertilizer would be applied to reestablish vegetative cover. The road use change is of primary interest to most road users. The following table summarizes the length of road proposed for decommissioning, as well as the effect of the decommissioning on travel access, for each alternative.

Ford Closure: This will be accomplished through obliteration of the current fords. The work will involve deep ripping of the approaches, mulching, seeding or planting of native vegetation (including shrubs), placement of large woody debris, and large boulders to prohibit vehicle use. Table 3.8.3 illustrates the number of ford closures by action alternative.

Ford Hardening: The approaches to the ford would be reconstructed (re-contoured) and stabilized. The road crossing would be "hardened" with the placement of concrete planks or suitable substrate that would be secured to bottom and streambanks so that vehicle use or high flows would prevent movement or scouring of the instream "hardened" ford crossing.

Minor Reconstruction/Maintenance: It involves grading and shaping of the roadway and minor drainage work (such as adding waterbars and replacing or adding a few culverts, generally not on live streams). The roadwork proposed with the action alternatives would be to prepare a road for timber hauling.

3.8.1.4 Analysis Methods

Information and analysis came from two sources. First is the area within the BLM project area and second is the incorporation of the Inventoried Roadless Areas (IRA), and Areas with Possible Unroaded Characteristics from the American and Crooked River FEIS (USDA-FS, 2005a) for certain roads that were covered in that analysis.

The BLM roads information used in the development of the action alternatives was obtained from the Cottonwood Field Office Transportation System database and from field survey data not previously stored in this database. All of the roads proposed for decommissioning were identified through analysis conducted as part of this project. The roads were determined to not be needed for future management of BLM system lands within the analysis areas. Issues raised internally, through public scoping, and in discussions with the NPNF were considered in the development of the alternatives. Spatial data is displayed using maps generated with Argos software.

3.8.2 Indicators - Road Decommissioning, Road Conversion, Miles of Road (Permanent and Temporary), and Bridges

Existing Condition

The BLM lands in the east portion of the Elk City township have had very little active management applied to them in the last 50 years. None of the primary access routes are owned or maintained by the BLM. Except for the area near the Alamance Mine, there are no secondary roads on BLM into any of the fuels/vegetation proposed treatment units. Appendix A, Map 15 displays the current road system.

Primary maintained roads are of two types. First are NPNF roads that bisect (road 1809 central portion of project) or are near BLM land (road 1809A east of project and 9812 north of project). Secondly are county roads that border (road 443 in central portion of project) or are near BLM land (road 1818 south of project).

Roads going through the private subdivisions are maintained by the private landowners. These road cross BLM prior to entering private property. The BLM presently has no permanent or temporary easements on these roads across private land.

The roads across BLM land within the project are all historic roads that evolved through necessity or tradition. Most are serpentine roads along streams, primarily the American River that originated for access to mining sites. The use of these roads has evolved into the primary ingress route to the American River Subdivision and east end of the Coppernoll subdivision, as well as recreational uses on the upper and lower ends of the project area. Most of these roads fall into RHCAs where riparian-dependent resources receive primary emphasis (see Section 3.4 Watershed).

There are approximately 10.3 miles of inventoried road in the Eastside Project area. Jurisdictions of these road miles vary. The following two tables summarize the current state of the road system within the Eastside Project.

Table 3.8.1 Current Road Miles by Owner

Owner	Length of Road (Miles) by Type		Percent of Total
	Primary Road, Regular Maintenance	No Regular Maintenance	
BLM		5.86	56.8%
Forest Service	1.58		15.3%
Idaho County	1.45		14.1%
Private		1.42	13.8%

Table 3.8.2 Current RHCA Road Miles by Owner

Owner	Length of Road (Miles) by Type		Percent of Total
	Primary Road, Regular Maintenance	No Regular Maintenance	
BLM		5.53	73.7%
Forest Service	1.24		16.5%
Idaho County	0.39		5.2%
Private		0.34	4.5%

There are existing private and NPNF roads that are outside of the project area that may be utilized. The private roads will be used either through existing permanent easements or through temporary easements. The use of Forest Service roads will require a road maintenance agreement. Additional roads that are needed for access but are not within the project area include:

- 7.67 miles of NPNF roads 1809, 1809a, 9812, 9812F, and 9812F1
- 2.65 mile of private roads on Bennett Forest Industries property (existing permanent easement)
- 0.29 miles of private road on Leslie Lynn property (temporary easement to be acquired).

Environmental Effects

Alternative A (No Action Alternative)
With Alternative A, the road system, in the Eastside Project area would remain unchanged. Parts of the American River road would continue to be chronic sediment sources. The portion north of the American River Subdivision viewed as an escape route would continue to deteriorate. Current fords would continue to impact sedimentation and fisheries in the American River.

Alternatives B, C, and D

Road Decommissioning, Conversion to Other Use

All roads proposed for decommissioning are identified as not required for future management needs. These roads were selected for decommissioning primarily because of the resulting benefit to watershed health by returning the landscape to a more natural state. These actions have direct and indirect effects to Watershed, Fisheries and Wildlife and are discussed in those sections. Table 3.8.3 show the amount of road decommissioning and conversion by alternative. Alternative C has the largest number of miles, followed by Alternatives B and D. All but 0.11 miles of roads proposed in any alternative for decommissioning are within the RHCAs, primarily along the American River. All of the roads converted

from highway vehicles to ATV are within the American River RHCA. This table also illustrates the effects on restricted public access and the differences of decreased highway vehicle miles.

Refer to Appendix J for a list of the roads proposed for and the method of decommissioning by alternative. Refer to Appendix A, Maps 2, 5, and 8, for graphic displays of the roads proposed for decommissioning by Alternative.

A summary of the costs associated with the proposed road decommissioning is presented in Section 3.13 (Socio-Economic). Table 3.8.3 show the amount of road decommissioning and conversion by alternative.

Stream Ford Closures
There are currently three live water crossings in the project area with active fords. Two of these are on the American River, and the other is on Kirks Fork at the confluence with American River. Closure of some or all of these fords is proposed in all action alternatives for watershed restoration purposes. These closures will stop a chronic sediment source into the American River system. These actions have direct and indirect effects to Watershed, and Fisheries and are discussed in those sections. Table 3.8.3 shows the number of fords closed or hardened by alternative.

Table 3.8.3 Road Decommissioning or Conversion

Item	Alt B	Alt C	Alt D
Decommissioned Miles	1.92	2.98	1.50
Conversion to ATV Trail Miles	1.62	1.62	2.39
Decreased Highway Vehicle Miles[1]	2.12[2]	2.62[3]	2.48[4]
Reduction of RHCA Road Miles	2.55	3.70	3.57
Ford Closures	2	3	3
Ford Hardening	1		

[1] 0.85 miles of road are substantially vegetated, and not open to vehicles.
[2] There are 0.57 miles of new permanent in this alternative.
[3] There are 1.13 miles of new permanent in this alternative.
[4] There are 0.56 miles of new permanent in this alternative.

Road Construction and Bridge Construction

The following actions have direct and indirect effects to Watershed, Fisheries and Wildlife and are discussed in those sections.

Permanent Road Construction
Some permanent road construction is proposed in all action alternatives for watershed restoration purposes. These new roads will provide landowner access while decommissioning existing roads or converting them to another use (ATV trails). Therefore, permanent road construction is related to decommissioning or conversion to another use and is reflected in Table 3.8.3 above.

Alternatives C and D were developed in part to address concerns about the loss of fire escape routes due to suggested alterations in the current road system for restoration objectives. Residents view 1.1 miles of road 2541 along the American River north of the American River subdivision to the intersection with Idaho County road 443 as an escape route. This would require the construction of 0.56 miles of road and a bridge spanning the American River.

Alternative D was developed in part to address concerns about the relocation of part of the main ingress route for the American River subdivision. Residents view 0.5 miles of road 2541 along the American River south of the American River subdivision to the intersection with forest service 1809 as the best section of road along the river, questioning restoration objectives, and fear that the new road would be not maintained.

Some new permanent roads will be open for public use only on a seasonal basis during and after the project is complete. Seasonal closure will be accomplished through installment of gates at each end of the new road. This closure would apply to the road in alternatives C and D that originates on the 2541 road and proceeds 0.46 miles west to intersect with Idaho County road 443.

Table 3.8.4 illustrates the miles of new permanent road by action alternative. Refer to Appendix J for a list of the roads proposed, and design or decommissioning features by alternative.

Temporary Road Construction
Alternatives C and D were developed in part to address concerns over the amount of temporary road in the proposed action. Alternatives B and C would construct 1.89 miles of temporary road across NPNF land with unroaded characteristics. These roads would exist for 1-3 years. Following decommissioning a corridor through the trees would remain for several years until new trees grow up on the site. Alternative D includes a temporary road constructed in the Middle American River RHCA. Approximately 0.06 miles would exist for 1-3 years within the RHCA. Table 3.8.4 illustrates the miles of temporary road by alternative. Refer to Appendix J for a list of the roads proposed, and design or decommissioning features by alternative.

Minor Reconstruction/Maintenance
Field surveys were conducted to determine the condition of the roads in the project area and the maintenance needs required to prepare the roads for access to the treatment areas. As stated earlier in this section, there are very few secondary roads on BLM land; private secondary roads have been recently used, and the primary roads are maintained by other entities. Therefore, only minor reconstruction or maintenance is needed.

Except for a few short segments of existing road in the Alamance Mine area, all of the work would be done on roads across private lands outside of the project area, and is the same for all Alternatives. These are:

- 2.65 mile of existing private roads on Bennett Forest Industries property (existing permanent easement).
- 0.29 miles of existing private road on Leslie Lynn property (temporary easement to be obtained).

Table 3.8.4 Road and Bridge Construction

Item	Alt B	Alt C	Alt D
Permanent Road Construction (Miles)	0.57	1.13	0.56
Bridge Construction ATV	2	2	2
Bridge Construction Highway Vehicles	0	1	1
Minor Reconstruction (Miles)	3.70	3.70	3.70
Temporary Road Construction on BLM (Miles)	12.97	8.43	10.28
Temporary Road Construction on Private (Miles)	0.19	0.19	0.19
Temporary Road Construction on NPNF (Miles)	2.15[1]	1.89[1]	0.26

[1] Includes 1.89 miles that was included in the FEIS for the American and Crooked River Project

3.8.3 Indicator–Miles of Trails

Existing Condition

Historically, trails in the area were primarily developed for access to mining claims, private lands, fire suppression activities and access to adjacent NPNF land for Forest Service administrative uses. Most trails were built to accommodate pack and saddle stock, and were the primary access routes in the American River drainage.

Currently, the majority of the trail system is utilized for recreational purposes. There are approximately 2.7 miles of system trails within the Eastside Project area; however there is no current budget for maintenance of these trails. These trails are primarily used by ATV(s), motorbikes, hikers, and pack/saddle stock. The following table displays the system trails in the Eastside Project area, their length, and current restrictions.

Table 3.8.5 System Trails on BLM land

Trail Number	Trail Name	Length (Miles)	Current Management Restrictions
T2524	Kirks Fork	.52	No Restrictions
T2523	Box Sing	.39	No Restrictions
T-01	Telephone Creek	.76	No Restrictions
T2517	East Fork American River	1.81	No Restrictions
T25	Lower American River	1.83	No Restrictions

There is an increasing demand from user groups for motorized trail opportunities. A concern raised during scoping was that decommissioning road 2541 north from the American River subdivision to Idaho County road 443 was less preferable than conversion of this road to and ATV trail.

There are several undesignated trails being used by ATV and two wheel motorized vehicles. There is an unauthorized ATV bridge spanning the American River in the southern portion of the project on BLM land. This would be replaced as part of the project.

There is a winter trail system that crosses BLM land that is not administered by the BLM. This winter trail system includes portions of the road system to provide a network of groomed snowmobile trails. This system is groomed regularly between December and April under a cooperative agreement between Idaho Department of Parks and Recreation, Idaho County and the Nez Perce Forest. The Eastside Project includes 1.1 miles of this groomed system is (Road 443–American River-Selway Falls).

Environmental Effects

Alternative A (No Action Alternative)
The miles of trails available to the public would not change under this alternative. However, the public's ability to use the trail system may eventually be restricted due to limited BLM funds available to maintain the trails.

As dead and dying trees fall across the system trails, maintenance costs will likely increase due to the increase in the number of trees down per mile. Even with annual maintenance occurring, the trail users will likely need to be prepared to cut trees in order to use the trail system.

Wildfire occurrence would increase the cost of trail maintenance. Trail damage from fire normally results in holes in the trail tread due to tree roots burning out; increased erosion due to the lack of vegetation resulting in the need for more erosion control structures; and an increase the number of down trees over the trail. Signs and erosion control devices would need to be replaced due to fire damage.

Alternatives B, C, and D
The miles of trails available to the public would change under all action alternatives. There would be a net increase in designated trails open to motorized Off Highway Vehicles (OHV). The miles of increase by alternative are, 1.62 for Alternatives B and C, and 2.39 miles for alternative D. This increase would come primarily as the result of reducing the running width of roads currently open to highway vehicles. In alternative D there is approximately 0.5 miles of new designated trail that would result by improving an undesignated, currently used trail around the ford on the American River on the north end of the project.

Road 443 provides access in all alternatives. If winter hauling occurs on Road 443, it would need to be restricted for snowmobiling during timber hauling for safety purposes. This would result in a short-term reduction in the number of miles of snowmobile trail available for use, 1.1 miles for Alternatives B and C, and 0.2 miles for Alternative D.

3.8.4 Inventoried Roadless Areas, and Areas with Unroaded Characteristics

Adoption from American and Crooked FEIS

This section incorporates portions of the American and Crooked River FEIS (USDA FS 2005) regarding IRAs and Areas with Possible Unroaded Characteristics. The analysis of Areas with Possible Unroaded Characteristics pertains to two temporary roads that approach the Elk City township line from the north.

3.8.4.1 Inventoried Roadless Areas

Existing Condition

One IRA lies east of the project area on the NPNF and is described in the 1987 Nez Perce National Forest Plan Final Environmental Impact Statement (USDA-FS 1987a). This closest point of the West Meadow Creek Roadless Area is separated from the Eastside Project by 0.6 miles of NPNF land.

3.8.4.2 Environmental Consequences All Alternatives

Direct Effects
The proposed action does not enter or occur in the adjacent inventoried roadless areas. There are no direct effects to inventoried roadless areas.

Indirect Effects
The values in the roadless area most at risk are those associated with apparent naturalness, remoteness, solitude, and semi-primitive recreation. The sights and sounds of logging could diminish each of these for the period of logging and for some time after logging.

However, it is important to put this into proper perspective. First, there are not trails that lead people into the portion of the roadless area where impacts would be seen or felt. None of the roadless area is immediately adjacent to the project area. Therefore the project is out of sight and inaudible and would have little impact on remoteness. Finally, the view from the area is not currently pristine or near natural appearing due to past harvest activity, road building, and past mining activities. None of the action alternatives would diminish the natural appearing nature of the IRA.

There would be minimal impacts of smoke from burning on air quality (see Section 3.2). Wildlife and TES species would be little impacted (see Section 3.7 Wildlife); additional or new motorized access is not an issue. Non-motorized primitive or semi-primitive recreation is not compromised by the project. The project does not create new access into the roadless area or change the recreation experience.

3.8.4.3 Unroaded Analysis

Introduction

In addition to an analysis of the impacts of the project on Inventoried Roadless Areas (IRAs) as described above, this analysis describes the impacts of the project on unroaded lands. This analysis pertains to NPNF lands that are adjacent to the Eastside Project, and that would be directly affected by the construction of temporary roads through them. The original analysis was done as part of the American and Crooked River FEIS, is incorporated by reference here, and has been supplemented with additional information.

For the purposes of this analysis, the Forest Service considered all areas without the presence of classified roads and outside existing inventoried roadless areas as unroaded lands. Map 2A in the American and Crooked River FEIS and Map 15 of this EIS provide a view of the unroaded areas.

This unroaded analysis will consider the unique values of the unroaded area in the context of five important resource values:

Natural Integrity is the extent to which long-term ecological processes are intact and operating.

Apparent Naturalness means the environment looks natural to most people.

Remoteness is the perceived condition of being secluded, inaccessible, and out of the way, and **Solitude** is a personal, subjective value defined as the isolation from the sights sounds, and presence of others and the development of man.

Special Features are unique geological, biological, ecological, and cultural or scenic features, and **Special Places** are those areas that cause one to visit for pleasure or their livelihood.

Manageability and Boundaries consider the ability of the NPNF to manage a roadless area to meet the minimum size criteria (5,000 acres) for wilderness. Additionally, the ability to allow fire to play a more natural role without threatening residential areas or communities and the ability to manage for non-motorized access from access points or private property were also considered in this category.

Existing Condition

The unroaded lands that would be affected by the Eastside Project are easiest to describe and evaluate if they are viewed as geographic areas. Below is a description of each unroaded area.

American-2 is west of the West Meadow Creek Inventoried Roadless Area (IRA) 1845C. This unroaded area has been subdivided along the subwatershed boundaries to better explain the affects to important subwatersheds. This unroaded area is comprised of 5,684 acres.

American-2a (AM-2a) (see Map 15) is west of the West Meadow Creek IRA 1845C and is comprised of 4,969 acres within the East Fork American River watershed. The southwestern most portion of this unroaded area lies within the Elk City community protection area (Wildland urban interface) where the management emphasis is protection of life and property from potentially catastrophic effects of wildfire.

Natural integrity is relatively high in this area, although the mixed conifer stands are stocked higher with trees and have less shrub and open grass lands than might be expected under a more natural fire frequency. Non-native plants and invasives are uncommon in the area. This area is not used by livestock. There is a high degree of Natural Integrity in this area. The watershed has high importance for anadromous fish habitat.

Apparent Naturalness is high except on the one and one half mile southwestern boundary along the Elk City township line that separates the National Forest lands from the BLM and private lands within the township that have been altered from their natural appearance. An unclassified motorized trail that is maintained by users follows the ridge and portions of the proposed temporary road location. AM-2a also contains one quarter mile of Trail 852 which is a motorized trail.

Remoteness and Solitude are increased as you get farther from the Elk City township, along the southwestern portion of the area. As indicated above, within the one and one half miles of the Elk City township line the feeling of solitude has been compromised.

Special features and special places are not present from the standpoint of geological resources. However, from a biological standpoint the East Fork of the American River as a high fish habitat value and contributes to the anadromous fish productivity. The area is not unique from the standpoint of known cultural or historic resources.

Manageability and Boundaries The unroaded area by itself is 4,969 acres adjacent to the 107,512 acre West Meadow Creek IRA. The proximity to roads and past harvest units could make the area difficult to manage for wilderness within the one and one half miles along the Elk City township, which comprises the southwestern boundary. Otherwise there are no boundary issues with this area.

American-2d (AM-2d) (see Map 15) consists of 306 acres on the western lobe of AM-2a, and encompasses a small portion of Flint Creek. Three separate watersheds converge near this unroaded area. The area has relatively high levels of past development in the form of roads and timber harvest. It is close to the major road system that provides access to the area. The southwestern most portion of this unroaded area lies within the Elk City township line and the community protection consideration (Wildland-urban interface) where the management emphasis is protection of life and property from potentially catastrophic effects of wildfire.

Natural integrity has been modified by past timber harvest and roads. The viewshed is comprised of highly modified landscapes. The mixed conifer stands are stocked higher with trees and have less shrub and open grass lands than might be expected under a more natural fire frequency. Non-native plants and invasives are uncommon in the area but may occur along the southern border of the area where previous disturbance has occurred. This area is not used by livestock.

Apparent Naturalness depends on scale. Although small portions of the unroaded area might seem natural, the proximity to Forest roads nearby logging, and development within the Elk City township has decreased apparent naturalness. The unclassified motorized trail originating in AM-2a continues to follow the ridge and/or proposed temporary road location until it junctions with Forest Road 9812.

Remoteness and Solitude are decreased due to the proximity of roads and development within the Elk City township.

Special features and special places are not present from the standpoint of geological, biological, or ecological reasons. The area is relatively common and like much of the forested area in north-central Idaho. The area is not unique from the standpoint of known cultural or historic resources.

Manageability and Boundaries: The unroaded area is 306 acres and is separated from the West Meadow Creek IRA 1845C by the 4,969-acre AM-2a unroaded area. The community protection emphasis, proximity to roads, past harvest units, the Elk City township boundary, and development would make the area difficult to manage for wilderness. The complex topographic features involved with the confluence of the three separate watersheds make boundary management more complex.

American-2e (AM-2e) (see Map 15) consists of 236 acres on the western lobe of AM-2a, and encompasses a small portion of the American River. The area has relatively high levels of past development in the form of roads and timber harvest. It is close to the major road system that provides access to the area. All but a tiny sliver of the unroaded area lies within the Elk City community protection area (Wildland-urban interface) where the management emphasis is protection of life and property from potentially catastrophic effects of wildfire.

Natural integrity has been modified by past timber harvest and roads. The viewshed is comprised of highly modified landscapes. The lodgepole pine stands are uniformly fully stocked with trees and have less open grass lands interspersed with the lodgepole pine than might be expected under a more natural fire frequency. Non-native plants and invasives are uncommon in the area but may occur along the southern border of the area where previous disturbance has occurred. This area is not used by livestock.

Apparent Naturalness depends on scale. Although small portions of the unroaded area might seem natural, the proximity to Forest roads nearby logging, and development within the Elk City township has decreased apparent naturalness.

Remoteness and Solitude is decreased due to the proximity of roads and development within the Elk City township.

Special features and special places are not present from the standpoint of geological, biological, or ecological reasons. The area is relatively common and like much of the forested area in north-central Idaho. The area is not unique from the standpoint of known cultural or historic resources.

Manageability and Boundaries: The unroaded area is 236 acres and is separated from the West Meadow Creek IRA 1845C by unroaded are AM-2d and AM-2a. The community protection emphasis, proximity of roads, past harvest units, the Elk City township boundary, and development would make the area difficult to manage for wilderness. The complex topographic features involved with the confluence of the three separate watersheds make boundary management more complex.

Environmental Consequences

Direct and Indirect Effects

All roads constructed by this project are temporary roads that will be obliterated upon completion of this action.

Alternative A (No Action Alternative)
Alternative A would not impact the unroaded lands described in this section, since no temporary road building would occur.

Alternatives B and C
AM-2a: This area has unroaded characteristics that are highly intact accept as noted previously in the western end. The temporary road is on the extreme western boundary and is part of an approximately one mile long temporary road off the 9812F1 road. Only 0.1 mile of this temporary road would be within this unroaded area. These alternatives would only affect the unroaded character (Natural integrity, Apparent Naturalness, Remoteness and Solitude) of this area along the extreme west boundary of this 4,969 acre area. The presence of the classified and unclassified motorized trails has already reduced the Apparent Naturalness of this area. This impact will recover in time as the approximately 0.4 acres directly effected by the temporary road corridor revegetates following decommissioning. The decommissioning of the temporary road may reduce the ability for future motorized use of the unclassified trail. Fish habitat, which is a special feature of this unroaded area, will not be impacted by the proposed action in the East Fork of the American River.

AM-2d: Approximately one mile of temporary road will be constructed from the 9812F1 road but only 0.56 mile is within AM-2d. This area has not retained high unroaded characteristics due to past activities in the area and is within the community protection area for the Ericson Ridge Subdivision within the Elk City township. There will be additional impacts to the unroaded characteristics due to the proposed action, but this is somewhat reduced due to previous disturbances in the area. Additionally the proposed activities are consistent with the community protection within the Elk City township. There will be additional temporary impacts to the unroaded characteristics (Natural integrity, Apparent Naturalness, Remoteness and Solitude) due to this activity. This impact will recover in time as the approximately 1.7 acres directly effected by the temporary road corridor revegetates following decommissioning.

AM-2e: Approximately one mile of temporary road will be constructed from 9812F, and one mile of temporary road will be constructed from 9812F1, with 1.23 mile within AM-2e. This area has not retained high unroaded characteristics due to past activities in the area and is within the community protection area for the Ericson Ridge Subdivision within the Elk City township. There will be additional temporary impacts to the unroaded characteristics (Natural integrity, Apparent Naturalness, Remoteness and Solitude) due to this activity. This impact will recover in time as the approximately 3.6 acres directly effected by the temporary road corridor revegetates following decommissioning.

Alternative D

Alternative D, would not impact the unroaded lands described in this section, since no temporary road building would occur on Forest Service land in these areas.

Cumulative effects

There are no cumulative effects to potential roadless areas. The NPNF does not include these areas in the current draft for potential roadless area designation in the analysis for the new Forest Plan.

3.9 Visual Resource Management

3.9.1 Introduction

Visual Resource Management classes (VRM) and the corresponding VRM objectives were established in the Chief Joseph MFP in 1981. The Proposed Action and all alternatives fall within areas managed under VRM Class III guidelines. The VRM Class III guidelines provide that management activities may be evident to the casual visitor; however, the activity should remain subordinate to the visual strength and natural character of the landscape.

A management activity may repeat the dominant qualities common in the landscape and may visually change the essential character of existing dominance factors in the landscape. However, these changes must be relatively small in scale and generally subordinate to the visual strength of the natural landscape.

All non-exempt resource management program actions that will modify the landform, water bodies, vegetation, and structures will comply with contrast rating directives.

Specific MFP Guidelines for Forest Management:

1. Clearcuts may be seen but must simulate typical natural openings. No geometric shapes are allowed. Size shall not be greater than 50 acres.
2. Shelterwood or selective logging, with a maximum cut of 60 percent are a modification of textural contrast. Therefore, resulting openings appear natural. They shall not exceed a 60 percent cut. Some feathering may be necessary to meet class objectives.

Class III guidelines for roads are that roads should be partially concealed by vegetation follow natural landforms and should be seeded as soon as possible.

Analysis Methods

The BLM no longer uses a numeric contrast rating system as described in the MFP. Instead the BLM now uses ratings of Strong, Moderate, Weak, and None for the contrast rating system (BLM Handbook H-8431-1).

The first step is to select Key Observation Points (KOPs). This is along commonly traveled routes or other likely observation points. Factors that influence KOPs are angle of observation, number of viewers, length of time area is in view, and season of use. KOPs for the project area are the American River road, the Ericson Ridge road, the Mother Lode Hill Road, and the Flat Iron Ridge road. Most of the project area is not viewable from KOPs.

Prior to completing the contrast rating, visual simulations of the proposed treatment activities viewable from the KOPs were prepared using two methods. Photographs of similar post treatment areas were obtained and the Forest Vegetation Simulator was used to model treatments. This output was then used in the Forest Visualization System to produce graphic representations of the proposed treatments. See Appendix K for KOP photo and FVS output.

Contrast ratings were then completed from the KOPs. A rating matrix is used to rate the degree of contrast by looking at basic features (i.e., landform/water, vegetation, and structures) and basic elements (i.e., for line, color, and texture). The impacts were evaluated considering a 5-year recovery period following the end of the project Class III areas can have a moderate contrast rating.

3.9.2 Indicator–Class III Visual Resource Objective

Existing Condition

Landforms within the project area are generally representative of the physiographic area. Rolling, forested hills intersected by perennial and intermittent streams, with small open meadows and glades form the basis of the landscape. The landscape type is common throughout the region. Typical views from ridge tops include foreground, middle ground, and background images. From valleys and river banks, the typical view is primarily foreground with occasional middle ground images.

Lines in the landscape are generally horizontal in nature, formed by the shape of the hills and differences in vegetative concentration and composition.

Vegetation is predominately lodgepole pine with interspersed Douglas-fir, grand fir, and western larch. Riparian zones and meadows are generally grassy with shrubs. Various shades of green are the predominant color with an increasing incidence of browns due to high numbers of dead and dying lodgepole pine.

The natural texture of the vegetation is coarse in the foreground, evolving to smooth texture in the middle and background areas. Ridgeline Douglas-firs provide a bit of textural contrast in background areas.

The natural landscape in the area has been extensively modified with numerous roads, structures, mining activities, and forest management activities occurring on private and NPNF lands adjacent to the project area. The extent of these modifications are an indication that visitor sensitivity to change in the visual landscape is low, and acceptance to visual change in the landscape is high. Travel corridors in the project area are mainly along the stream and river system, limiting the amount of proposed activities that would be visible from high traffic areas. To date little road development has occurred on BLM administered lands and forest management has been confined to private and NPNF lands.

Environmental Effects

The size and position of fuels and vegetation treatments are an element to consider in contrast rating for visual resources. Direct effects result from the amount of vegetation removed, logging methods and roads constructed.

Alternative A (No Action Alternative)
Under the “no action” alternative, the vegetation and fuel conditions would continue to change albeit in a different fashion than if an action alternative is implemented. Due to the mountain pine beetle infestation, most of these stands will continue to experience high mortality. With increasing numbers of dead lodgepole pine the vegetation will change as will the color and texture across the landscape. This has already created a moderate contrast (begins to attract attention, and begins to dominate the characteristic landscape) from several of the KOPs as shown in Figure 3.9.1.

Figure 3.9.1 VRM American River–Flat Iron Ridge Road Point, Looking WSW Towards Alamance Mine

The changing fuel conditions would make the area more susceptible to fires that would consume a large amount of the vegetation (see Section 3.1 Fire and Fuels). If such an event were to occur, there would be a strong contrast across the landscape. The altered vegetation would be dominant and become the natural character of the landscape.

Alternatives B, C, and D
The alternatives are similar in the direct effects. This is due in part because of the proximity of treatment areas to the KOPs.

The proposed project would result in moderate to low contrast between the project actions and the existing landscape. Line, color, and texture would be affected to varying degrees. From the KOP on the Mother Lode road and the Ericson Ridge road, the action alternatives would affect foreground, middle ground, and background visuals. From KOPs on American River and Flatiron Ridge, the foreground and occasionally the background visuals would be affected. The impacts of the action alternatives are judged to be moderate to low and within the guidelines of the MFP.

Removing up to 60% of the existing forest cover would change the texture of the visual landscape in the project area, with less canopy and more open viewing. Foreground areas would be most visible (see Figure 3.9.2), but would remain coarse in texture. Middle ground and background area would be more coarse, but the contrast would be less noticeable if cuts are feathered to reduce sharp changes in lines and geometric patterns. See Figure 3.9.3 for an example of the middle ground visual with similar treatment.

Color would not change significantly, although greater open canopy areas would result in varied shades of green with fewer browns.

Figure 3.9.2 Foreground example

Figure 3.9.3 Middle ground example

Temporary roads and skid trails within the project area would be located so that they are substantially hidden from view, and new construction would be put to bed upon completion of the project. Therefore structural contrast is considered low.

Irreversible or Irretrievable Effects–Visual Resource Management

Common to All Alternatives
No irreversible commitments are proposed under any of the alternatives. Visual vegetation changes due to tree mortality and loss of other vegetation due to wildfire would be irretrievable but not irreversible as trees and other plant life would regenerate over time. The same is true of the visual vegetation changes due to vegetation and fuels treatments.

Cumulative Effects–Visual Resource Management
The cumulative effects area for Visual Resource Management is the viewsheds adjoining the Eastside Project. Because the natural landscape has already been significantly modified in and around the project area, cumulative impacts are difficult to assess. Existing human-caused modification on adjacent lands renders the contrasts of the proposed project less noticeable than if they were to occur in a natural landscape, and each successive project could be considered to reduce the contrast even further, eventually changing the landscape character completely. The NPNF American and Crooked River project, which adjoins the Eastside Project area, identified that all proposed activities were consistent with the Forest Plan standards for visual quality (USDA-FS, 2005a). The Eastside Project units were designed to maintain an acceptable contrast rating according to MFP guidance; therefore, the project would not contribute substantially to the visual decline in landscape character.

3.10 Cultural Resources

3.10.1 Introduction

3.10.1.1 Scope of the Analysis

Several analyses were completed to evaluate cultural resources in the analysis area. Consultation was initiated with the Nez Perce Tribe Cultural Department regarding identification of any cultural resources or Traditional Cultural Properties in the analysis area. Research of available documentation was conducted regarding the prehistory and the history of the analysis area. A cultural resource inventory was conducted to identify historic properties in the area of potential effect. Identified properties were evaluated for their eligibility to the National Register of Historic Places and project design measures were initiated to prevent an adverse effect. Consultation with the Nez Perce Tribe Cultural Department continues throughout the project development and consultation with the Idaho State Historic Preservation Office (SHPO) has been completed.

3.10.1.2 Regulatory Framework

Cultural resources are managed under a variety of Federal laws. Specifically, Section 106 of the National Historic Preservation Act (NHPA) of 1966, and amendments, requires federal agencies take into account the effect of the undertaking on any site that is included in or eligible for inclusion in the National Register of Historic Places. Implementation of Section 106 is codified under 36 CFR 800. A cultural resource inventory is completed; resource eligibility evaluated in consultation with the SHPO; and potential impacts evaluated in consultation with the SHPO. A state protocol agreement between the BLM and the Idaho SHPO regarding the manner, in which the BLM will meet its responsibilities under the NHPA, as provided for in the National Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers, is followed. These cultural resource data are incorporated into National Environmental Protection Act (NEPA) documents.

Cultural resource information is also gathered and coordination completed through the Government-to-Government relationship with the Nez Perce Tribe that is based on the trust relationship created from treaties. Treaties are negotiated contracts made pursuant to the Constitution of the United States. Coordination and consultation with the Nez Perce Tribe is also carried out under other federal laws or orders including the NHPA, the American Indian Religious Freedom Act of 1978; Executive Order 13007, Indian Sacred Sites; and Executive Order 13175, Consultation and Coordination with Indian Tribal Governments.

3.10.1.3 Analysis Methods

The area of potential effect (APE) was identified which is considered the treatment units, proposed roads/trails, bridges, landings, and restoration actions for all alternatives. Review of existing cultural resource data was then initiated. Reference materials were examined to develop a historical context for the analysis area. The Nez Perce Tribe Cultural Department was contacted regarding identification of any known cultural resources or Traditional Cultural Properties. A cultural resource inventory was conducted covering the treatment units, landings, bridges, proposed roads/trails (both treatment and restoration), and restoration projects. Cultural resources were recorded on standard Archaeological Survey of Idaho Site Inventory Forms. All sites were photographed and the majority GPSed and recorded on USGS 1:24,000 scale maps. Proposed project treatments were then compared to site locations, and in the majority of cases, sites were avoided by project design. Project design measures were developed to achieve no adverse effect on those sites that could not be completely avoided. The results of the inventory were presented to the SHPO and the Nez Perce Tribe Cultural Department. Consultation was completed with the SHPO regarding the results of the inventory and design measures developed to achieve no adverse effect. The SHPO has concurred with the finding of no adverse effect.

3.10.2 Existing Condition

Cultural resources have generally been characterized as having a physical presence on the landscape (i.e., archeological site, cabin, etc.), but this definition has gradually changed to include Traditional Cultural Properties. A brief cultural context is presented to create a basic understanding of the types of cultural resources present in the analysis area.

The annual cycle of the Nez Perce is reflected by their subsistence economy. The canyon settings were primarily used in the winter from October to early spring. In the early and late spring, the Nez Perce were found utilizing the drainage systems of the tributaries leading in the major river systems such as the Snake, Salmon, and Clearwater rivers. When the roots matured large groups of people could concentrate in an area to harvest the crop, usually in early summer. By August, the Nez Perce would often break into smaller groups and move into more mountainous terrain before returning to the canyons around October. A wide variety of plants and animals were used. Marshall (1977) has summarized the seasonal use of areas and provides lists of resources used.

Prehistoric use in this area is extremely hard to determine since many prehistoric sites have been destroyed by historic mining activity or are possibly located on private land. In 1976, Wanda Jo Gallaher conducted an archaeological reconnaissance of the Elk City township and recorded two sites known to have been used historically by the Nez Perce. These include a camp site and the Nez Perce Trail, which was later used as the Elk City Wagon Road (Gallaher, 1976:39–40). The two sites reflect two primary uses of the township. The first was the utilization of numerous food resources on a seasonal basis, and second was as a trail route on their way via the Nez Perce Trail to the plains to hunt buffalo (Gallaher, 1976:13).

Gallaher (1976) provides a detailed summary of the historical development of Elk City. The EuroAmerican history of the Elk City area begins in May 1861 when gold was discovered. Until 1863, all placering was done manually with a pan, a sluice box, or a rocker, and production was relatively low. With the introduction of hydraulics, production was greatly increased. In order to operate these hydraulic giants on the relatively level ground, an extensive ditch system was needed. In 1872 there was a rush of Chinese into the area that bought mining claims from the remaining EuroAmerican miners, worked the "skim diggings" and even profitably reworked some of the tailing dumps. The era of the Chinese miners came to a close in 1887 when a judge ruled it was illegal for aliens to hold mining claims in this area (Elsensohn, 1970).

To break down the gold-bearing deposits, there had to be sufficient supply of water. Water was transported to the mine via ditches and flumes. The water could be directly diverted from a creek to a ditch or a ditch could begin at a dam that was built to store the water. A ditch was dug down into the soil on the contour of the slope. The water was carried directly to the mine or sometimes to a reservoir above the mine through the ditch. The water was then carried in a pipe from the ditch or reservoir directly to the mine under great pressure. At the end of the pipe was a hydraulic giant which was used to wash the gold-bearing deposits into a sluice box with riffles to catch the gold.

The first quartz vein to be developed was called the Buster in 1884 (Shiach et al. 1903:445). Many others were soon developed. In the 1890s dredging was attempted with varying degrees of success (Shiach et al. 1903:445). Successful dredging operations didn't occur until the 1930s which continued through the late 1950s.

The cultural resource inventory has documented 54 sites in the analysis area with the majority related to historic mining. The sites are generally characterized by major features such as hydraulic mine cutbanks, tailing piles, ditches, reservoirs, rock walls, shafts, adits, dredge tailings, etc. Several sites with collapsed cabins or foundations and several trails were located. Several historic artifact scatters were also located. No prehistoric sites were discovered. One Chinese site was located which is affiliated with hydraulic mining.

Fifty sites meet criteria 36 CFR 60.4(a) "… that are associated with events that have made a significant contribution to the broad patterns of our history; …" and criteria 36 CFR 60.4 (d) "… that have yielded, or may be likely to yield, information important in prehistory or history." for eligibility in the National Register of Historic Places. The sites represent the mining phase of Idaho history. There are sites that depict hydraulic mining and information on mining techniques may be gleaned from studying the construction of the dams, the arrangement of the tailing piles, and cutbanks. The shafts and adits reflect lode mining activity. Information on mining techniques may be gleaned from studying the arrangement and construction of the ditches. The primary value that ditches can provide comes from their location (that can be mapped with a GPS unit), and the construction method (that can be gleaned from measurements and cross-sections). Dredge piles have marginal values with the undisturbed tailing piles potentially indicating the techniques that led to their deposition which can be documented with photographs, measurements, and GPS units. Most of the sites date from the late 1800s to the early 1900s with several representing the 1930s to 1950s mining activity. There is potential for information in the archeological deposits and some information can still be gleaned from the remaining structures or habitation sites.

Four sites are determined not eligible to the National Register of Historic Places. They consist of two separate scatters of historic artifacts, a short segment of road, and a small section of stage road severely modified and currently used as an access road on private land. These sites do not possess information than can contribute to our understanding of history.

3.10.3 Environmental Effects

Alternative A (No Action Alternative)
Under this alternative no project actions would be undertaken. Therefore, there will be no effect to cultural resources. Cultural sites will continue to naturally deteriorate.

Alternatives B, C, and D
Project design measures were developed to achieve a no effect or no adverse effect for cultural sites in the APE. The majority of sites were avoided with a buffer of 10 meters placed around all those sites. Only two types of sites could not be avoided: ditches and dredge piles. On the occasion that these sites could not be avoided, design features for ditches and dredge piles would be implemented (see Table 2.2.2). Treatment activities would be completed over snow in units 34 and 35 to protect cultural values. There is potential for indirect effects by increased use of the area by contractors which could lead to removal of artifacts. Those artifacts with the greatest chance of being removed will be systematically collected prior to initiation of the project.

3.10.4 Cumulative Effects

Only two cultural feature types will be impacted from this project. Two ditches will be affected by road construction and several portions of dredge piles may be impacted by road construction or bridge construction. To evaluate the cumulative effects of the proposal, all historic mining ditches that transported water to mining operations (ditches within the actual hydraulic mine were not included) that cross through the APE were included. If the ditch extended out of the APE, and if data were available, the entire length of the ditch was included. The total length of all ditches amounts to 7.26 miles (38,331 feet). Within the APE about 525 feet of ditch would be affected; that accounts for 1.4% of the total.

Several areas of dredge tailing piles may be impacted by proposed new roads or ATV trails that would be used to reroute vehicle use from the road immediately adjacent to American River to these new roads/trails. All actions are part of the restoration effort. The total area of dredge piles in the APE amounts to 124,123 yd^2. About 1,292 yd^2 may be impacted over the entire project area which accounts for about 1% of the total amount of recorded tailings in the APE.

Cumulative effect to the ditches and dredge tailings is considered no adverse effect. Information gained from the documentation of the features recovers available data.

3.10.5 Irreversible or Irretrievable Effects

No irreversible or irretrievable effects are anticipated.

3.11 Tribal Trust and Treaty Rights

3.11.1 Introduction

3.11.1.1 Scope of Analysis

The Nez Perce Tribe was consulted to gather information regarding potential issues in the analysis area. The analysis area is within the original Nez Perce territory. Consultation was initiated specifically with the Nez Perce Tribe Cultural Department regarding identification of any cultural resources or Traditional Cultural Properties in the analysis area. The Nez Perce Tribe Natural Resource Subcommittee has also been consulted.

3.11.1.2 Regulatory Framework

On June 11, 1855, the Nez Perce Tribe and the United States signed the Treaty with the Nez Percés, 1855, (12 Stat. 957). The Tribe relinquished ownership of millions of acres of land to the United States. The treaty also guaranteed a permanent homeland for the Tribe, which became known as the Nez Perce Reservation. Article 3 of the treaty states:

> "The exclusive right of taking fish in all the streams where running through or bordering on said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

This article of the treaty has direct applicability to natural resource management actions by the BLM. Under this article, the rights to fish, hunt, and gather are maintained by the Tribe and hence, natural resource management decisions then potentially affect treaty rights. The analysis area lies immediately to the east of the 1855 treaty boundary and is well within the aboriginal territory as described in the Indian Court of Claims (Chalfant, 1974). In the early 1860s gold was discovered on the Nez Perce Reservation. This ultimately led to a new treaty. The 1863 treaty dated June 9, 1863 (14 Stat. 647), titled Treaty with the Nez Percés, 1863, greatly reduced the 1855 reservation boundary.

Treaties are negotiated contracts made pursuant to the Constitution of the United States. Coordination and consultation with the Nez Perce Tribe is also carried out under other federal laws or orders including the NHPA, the American Indian Religious Freedom Act of 1978; Executive Order 13007, Indian Sacred Sites; and Executive Order 13175, Consultation and Coordination with Indian Tribal Governments.

Treaties ensured that Native American rights were reserved to maintain their culture as well as provide for physical subsistence activities. These rights are often referred to as trust responsibilities and include hunting, fishing, and gathering rights. Therefore, the totality of the entire area takes on importance not only for the physical subsistence aspect but also for the socio-cultural well being of the cultural group.

3.11.1.3 Analysis Methods

Resource information is gathered and coordination completed through the Government-to-Government relationship with the Nez Perce Tribe that is based on the trust relationship created from treaties. Natural and cultural resource data are compiled and analyzed in this document.

3.11.2 Existing Conditions

The existing conditions of various resources are described under their own sections in this document. When addressing overall resource condition it is important to also understand that this has implications for Native American subsistence use that includes gathering or hunting for food, as well as gathering medicinal resources, and craft materials. This is done in a landscape that often has spiritual meaning, not

only for the collected physical resources, but also the landforms where this activity takes place, in addition to the actual activity associated with this action. All landforms, soil, plants, animals, and water are interconnected and so the entire ecosystem must be analyzed to more fully understand the condition of all culturally related resources. No TCPs or other resource procurement areas have been identified by the Tribe that could be affected by any of the action alternatives.

3.11.3 Environmental Effects

Alternative A (No Action Alternative)
Under this alternative no project actions would be undertaken. No harvest activities or restoration projects proposed under this project would be completed. Existing riparian and aquatic habitats along some stream segments will remain in poor to fair condition.

Alternatives B, C, and D
All action alternatives will support upward trends for riparian/aquatic habitats within the American River watershed. Existing riparian and aquatic habitats along some stream segments are currently in poor to fair condition. These restoration actions will support trends toward fair to good condition in the long term.

Temporary road construction will increase in the number of roads available to access areas to procure resources. Since the roads are all temporary and some existing roads will be obliterated, there will be fewer roads available for access after project completion.

Irreversible or Irretrievable Effects

No irreversible or irretrievable effects are anticipated.

3.12 Grazing

3.12.1 Existing Environment

Grazing Allotment Profiles

The American River (36173) and Kirks Fork (36261) Allotments are located in the Elk City township. The Northern Idaho Grazing EIS (1981) Record of Decision, and North Idaho Range Management Program (1988) established the following on the two allotments:

Table 3.12.1 Allotments Established by the North Idaho Range Management Program (1988)

Allotment Name	Allotment Number	Allotment Category	Allotment Acres	Season of Use	Livestock AUMs
American River	36173	Custodial	487	6/15–10/1	15
Kirks Fork	36261	Maintain	1,314	7/1–10/1	45

The American River allotment is located 3.0 air miles north of Elk City, Idaho. The allotment is currently leased and is predominantly forested with an inter-dispersion of perennial grasses. The current forage production on the allotment is 15 animal unit months (AUMs).

The Kirks Fork Allotment is located 1.0 air mile east of Elk City, Idaho. The allotment is currently leased and is predominantly forested with an inter-dispersion of perennial grasses. The current forage production on the allotment is 46 AUMs. The current carrying capacity on the American River allotment is 32 acres/AUM and on the Kirks Fork allotment it is 25 acres/AUM.

3.12.2 Environmental Effects

Alternative A (No Action Alternative)
The no-action alternative would have a negative impact upon grazing management. The overstory reduces the amount of herbaceous vegetation produced and available for livestock and wildlife. In addition, as the dead trees fall, access through the allotments becomes very limited to livestock.

There would be potential consequences to the grazing use of the two allotments should wildfire occur within the project area. Impacts would be relative to the extent of the fire and the intensity, which would likely be higher if fuels continue to accumulate through no action. Burned areas on BLM land are closed to grazing a minimum of two growing seasons post-fire to allow for vegetative recovery. Should the entire allotment burn, it would be closed in its entirety. When the allotment is again available for grazing there could be a temporary increase in forage until the trees begin to shade out the forage species. This increased forage may be available for as long as 15 years. The forage would then decrease to current levels unless management or fire again opens the canopy. Unplanned wildfire is difficult for livestock lessees as it immediately impacts their operations and does not allow time to adjust livestock numbers or make other arrangements for grazing.

Alternatives B, C, and D
The American River and Kirks Fork allotments could be partially closed to livestock grazing during the logging, site preparation, restoration, and reforestation activities. When logging and site preparation are not active; livestock grazing may continue to be authorized as long as it does not conflict with the project. After reforestation and restoration is complete, livestock grazing would be restricted for two growing seasons so that saplings and seeded areas can be established. It is anticipated that there will be long-term benefits (15 years) for livestock as the result of the project because of the additional forage produced and improved access. It is estimated that the additional forage created through timber harvest would be available for 15 years following reforestation before it is lost through plant succession. In addition, forage

production is estimated to become 2–6 acres per AUM during the 15 year period. Currently the carrying capacity on the American River allotment is 32 acres/AUM, and on the Kirks Fork allotment is 25 acres/AUM.

3.12.3 Cumulative Effect

There would be no cumulative impacts on the two grazing lessees.

3.13 Socio Economic

3.13.1 Introduction

Idaho County is the largest county in Idaho and has an estimated population of 15,000 people. The Interior Columbia River Basin Ecosystem Management Project released a report on the economic and social conditions of 543 upper Columbia River Basin communities (Harris et al., 1996). The study reviewed several factors impacting the economies of these communities. The study found that many communities were strongly influenced by the amount of public land within a 20-mile radius and that their employment base tended to be more agriculture, wood products, mining or federal Government. Elk City is considered an isolated community and 98% of the land within a 20-mile radius is federally managed (Harris et al., 1996).

Recreation-based industry could not be quantified by Harris et al. (1996). Given its location, it can be assumed that Elk City is a key access point for back country travelers to portions of the Selway-Bitterroot, Gospel Hump and Frank Church wilderness areas as well as the Cove-Mallard and other roadless areas. It also attracts substantial numbers of hunters each fall.

With wood products its second highest employment specialization, Elk City is classed as a resource dependant community (Harris et al., 1996). That Elk City is virtually surrounded by federally managed land, it is easily discernable that they are dependant on Federal resource management, particularly Federal timber harvest. The Bennett Forest Industries saw mill is within the analysis area. It currently employs 115 people and provides an annual payroll of $4.7 million plus associated contract loggers and truckers (Bennett, 2002). However, citing a lack of a reasonable priced log supply from Federal lands, the milling operation will be closed and relocated to Grangeville in early 2006 (Idaho County Free Press, December 18, 2002).

3.13.1.1 Scope of the Analysis

The economic analysis for the Eastside Project will focus on those costs and revenues associated with implementation of each of the proposed alternatives. The purpose of the economic analysis is to display potential costs and revenues associated with implementation of the alternatives for comparison purposes.

3.13.1.2 Analysis Methods

Economic conditions are constantly changing and the prices and costs used for this analysis are a “snapshot” in time, but they do provide a standardized method to compare the impacts of each alternative. A weighted average delivered log price based on the median for each species of current prices being paid for logs delivered to the Bennett Forest Industries mill in Grangeville was used for this analysis. These prices should remain static until June 2006 (Glen Poxlitner, BFI, personal communication). This price source was chosen as it is the closest processing facility to the project area.

The direct impact of the project on local employment was assessed using an IMPLAN model and is displayed in Table 3.13.2. IMPLAN is an economic impact assessment modeling system that allows the user to estimate employment and other changes resulting from various management decisions.

3.13.1.3 Direct and Indirect Effects

Long-term and cumulative effects of individual projects are difficult to quantify. Private lands will continue to produce forest products, but the rate of harvest is largely dependent on the landowner’s circumstances and is unpredictable.

3.13.2 Indicator 1–Local Employment

Alternative A (No Action Alternative)
Local employment could be directly or indirectly impacted by the No Action Alternative. Based upon IMPLAN analysis summarized in Table 3.13.2 the project would help support 227-245 jobs. In the short term, the No Action Alternative does not provide this direct support, possibly jeopardizing local employment opportunities.

In the long term the lodgepole pine in the analysis area is experiencing continuing mortality from mountain pine beetle. Stand exams completed in 2004 show that 30 to 50 percent of the mature trees are dead and mortality rates are 20–30% per year (see Section 3.3 Vegetation). Table 3.13.1 displays the sawlog harvest volume and percent of lodgepole pine by alternative.

Table 3.13.1 A.C. Sawlog Harvest and Lodgepole Pine Volume by Alternative

Alternative	Total Volume (MMBF)	Lodgepole Pine (MMBF)	Percent of Volume
B	9.705	6.623	68
C	11.104	8.034	72
D	10.467	7.537	72

No action results indirectly in a lost opportunity for commercial timber harvest for at least 60 years on much of the project area. This would be the time required for the next generation to establish and grow to commercial size. The indirect effect would be the lost employment potential of the current forest stands. If a stand replacing fire should occur, the timeframe for the maturity of the next generation would be extended. The length of the delay to maturity would depend on when the fire(s) occurred and the extent of the fire(s).

Alternatives B, C, and D
Local employment would be directly impacted by all action alternatives. Employment opportunities that may result from project implementation include:

- restoration activities (watershed, riparian, mine site, roads, etc)
- fuel reduction
- forest product (including harvest, transportation and milling)
- reforestation
- road construction

Table 3.13.2 provides a summary of the potential jobs related to each phase of project implementation based on IMPLAN analysis.

Table 3.13.2 Direct Employment Effects

Project Type	Alt B	Alt C	Alt D
Restoration/Reforestation	18	18	18
Hazardous Fuel Reduction	11	11	10
Forest Products	196	212	196
Road Construction	5	4	3
Total Jobs	**230**	**245**	**227**

Secondary economic activity would also be supported indirectly through implementation of any action alternative. This would be related to suppliers of equipment and fuel, repairs, lodging, etc.

Stewardship contracting is an implementation tool that is available for project implementation. During the scoping process with the public and the Nez Perce Tribe, implementing portions of the project under stewardship authorities was discussed and supported. Stewardship guidance, particularly for NFP fuel reduction projects, provides an emphasis for local hiring, the use of local contractors, and providing local training opportunities. This results in potentially more direct local income and job benefits than standard service and timber sale contracting and, through the training opportunities, can create a labor pool for continued employment opportunities.

3.13.3 Indicator 2–Revenues and Costs

Alternative A (No Action Alternative)
The No Action Alternative, by foregoing implementation of timber harvest and the development and restoration package, would result in no change to the current revenue production or expenditures.

Alternatives B, C, and D
The implementation of any action alternative has the potential to affect associated revenue and costs. Lodgepole pine represents 68–72 percent of the available sawlog volume across the three action alternatives. With the annual rate of mortality expected to be 20–30 percent, the loss of potential revenue is quite high. The available volume figures are from stand exams completed in 2004 and represent the current available harvest volume. This will change with the continuing mortality, but the relative comparisons presented will remain valid. The top portion of Tables 3.13.3–3.13.5 display the revenue and costs associated with the harvest activities and the bottom portion displays the restoration activity and its associated cost. This information provides an estimate only and can be used as a relative comparison tool of the economic impact of each alternative.

Table 3.13.3 Revenue and Costs of Implementation–Alternative B–Proposed Action

Item	Cost/Unit	Units	Costs	Revenue
Vegetation/Fuels Treatment Activities				
Delivered Log Price	$345	9,705.0		$3,351,130
Tractor Logging (mbf)	$165	6,757.0	$1,114,905	
Cable/Skyline Logging (mbf)	$200	2,386.0	$477,200	
Helicopter Logging (mbf)	$325	562.0	$182,650	
Underburn Fuels (acre)	$491	340.0	$166,940	
Broadcast Burn Fuels (acre)	$480	140.0	$67,200	
Excavator Pile & Burn (acre)	$278	770.0	$214,060	
Hand Pile & Burn (acre)	$450	54.0	$24,300	
Reforestation (acre)	$490	470.0	$230,300	
Temporary Road Construction & Decomm. (miles)	$13,000	15.1	$196,300	
Road Improvement (miles)	$2,700	2.4	$6,480	
Subtotal–Treatment Activities			**$2,668,335**	**$3,351,130**
Restoration Activities				
Road Decommissioning (miles)	$6,945	1.9	$13,196	
Watershed Road Improvements (miles)	$3,934		$0	
New Permanent Road (miles)	$99,000	0.6	$59,400	
New Automobile River Crossing (Bridge)	$90,000	0.0	$0	
Queen Creek–American River Re-connect	$30,692	1.0	$30,692	
Number of sites of Watershed Trail Improvements[5]	$31,350	2.0	$62,700	
Stream Crossing Improvements	$5,173	2.0	$10,346	
Riparian Planting (miles)	$21,818	4.8	$104,726	
Stream Bank Re-contour (miles)	$30,045	1.2	$36,054	
Recreation and Trail improvements (miles)	$6,652	0.2	$1,330	
Access Change (road to trail–miles)	$10,000	1.6	$16,000	
Mine Site Reclamation (acres)	$20,045	0.5	$10,023	
Subtotal–Restoration Activities			**$344,467**	**0**
Subtotal			**$3,024,802**	
Net Revenue				**$326,328**

Table 3.13.4 Revenue and Costs of Implementation–Alternative C

Item	Cost/Unit	Units	Costs	Revenue
Vegetation/Fuels Treatment Activities				
Delivered Log Price	$343	11,104.0		$3,805,405
Tractor Logging (mbf)	$165	5,335.0	$880,275	
Cable/Skyline Logging (mbf)	$200	1,209.0	$241,800	
Helicopter Logging (mbf)	$325	4,560.0	$1,482,000	
Underburn Fuels (acre)	$491	469.0	$230,279	
Broadcast Burn Fuels (acre)	$480	0.0	$0	
Excavator Pile & Burn (acre)	$278	767.0	$213,226	
Hand Pile & Burn (acre)	$450	54.0	$24,300	
Reforestation (acre)	$490	470.0	$230,300	
Temporary Road Construction & Decomm. (miles)	$13,000	10.5	$136,500	
Road Improvement (miles)	$2,700	2.4	$6,480	
Subtotal–Treatment Activities			**$3,445,160**	**$3,805,405**
Restoration Activities				
Road Decommissioning (miles)	$6,945	3.0	$20,696	
Watershed Road Improvements (miles)	$3,934		$0	
New Permanent Road (miles)	$99,000	1.1	$108,900	
New Automobile River Crossing (Bridge)	$90,000	1.0	$90,000	
Queen Creek–American River Re-connect	$30,692	1.0	$30,692	
Number of sites of Watershed Trail Improvements	$31,350	2.0	$62,700	
Stream Crossing Improvements	$5,173	3.0	$15,519	
Riparian Planting (miles)	$21,818	4.8	$104,726	
Stream Bank Re-contour (miles)	$30,045	1.2	$36,054	
Recreation and Trail improvements (miles)	$6,652	0.2	$1,330	
Access Change (road to trail–miles)	$10,000	1.6	$16,000	
Mine Site Reclamation (acres)	$20,045	0.5	$10,023	
Subtotal–Restoration Activities			**$496,640**	**0**
Subtotal			$3,941,800	
Net Revenue				**($136,395)**

Table 3.13.5 Revenue and Costs of Implementation–Alternative D

Item	Cost/Unit	Units	Costs	Revenue
Vegetation/Fuels Treatment Activities				
Delivered Log Price	$343	10,467		$3,585,850
Tractor Logging (mbf)	$165	6,527	$1,076,955	
Cable/Skyline Logging (mbf)	$200	1,209	$241,800	
Helicopter Logging (mbf)	$325	2,731	$887,575	
Underburn Fuels (acre)	$491	266	$130,606	
Broadcast Burn Fuels (acre)	$480	134	$64,320	
Excavator Pile & Burn (acre)	$278	726	$201,828	
Hand Pile & Burn (acre)	$450	43	$19,350	
Reforestation (acre)	$490	470	$230,300	
Temporary Road Construction & Decomm. (miles)	$13,000	10.7	$139,100	
Road Improvement (miles)	$2,700	2.1	$5,670	
Subtotal–Treatment Activities			**$2,997,504**	**$3,585,850**
Restoration Activities				
Road Decommissioning (miles)	$6,945	1.5	$10,418	
Watershed Road Improvements (miles)	$3,934	2.1	$8,261	
New Permanent Road (miles)	$99,000	0.6	$59,400	
New Automobile River Crossing (Bridge)	$90,000	1.0	$90,000	
Queen Creek–American River Re-connect	$30,692	1.0	$30,692	
Number of sites of Watershed Trail Improvements	$31,350	2.0	$62,700	
Stream Crossing Improvements	$5,173	1.0	$5,173	
Riparian Planting (miles)	$21,818	4.8	$104,726	
Stream Bank Re-contour (miles)	$30,045	0.8	$24,036	
Recreation and Trail improvements (miles)	$6,652	0.2	$1,330	
Access Change (road to trail–miles)	$10,000	2.6	$26,000	
Mine Site Reclamation (acres)	$20,045	0.5	$10,023	
Subtotal–Restoration Activities			**$432,759**	**0**
Subtotal			**$3,430,263**	
Net Revenue				**$155,587**

The information in Tables 3.13.3–3.13.5 displays that the net value (all implementation costs minus revenues) for Alternative B is $326,328; Alternative C is ($136,395); and Alternative D is $155,587.

This shows that Alternative B and D would provide sufficient revenue to offset the implementation and restoration costs, while Alternative C would be expected to cost an additional $136,395 to implement all proposed activities. With lodgepole pine a significant component of each action alternative (see Table 3.3.1) and its declining value due to beetle mortality, it is conceivable that Alternatives B and D would move closer to zero or negative value with time. Options that could be implemented to ensure revenue are sufficient to cover expenses include dropping some higher costing harvest methods (helicopter), reducing the area that would be reforested with a different seral mix, or delaying implementation of restoration actions in excess of those needed to support an upward trend.

3.13.4 *Indicator 3–Other Economic Effects*

Common to All Alternatives
Grazing and recreation-based services also provide economic inputs to the local economy, but they are very minor relative to the values of the forest products and restoration treatments. Current grazing levels and recreation-based economic activities would not be appreciably affected by implementation of any alternative.

3.13.5 *Indicator 4–Environmental Justice*

Common to All Alternatives
Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Through scoping, public and collaborative meetings, the public and local residents have had a voice in developing alternatives and have been thoroughly informed of potential environmental consequences.

The analysis area is within the ceded territory of the Nez Perce Tribe. Consideration on the impacts to Native Americans can be found in Section 3.11 (Tribal Trust and Treaty Rights). The Tribe was also kept fully involved in project development through meetings with the Natural Resources Subcommittee and specialist to specialist dialogue. No environmental health hazards have been identified resulting from project implementation. The project should not disproportionately affect income levels.

3.14 Recreation

3.14.1 Introduction

Recreational use within the project area is heavily influenced by the presence of the existing transportation system and land ownership pattern. Dispersed recreation is predominant. Primary recreation activities in the area are hunting, fishing, ATV trail riding, and snowmobiling. Other activities include picking berries and mushrooms, cross country skiing, and viewing wildlife and fisheries. Swimming and picnicking are also popular activities along the American River near the Alamance Mine Site. Motorized and non-motorized trail use is increasing. ATV use is increasing in popularity on the trail system in this area. Non-motorized uses remain relatively consistent, with light to moderate numbers of local and out-of-area recreational users during the summer and fall seasons. Most recreation users are from north central Idaho, although in the fall, a significant percentage of hunters are from out-of-state or other parts of Idaho.

Recreation Opportunity Spectrum (ROS) classes and the corresponding ROS objectives were established in the Chief Joseph MFP in 1981. The Proposed Action and all alternatives fall within areas managed for Rural and Roaded Natural recreation opportunities.

Roaded Natural ROS areas include moderate evidence of human modification. Surface and vegetative modifications are common. Constructed roads and highways are present. Structures are generally scattered, remaining visually subordinate. Structures may include small reservoirs, power lines, microwave installations, etc. Recreation facilities are generally small and rustic. The number of encounters with other recreation users is low.

3.14.1.1 Analysis Methods

In the initial steps of project design ROS classes were reviewed for the project area as delineated in the MFP. Based upon the class, vegetation/fuels management treatments and aquatic restoration treatments were designed to be compatible.

Current recreational use areas (dispersed campsites), ATV use patterns, and highway vehicle use patterns are the baseline upon which potential impacts on recreational opportunities were evaluated. Recreation opportunities associated with dispersed activities such as hunting, fishing, camping and driving were used.

3.14.2 Indicator 1–Resource Opportunity Spectrum Class

3.14.2.1 Existing Condition

The entire project area is managed under Roaded Natural or Rural guidelines as described in the Recreation Opportunity Spectrum. Recreation activities include big game hunting, driving for pleasure, and various motorized and non-motorized trail uses. The Elk City township is a combination of BLM, and private lands. It is a rural, pastoral setting, with a small town within a remote, forested landscape. Elk City has become a destination on driving tours primarily from the Selway basin and along the Elk City Wagon Road. The Elk City Dust Devils is a local ATV club with over 100 members, many from outside the area (Evett, 2005).

3.14.2.2 Environmental Effects

Direct and Indirect

Alternative A (No Action Alternative)
Recreation Opportunity Spectrum Classifications identified in the MFP for the project area would remain unchanged by the "no action" alternative.

Alternatives B, C, and D
Visitors traveling in the American River watershed could encounter a very slight increase in traffic. Noise and dust from proposed treatment activities would have a short term temporary impact on recreation visitors. Minor, temporary changes to the recreational experience are expected from project activities which occur in the vicinity of popular use areas or along roads and trails. Frequency of contact would increase in those areas currently not adjacent to existing roads as temporary access roads are used. Permanent changes on the type of access available will result in a change in recreation activities and use patterns along the American River.

The transportation system would be altered by road decommissioning, ford closures, ATV bridge construction and changes in highway vehicle use to ATV trails with the action alternatives. Current highway vehicle access to areas of relatively high use, e.g. the Alamance Mine and the area near the upper American River Ford will be restricted, and may reduce the number of visitors at these sites. Reducing the amount of highway vehicle access could create an increased sense of remoteness for users in some areas; however contact with other users on main travel routes would continue to be common.

Although there will be some effects to recreational experiences resulting from the action alternatives, the effects will not be substantial enough to alter the Recreation Opportunity Spectrum (ROS) Classifications identified in the MFP for the project area.

3.14.2.3 Cumulative Effects

The NPNF is implementing the American and Crooked River Project adjacent to the Eastside Project area. They used a similar classification system and categorize 97 percent of their project area Roaded Natural (USDA-FS, 2005a). Their project will not alter the ROS class. Cumulative effects are therefore the same as the direct and indirect effects at a broader scale.

3.14.3 Indicator 2–Recreational Activities

The project area is a popular big game hunting area for elk, moose, deer and bear. The roads along the American River are popular for sight seeing and dispersed camping. American River contains rainbow, cutthroat, brook and bull trout; steelhead, and spring and summer chinook salmon. Most dispersed use visitors are self-contained. Dispersed camp sites are scattered along open roads.

3.14.3.1 Environmental Effects

Direct and Indirect

Alternative A (No Action Alternative)
The recreation uses would remain unchanged by the "no action" alternative.

Alternatives B, C, and D
Visitors traveling in the American River watershed could encounter a very slight increase in traffic. Visitors would notice a short term increase in dust and noise from the proposed activity. Anglers along American River could be temporarily displaced by the proposed project, due to traffic, noise and/or watershed restoration actions. Hunters could also be displaced by activities associated with the action alternatives or encounter different conditions for several seasons. The quality of experience of campers in the American River watershed could be reduced by increased activity during the implementation of the

proposed actions. The road along the American River in the south portion of the project would no longer be accessible to highway vehicles and may affect visitor numbers. Many of the vegetation/fuels treatment areas may become snowmobile play areas for several years until trees become taller.

Alternatives C, and D
The road along the American River in the north portion of the project would no longer be accessible to highway vehicles, which may affect the number of visitors.

3.14.2.4 Cumulative Effects

The NPNF is implementing the American and Crooked River Project adjacent to the Eastside Project area. Cumulative effects are therefore the same as the direct and indirect effects at a broader scale.

Chapter 4. Consultation and Coordination

4.1 List of Preparers

Name	Years Experience	Role/Responsibility	Education
Greg Yuncevich	28	Line officer	B.S., Wildlife Biology
Robbin Boyce	27	Silviculture, Fire/fuels	M.S., Silviculture/Fire Management and Ecology B.S., Forest Management
Mark Craig	23	Socio - Economic	B.S., Forest Management, minor in Business Administration
Kristen Sanders	17	Air Quality, Fire/fuels	M.S., Forestry/Fire Management B.S., Biology
Chuck Dillon	10	Geographic Information System	B.A., Geography Graduate work in GIS/Remote Sensing/Regional & City Planning
LeAnn Eno	17	Special Status Plants, Vegetation–Riparian and Wetlands	B.S./Biology Graduate work Botany and Plant Ecology
LuVerne Grussing	29	Recreation, Visual Resources	M.Ed., Recreation & Park Administration
Dean Huibregtse	26	Livestock Grazing	B.S., Range Management/ Wildlife Management
Craig Johnson	31	Special Status Fish and Wildlife, Fish and Wildlife	M.S., Range Resources B.S., Wildlife/Fisheries
Mark Lowry	21+	Special Status Plants, Vegetation, Riparian and Wetlands	B.S., Rangeland Resources
David Sisson	28	Cultural Resources, Indian Trust Resources and Tribal Treaty Rights	M.A., Interdisciplinary Studies B.S., Anthropology
Mike Stevenson	19	Soil Resources, Water Resources	B.S., Geology
Stephanie Snook	30	District Planning and Environmental Coordinator	

4.2 Distribution List for Final EIS

Private Individuals and Commercial Interests

Abbott, Peter Lynn
Bailey, Carolyn
Baldwin, Daniel A.
Bennett Forest Industries
Biggers, Larry
Blasch, Kyle
Bonnalie, Russell
Brando, Cathy
Chandler, Donald L.
Clapp, Douglas E.
Clements, Mike
Conboy, Michael A.
Denham, Joseph E.
Edwards, Ellen
Evans, Stanley R.
Gallaugher, Clifford
GillesRealty.com
Lange, Irvin B.
Orton, Senes D.
Pierson, Larry
Rutt, Mable
Shawley, Margaret J.
Three Rivers Timber, Inc.
Woods, Trent

Environmental and Recreational Groups

Coeur d'Alene Dist. Resource Advisory Council
Dust Devils ATV Club
Framing Our Community
Friends of the Clearwater
Idaho Conservation League
Ida-Lew Economic Development Council
The Ecology Center, Inc

Government and Tribal Agencies

Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Idaho Department of Commerce/Labor
Idaho Department of Environmental Quality
Idaho Department of Fish & Game
Idaho Department of Lands
Idaho Department of Parks and Recreation
Idaho Department of Water Resources
Idaho State Historic Preservation Office
Minerals Management Service
National Park Service
Nez Perce National Forest
Nez Perce Tribal Executive Committee
Nez Perce Tribe Cultural Program
Nez Perce Tribe Fisheries Division
Nez Perce Tribe Natural Resource Division
Nez Perce Tribe Office of Legal Council
NOAA Fisheries
Office of Surface Mining
Office of Environmental Policy and Compliance
US Army Corps of Engineers
US Department of Energy
US Department of the Interior
US Environmental Protection Agency
US Fish & Wildlife Service
US Geological Survey

Elected Officials

Idaho County Commissioners
Idaho State Representative Paul Shepherd
Idaho State Representative Ken A. Roberts
Idaho State Senator Leland Heinrich
US Representative Bill Sali
US Senator Larry E. Craig
US Senator Mike Crapo

4.3 Consultation

Consultation with the NMFS and the USFWS was initiated February 2004 with the sending of a scoping letter. During March 2004, a Level 1 meeting was held with BLM and NPNF staff and NMFS and USFWS biologists. During this meeting the NPNF American and River Crooked River Project and BLM Eastside Project proposals were presented, along with some initial analysis information on the projects. Consultation has been ongoing, with exchange of information and several field reviews of the project area. A draft Biological Assessment (BA) has been prepared for the project and submitted to NMFS and USFWS. Consultation on the project will continue and a final BA will be submitted to NMFS and USFWS. Once the Biological Opinion BO) for the Eastside Project is received the Record of Decision will be completed.

The BLM will continue to coordinate and consult with the U.S. Army Corps of Engineers, Idaho Department of Water Resources, and Idaho Department of Environmental Quality regarding any necessary permits and/or water quality certification related to floodplains, wetlands, and streams. Review of the Draft EIS has been completed by Idaho Department of Environmental Quality (December 11, 2006) and it complies with Idaho's Water Quality Standards 58.01.01.350.

A cultural resource inventory was conducted to identify historic properties in the area of potential effect. Identified properties were evaluated for their eligibility to the National Register of Historic Places, and project design measures were initiated to prevent an adverse effect. The Nez Perce Tribe was consulted to gather information regarding potential issues in the analysis area. Consultation with the Nez Perce Tribe's Cultural Department continued throughout project development to identify cultural resources and Traditional Cultural Properties. The Nez Perce Tribe's Natural Resource Subcommittee was consulted and representatives from the Tribe attended a field tour in 2005. The Cottonwood Field Manager met with the Subcommittee several times, as recently as October 3, 2006, to request input on the Draft EIS. Consultation with the Idaho State Historic Preservation Office (SHPO) has been completed.

4.4 Public Scoping Synopsis

The public comment garnered during the scoping process came from various sources, including other Federal and State Agencies, the Nez Perce Tribe, organized groups at the local and regional level, and individuals.

The consideration of feedback (those perceived cause-effects) was documented to determine those to be considered for further analysis (as potential effects) and to help gather the various cause-effects statements into issues to be analyzed in depth. A brief description of the process follows.

The feedback was broken into statements that contain the perceived/alleged cause-effect. The statement was used to assign a cause (an activity in the proposed action) and an effect. A determination was then made if it constituted an applicable potential effect to consider further. The various cause-effects were lumped into issue statements used in the analysis in this EIS.

The bulk of the perceived cause-effect statements in decreasing number were centered around: road & trail factors; watershed- and fisheries-related exiting conditions and outcomes; present and future fuels and vegetation conditions; wildlife concerns; economics; and recreation.

4.5 Comments Received on the Draft EIS and BLM Responses

The 60-day public comment period on the Draft EIS started on July 14, 2006 and ended on September 11, 2006. In August, 2006, a public meeting was held in Elk City, Idaho. Two members of the public

attended the meeting. A total of 10 comment letters were received on the Draft EIS from individuals, groups and government agencies.

The following individuals and organizations submitted comments to the BLM concerning the Eastside Project. Each comment letter, listed by author and the individual comments within has been assigned a number to identify the comment and the ID Team response. The ID Team reviewed each comment letter and addressed those comments that were substantive in nature and within the scope of this project. These comments and their responses are listed below.

Letter Number:

1. B. Sachau. 07/11/2006.
2. Idaho State Department of Parks & Recreation (Jeff Cook). 08/24/2006.
3. Larry and Shirley Biggers. 08/29/2006.
4. Idaho Conservation League (Jonathan Oppenheimer). 09/07/2006.
5. Lynne Nelson. 09/07/2006
6. Joseph Bayley. 09/08/2006.
7. Susan Westervelt. 09/08/2006.
8. F. Russell and Roberta Bonnalie. 09/08/2006.
9. Friends of the Clearwater (Gary MacFarlane). 09/11/2006
10. U.S. Environmental Protection Agency (Christine B. Reichgott). 09/11/2006

Letter 1: B. Sachau

jean public
<jeanpublic@yahoo.com>
07/11/2006 08:18 AM

To ROBBIN.BOYCE@BLM.GOV, WOINFO@BLM.GOV, PRESIDENT@WHITEHOUSE.GOV
cc
bcc
Subject PUBLIC COMMENT ON FEDERAL REGISTER OF 7/11/06 VOL 71 #132 PG 39126

DOI ID 420 2824 DD FM 04
NOA DEIS EAST SIDE TWP IDAHO

1-1 THIS IS A LOGGING PROJECT TO ENRICH LOCAL LOGGERS PURE AND SIMPLY. I VERY MUCH OPPOSE THIS ENTIRE PROJECT.

I ALSO THINK THE FOLLOWING LAWS SHOULD BE IMPOSED ON THIS NATIONALLY OWNED BY TAXPAYER LAND, WHICH IS IN THE PROCESS OF BEING DESTROYED COURTESY OF THE CORRUPT WASHINGTON BUREAUCRACY.
BAN
1. HUNTING
2. TRAPPING
3. NEW ROADS
4. ALL SNOWMOBILES AND ORV'S
5. USE OF TOXIC CHEMICALS
6 PRESCRIBED BURNING OF ANY KIND, WHICH RELEASES VERY FINE PARTICULATE MATTER WHICH TRAVELS THOUSANDS OF MILES SETTLING IN THE LUNGS OF PEOPLE CAUSING LUNG CANCER, HEART ATTACKS, STROKES, ASTHMA, ALLERGIES AND PNEUMONIA, KILLING AND INJURING FELLOW AMERICANS.

B. SACHAU
15 ELM ST
FLORHAM PARK NJ 07932

Do You Yahoo!?
Tired of spam? Yahoo! Mail has the best spam protection around
http://mail.yahoo.com

Letter 1: B. Sachau

Comment: 1-1
Response: Thank you for your comments on the Eastside Draft Environmental Impact Statement.

Letter 2: Idaho Department of Parks & Recreation

JAMES E. RISCH
governor

Robert L. Meinen
director

Dean Sangrey, Administrator
operations division

David M. Ricks, Administrator
management services division

IDAHO PARK AND RECREATION BOARD

Steve Klatt
region one

Randal F. Rice
region two

Ernest J. Lombard
region three

Latham Williams
region four

Jean S. McDevitt
region five

Douglas A. Hancey
region six

IDAHO DEPARTMENT OF PARKS AND RECREATION

p.o. box 83720
boise, idaho 83720-0065

(208) 334-4199

fax (208) 334-3741

tdd 1-800-377-3529

street address
5657 Warm Springs Avenue

www.parksandrecreation.idaho.gov

RECEIVED
AUG 28 2006
BLM Cottonwood
Idaho 83522

August 24, 2006

Greg M. Yuncevich, Field Manager
Cottonwood Field Office, BLM
1 Butte Drive
Cottonwood, ID 83522

RE: Eastside Township Fuels & Vegetation Project DEIS

Dear Mr. Yuncevich:

Staff reviewed the Eastside Township Fuels & Vegetation Project Draft Environmental Impact Statement (DEIS). The project proposes to harvest timber, conduct prescribed burning, and decommission roads on the east side of the Elk City Township.

We previously commented on this project during the Notice of Intent period. In our comments, we were concerned about how the project would affect snowmobiling opportunities in the area.

2-1 Several of the harvest units would use Road #443 or Road #1809 as log haul routes. These roads are a part of the Elk City Snowmobile Trail System. In order to not disrupt snowmobiling in the Elk City area, the Idaho Department of Parks and Recreation requests that winter logging be prohibited.

2-2 If winter logging is necessary, winter logging operations should cease after December 15th. This mitigation measure would allow snowmobiling on these roads for most of the winter.

2-3 We were disappointed that this mitigation measure was not developed into the project design features. Is the BLM planning to log this area during the winter? If so, would it continue after December 15th?

2-4 If winter logging is going to occur, the Cottonwood Field Office needs to work closely with the Elk River/Dixie Snowmobile Grooming Program. Mike Howzen is grooming program contact. His phone number is (208) 842-2749.

Working with the grooming program should minimize potential conflicts between the logging operation and the snowmobiling public.

We appreciate the opportunity to review the DEIS. If you have any questions about our comments, please contact me at (208) 334-4180 ext. 230.

Sincerely,

Jeff Cook, Outdoor Recreation Analyst
Comprehensive Planning, Research and Review

Letter 2: Idaho Department of Parks & Recreation

Comment: 2-1
Response: The effect of the project on recreation, including snowmobiling, was considered in the design process. Please refer to the Project Design Measures Table 2.3.1, which includes the requirement to maintain a minimum of two inches of snow when plowing roads (item 10). This would allow for snowmobile use on the roads as well. Items 11 and 39 in this Table allow for harvest during frozen conditions to help mitigate impacts to soil and plants. There would be fewer environmental impacts from winter logging operations. Upon further communication with Jeff Cook, roads #443 and #1818 noted in the DEIS are part of the snowmobile system, while road #1809 is not.

Comment: 2-2
Response: See Response to Comment 2-1.

Comment: 2-3
Response: See Response to Comment 2-1.

Comment: 2-4
Response: We contacted Mike Howzen and will continue to work with the grooming program in mitigating the impacts from the project. Where possible, the BLM will plow one lane for logging traffic and leave one lane unplowed to be groomed for snowmobile use. Logging traffic will be prohibited on weekends to reduce potential conflicts between logging and snowmobile use.

Letter 3: Larry and Shirley Biggers

RECEIVED
AUG 2 9 2006
BLM Cottonwood
Idaho 83522

Bureau of Land Management
Cottonwood Field Office
1 Butte Drive
Cottonwood, Id. 83522-5200

Attention: Robin B. Boyce

Sir:

This is in reference to the Eastside Project Area of American River. It seems that you are still considering the Decommission of the road that goes up river from the county bridge. As you probably know the existing road has a very good rock base that does not give way to mud during the spring thaw. The only time we have to go into four- wheel drive is sometimes when we reach portions of the County road between the County bridge and town. If you talk with the County Road Dept. they can tell you how many tons of rock they have applied to that area, and in a short period of time the rock has been swallowed up and there is mud once again.

3-1 **In a meeting sometime back, we asked if you would maintain the proposed new road. You made it very clear that you do not do road maintenance. Any new road you build will be a mud hole, and impassable during the spring thaw, without regular maintenance.**

For these reasons we object to any thought of Decommissioning of the present road in favor of a new road between the American River bridge and the private property belonging to Jeff Stacy McCusker. There are a number of families that live here year round and we have to have a road that is useable the year round.

3-2 **In the event you decide to Decommission the present road there will be litigation.**

Sincerely
Larry Biggers
Shirley Biggers
Larry and Shirley Biggers

Letter 3: Larry and Shirley Biggers

Comment: 3-1
Response: We understand your concerns. We took these into consideration along with our need to reduce sediment and complete the watershed restoration portions of this project. (See the Roads information in Section 3.8.1.3 for a discussion about permanent road construction). By using geosynthetic fabrics and/or geogrid systems along with predetermined depths of pit run rock for base; proper drainage, and surface material, the new road would be designed and built to address the spring thaw and wet conditions. We expect a properly designed road would require less maintenance than the existing road, which consists primarily of dredge waste rock, would meet the needs of the landowners while improving riparian habitats and further reducing sediment in the American River. Continuing with present day maintenance activities, the road could be maintained for year round use.

Comment: 3-2
Response: We hope you and other local landowners will consider the need to improve water quality and fish habitat in the American River. Thank you for your comment on the Eastside Draft Environmental Impact Statement.

Letter 4: Idaho Conservation League

Jonathan Oppenheimer
<joppenheimer@wildidaho.org>
09/07/2006 04:06 PM

To <robbin_boyce@blm.gov>, Greg Yuncevich <greg_yuncevich@blm.gov>
cc
bcc
Subject Idaho Conservation League comments on the Eastside Township DEIS

Attached, pasted below, sent via fax and USPS are our comments on the Eastside Project. Please let me know if you have any difficulty opening the attachment, or if you have any questions about these comments.

-jonathan

Jonathan Oppenheimer
Conservation Associate
Idaho Conservation League
P.O. Box 844
Boise, ID 83701

Ph: (208) 345-6942 Ext. 26
Fax: (208) 344-0344
joppenheimer@wildidaho.org

For thirty years, the Idaho Conservation League has worked to preserve Idaho's clean water, wilderness and quality of life.

Robbin Boyce
BLM, Cottonwood Field Office
1 Butte Drive
Cottonwood, Idaho 83522

September 7, 2006

RE: Idaho Conservation League Comments Regarding the Eastside Township DEIS

Dear Robbin,

Thank you for considering our comments on the Eastside Township DEIS. For thirty years, the Idaho Conservation League has worked to protect Idaho's clean water, wilderness, and quality of life through citizen action, public education, and professional advocacy. For more information or to become a member, visit www.wildidaho.org <http://www.wildidaho.org/> . As Idaho's largest state-based conservation organization we represent over 9,000 members, many of whom have a deep personal interest in ensuring that logging projects are consistent with protecting our water, wildlands, and wildlife.

We would like to thank you again for providing the opportunity to tour the project area in June. After reviewing the DEIS however, we remain concerned about the fact that more than 15 miles of temporary roads and more than 2
4-1 miles of new roads will be constructed as part of the Eastside Township project, with limited decommissioning. The road construction, coupled with legacy issues, high levels of sediment over natural conditions, and high values of equivalent clearcut area beg the question of whether or not the

Letter 4: Idaho Conservation League

Comment 4:1
Response: The majority of temporary roads proposed for construction occur in land types that do not have high sediment delivery potential to streams (e.g., ridge tops, upper and mid slopes. The action alternatives identify from 0.56 to 1.13 miles of new permanent road would be constructed - not two miles as you have indicated (See Tables 2.2.1 and 3.8.4). The majority of the new road construction (0.6 mile of road relocation) is proposed so that portions of the American River subdivision road, paralleling the river, can be decommissioned. Consequently, it was necessary to develop an alternate route to the subdivision by relocating the road away from the riparian area and floodplain of the American River.

Appendix H in Volume II of this EIS provides additional discussion regarding aquatic trend analysis. Also additional analysis has been added to this appendix in this Final EIS in response to this and other comments.

In addition to restoration work proposed in the Eastside Project other restoration has been implemented, is currently taking place, and is planned for the near future; all of which support upward trend in the upper South Fork of the Clearwater River subbasin. Refer to the following sections in this EIS, for additional information regarding these restoration actions: pages 41-43 (Table 3.0.1), and pages 171, 172, 180, 181 (Table 3.6.18), and 187. Additional information has been added to Appendix H in this Final EIS.

Letter 4: Idaho Conservation League

4-1 Cont'd upward trend requirement will be met. We appreciate the proposed restoration activities in the project, however, given the presence of sensitive and listed fish species and the impaired state of the South Fork Clearwater River Subbasin, additional restoration is needed to mitigate the effects of this project.

4-2 We also remain concerned about the impacts to unroaded areas. The analysis in the DEIS contains nothing in addition to the information presented in the American and Crooked River Project FEIS. Simply reiterating faulty analysis does not make it any more acceptable. At the same time we are opposed to the construction of a new stream crossing and encourage you to consider alternatives to either approach. In addition, there is no analysis of the impacts to the BLM unroaded area (which lie adjacent to the FS unraoded areas).

Once again we thank you for the opportunity to submit comments on the Eastside Township DEIS. Please send us any subsequent documents for this project. We look forward to continuing to work with the Cottonwood Field Office on this project and others in the future.

Sincerely,

/s/Jonathan Oppenheimer
Jonathan Oppenheimer
Conservation Associate

/s/ Bradley Smith
Bradley Smith
Conservation Assistant

Idaho Conservation League Comments Regarding the Eastside Township DEIS

Watershed

Upward Trend Requirement

4-3 Pursuant to the upward trend requirements for BLM lands in the Eastside Township, the project proposal includes efforts to restore riparian areas along the American River. While these riparian restoration efforts are warranted, given past activities in the watershed that have been highly detrimental, the proposed project contains several aspects that contradict (and even negate the restorative aspects) the upward trend requirement.

Specifically, the Eastside Township proposes to construct up to 15.1 miles of temporary roads, 2.12 miles of permanent roads, and would only result in the decommissioning of up to 3 miles of existing roads. As part of ICBEMP , road densities were categorized as follows: very low, 0.02 - 0.1 mi/mi2; low, 0.1 - 0.7 mi/mi2; moderate, 0.7 - 1.7 mi/mi2; high, 1.7 - 4.7 mi/mi2; and extremely high, 4.7 + mi/mi2.[1] <#_ftn1> Using these road density categories, Lee et al. found that non-anadromous salmonids such as bull trout and westslope cutthroat are less likely to be found in watersheds with moderate to high road densities or are less likely to exist as strong populations compared to low or very low road densities.[2] <#_ftn2>

Letter 4: Idaho Conservation League

Comment: 4-2

Response: The BLM-managed lands within the project boundary contain numerous classified roads (which includes motorized trails) and is not considered to be unroaded. Please refer to Appendix A, Maps 15 and 18 and Table 3.8.5 of this EIS. All of the project area is considered to be a Wildland Urban Interface area, as depicted on Map 18 Appendix A, where the presence of human development is common. As stated in Section 3.8.4.2, "the proposed action does not enter or occur in the adjacent inventoried roadless areas."

Comment: 4-3
Response: The effects analysis is contained in Sections 3.6.3, 3.4.2.2

Appendix H of provides additional discussion regarding aquatic trend analysis and has been supplemented in this Final EIS in response to this and other comments. It is acknowledged that short term sediment impacts would occur from project implementation. However, long term benefits would occur from a reduction in chronic sediment sources and riparian/aquatic restoration efforts.

Also see response to comment 4-1 which states the correct miles of new proposed permanent road (0.56 to 1.13).

BLM lands often do not comprise a large majority of the watershed and mixed ownership patterns, BLM opportunities are often limited in many subwatersheds. Consequently, BLM opportunities to reduce road densities in many subwatersheds are very limited.

Development of the road and access alternatives are based on a combination of criteria as stated in Section 3.8.1.3. Table 3.8.1 illustrates miles of road by owner and Map 15 in Appendix A their location. The ability to decrease existing roads is extremely limited due to lack of ownership by the BLM, few roads occurring on BLM lands in several subwatersheds, and ingress and egress needs of adjacent owners.

The road densities noted by this comment are not the "result" of the Eastside project. These density classifications exist at present, and the Eastside project actually decreases the lower American river from a High to a Moderate using these criteria. See table 3.4.2 and 3.4.3

Letter 4: Idaho Conservation League

Furthermore, Lee et al suggest that 'There are no logical reasons to expect anadromous fishes to be immune to the effects of habitat change from roads evident in the non-anadromous species.'

At the subwatershed level, all action alternatives would result in moderate road densities in three subwatersheds and high road densities in four subwatersheds.[3] <#_ftn3> Based on ICBEMP research, which covers a wide, and therefore representative geographical sample, the condition of the subwatersheds in the American River drainage following implementation of this project will not be conducive to ideal salmonid habitat. Although there are roads associated with private property, which the BLM and the Forest Service can do nothing about, impacts on public lands in and adjacent to the township have also experienced excessive impacts from past activities in the American River Watershed.

The high level of temporary road construction and the resultant effects accompanying this project proposal are downplayed by the BLM with Design Measure #8, in which temporary roads would be decommissioned within 1 - 3 years following construction.[4] <#_ftn4> However, the most severe impacts of road construction on fisheries and watershed resources occur in the short-term. Given the existing impaired condition of the American River Watershed, both new and temporary road construction should be avoided as much as possible in order to accomplish the upward trend requirement in the American River Watershed. All stream fords should be removed through road decommissioning or bridge and culvert placement.

Sediment

It is unclear how the proposal meets direction from Addendum 1: BLM Fisheries/Water Quality Objectives by Prescription Watershed Supplement to Chief Joseph Management Framework Plan (1989). According to the Addendum, the number of years that sediment yield guidelines can be approached or equaled is limited to between 1-3 years. In some of the prescription watersheds, current conditions exceed sediment yield objectives, indicating that the BLM is not abiding by the Addendum, and therefore stands in violation of its own MFP. Therefore, without an amendment to the MFP, it is unclear how the proposed activities can proceed.

Further, for most of the prescription watersheds in the project area, elevated levels of sediment are one of, if not the, primary limiting factor to fisheries habitat and water quality. The BLM anticipates an upward trend as a result of modeled sediment additions, but has not shown an upward trend in the past. The models utilized do not account for all sediment entering the subwatersheds, and the BLM makes no attempt to estimate the % of sediment that is not modeled. As a result, the sediment and water quality judgments are speculative and the upward trend determination is presumptive. Instead, we encourage BLM to undertake restoration actions in advance of any new ground-disturbing activities (i.e. logging, road construction, etc.).

Letter 4: Idaho Conservation League

Comment: 4-4
Response: We concur that NEZSED should be used in conjunction with monitoring and professional judgment. The model limitations are presented in Appendix H, pages H-9 and H-10. As discussed on page 89, NEZSED has been tested using locally collected sediment yield data. Results of the individual tests varied, with predictions being over, under and close to observed values. The model has a general tendency to under-predict, but has been determined to be a reasonably realistic tool for alternative assessment (Gloss, 1995; Gerhardt, 2005).

Comment: 4-5
Response: Potential increases in sediment yield not covered by the NEZSED model, including sediment from increased traffic, are addressed in other ways. As stated on page 99, potential impacts from increased traffic "will be reduced through road maintenance where needed and contract provisions to minimize resource damage during wet periods." Please refer to Table 2.3.1 (pp27-32), for specific project design measures and their relative effectiveness. Applicable measures to address these concerns would include, but not be limited to, design measures # 7, 11, 12, 14, and 15.

Regarding the upward trend concern, Whittaker and Queen are meeting objectives and do not trigger the upward trend requirement – see Section 3.6.2.2 pages 147-148. The BLM is not proposing to conduct riparian restoration or designate new OHV trails in Whitaker, Queen, and Box Sing Creeks.

Letter 4: Idaho Conservation League

Inadequacy of the NEZSED Model

4-4 As part of the watershed analysis in the DEIS for the Eastside Township project, the BLM relied upon the NEZSED model. The NEZSED model has a general tendency to underestimate sediment yield[5] <#_ftn5> . Accordingly, the BLM should assume that sediment yields modeled by NEZSED are not adequate or conservative estimates. For the sake of sensitive, threatened, and endangered salmonids in the American and South Fork Clearwater Rivers, intense caution is warranted to avoid adverse effects to these species and trend toward an upward improvement in habitat conditions. Further the purpose of NEZSED is for alternative comparison, as opposed to positively determining sediment yield.

4-5 To compound the problems associated with the NEZSED model in general, the analysis for the Eastside Township DEIS did not model increases in sediment yield associated with: 1) traffic increases that will result from new and temporary road construction; 2) increased sediment yield associated with newly designated OHV trails; and 3) increased, short-term sediment yield associated with riparian restoration aspects of the project[6] <#_ftn6> . This is particularly concerning where logging and road construction is to take place in the Whitaker, Queen, and Box Sing Creeks where current % over natural sediment yield is at or near the thresholds established in the Management Plan Framework supplemental guidance.[7] <#_ftn7> Given the inadequacy of NEZSED, it is reasonable to assume that the 60% over natural threshold will be exceeded, also impairing the ability of the BLM to comply with the upward trend requirement.

4-6 Additionally, there is no assurance that the BLM will comply with the Clean Water Act (CWA), TMDLs, and state water quality standards based on insufficient models. The South Fork Clearwater River is listed pursuant to section 303(d) of the CWA for sediment and temperature for its entirety, the TMDL mandates a 25% reduction in human-caused sediment[8] <#_ftn8> . Since both the Red and American Rivers converge to form the South Fork Clearwater River, the cumulative effects of sediment yield in the American and Red Rivers occur in the South Fork Clearwater. Therefore the BLM and the Forest Service have an obligation to reduce sediment yields, which the analysis for the Eastside Township has not adequately demonstrated will occur as a result of implementing this project, much less to reduced existing levels by 25% to comply with the TMDL.

4-7 Furthermore, without a drastic reduction in the proposed new and temporary road construction, adjustments to the yarding methods and logging treatments, and without more aggressive restoration in the American River riparian areas, beneficial uses in the American River will continue to remain impaired. These include: cold water biota, salmonid spawning, primary contact recreation, domestic water supply, and special resource water.[9] <#_ftn9> While about 80% of the road decommissioning proposed in this project would occur in RHCAs[10] <#_ftn10> helping to reduce that source of sediment, remaining high levels of % over natural sediment, detrimental disturbance, and equivalent clearcut area will retard the ability of the BLM to demonstrate an upward trend in the American River watershed, absent more aggressive restoration efforts.

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Comment: 4-6
Response: An implementation plan for the South Fork Clearwater River TMDLs was completed in 2006, and the BLM has been a cooperator in this process. No single project will be expected to achieve the entire TMDL sediment reduction goal. This project is predicted to result in a net decrease in sediment yield to the South Fork Clearwater River over time (refer to tables 3.4.7 and 3.4.8, and Figure 3.4.5).

The South Fork Clearwater River TMDL target reduction of 25% for sediment does not identify a specific time frame or mandate project specific reductions of such. Consequently, the Eastside Project would not be expected to achieve entire the TMDL sediment reduction. Achievement of TMDL objectives would be accomplished with a variety of management and restoration actions. The BLM is currently conducting and proposing other restoration actions that would also support achievement of TMDL targets for the South Fork Clearwater River.

Again, because BLM lands comprise only 13 percent of the American River watershed and 2 percent of the South Fork Clearwater River subbasin, BLM restoration opportunities are often limited in many subwatersheds

Comment: 4-7
Response: See response to comment 4-1 – Even with limited landownership in the American River watershed, BLM is conducting and pursuing active restoration measures. In addition to restoration actions identified in the Eastside Project, the BLM is currently undertaking and is proposing other restoration efforts to support upward trend. See Appendix H update Table H.6 in this Final EIS for additional information.

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Equivalent Clearcut Area (ECA)

4-8 We are expecially concerned about the level of impacts in smaller watersheds, such as Box Sing, Whitaker, Queen Creeks. The proposed logging treatments in the Whitaker and Queens Creeks will result in levels of ECA exceeding 15%.[11] <#_ftn11> However, the BLM suggests that the 1995 Biological Opinion (Biop) for a number of Land and Resource Management Plans guiding the management of forests with anadromous fish habitat is irrelevant because these two streams do not contain listed or sensitive fish.[12] <#_ftn12> The BLM relies upon PACFISH to insure that logging in these watersheds will not adversely affect salmonids and water quality.

However, the 1995 Biop does not specify the HUC code at which the 15% ECA standard should be applied. Specifically the Biop states with regard to ECA:[13] <#_ftn13>

In many watersheds, peak flows appear to rise in a curvilinear fashion with increased timber harvest (Grant 1988), rather than failing to change until after a threshold of forest clearing has been reached. Hydrologic impacts may appear when less than 20% of a watershed is clearcut. For example, peak winter storm flows increased 13% after 19% of a coastal British Columbia watershed was clear-cut (Golding 1987). However, related effects such as sediment mobilization and channel modification may not be evident until a threshold has been reached (Grant 1988; Satterlund and Adams 1992). An ECA level of no more than 15% of a watershed in young age classes (defined as stands less than 30 years old by McCammon {1993}) should confer a low risk of hydrologic effects on streams based on the cumulative effects procedure developed by

McCammon (1993) and studies reviewed by Satterlund and Adams (1992). (emphasis added).

Exceeding the 15% ECA level in the Biop in any watershed will result in the potential for significant adverse effects in that watershed. High levels of ECA will change the timing, volume, and duration of peak flows. As a result, water temperatures in the watershed will be elevated since the peak flows will occur earlier rather than when summer temperatures begin to rise and will occur for a shorter duration of time. Increases in water temperature in tributaries of the American River will translate into increased water temperatures in the American River, further impairing the beneficial uses of both the tributaries and the American River.

4-9 Secondly, the increased velocity of the peak flows will increase the potential for changes in channel morphology. In watersheds exceeding the 15% ECA in the Biop as a result of this project, the BLM has not analyzed whether or not there will be any change in channel morphology or not.

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Comment: 4-8
Response: We are also concerned about impacts to the smaller watersheds.

This EIS, pages 145-148, provides an overview of these three watersheds, including the fish species present. This EIS does not infer that ECA concerns are irrelevant or that these drainages do not have sensitive fish. For analysis of ECA refer to pages 176 – 178, and Appendix H, page H-8 – H-9.

In response to your comment, we have further clarified the water yield analyses procedures in Appendix H, page H-9.

Comment: 4-9
Response: Channel morphology has been assessed in those watersheds where ECA is predicted to exceed 15% as described on page 176-178. See response to comment 4-8.

Comment: 4-10
Response: This EIS identifies that the greatest potential to exceed temperature guidance attributed to BLM management actions would be associated with potential impacts to riparian habitats and shading (see pages 103 – 105, 137 – 138, 174 -177). Refer to Appendix H, pages H-8 – H-9, for additional discussion in regards to ECA. This project's restoration efforts and no timber harvest in RHCAs support the South Fork Clearwater River temperature TMDL guidance.

Comment: 4-11
Response: See response to comments 4-8 (ECA) and 4-10 (temperature) and Table 0.2 (page ix), summary assessment of water yield, and pages 96-102 for sediment analysis and trend information.

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4-10 Thirdly, the change in ECA has the potential to alter timing of peak flows and runoff. This is likely to affect temperature in streams. Even if no logging is conducted in RHCAs, if snowmelt is coming off quicker, there will be increases in stream temperature after the spring melt. This has the real potential to exceed temperature guidance established in the TMDL.

4-11 Lastly, high levels of ECA will result in lower levels of both above- and below-ground biomass. Above-ground biomass reduces surface erosion through the interception of precipitation. Below-ground biomass reduces the potential for both surface erosion and landslides. Therefore high values of ECA in the tributaries of the American River will prove difficult toward meeting the upward trend requirement and state water quality standards, particularly with regard to the mandated reductions in sediment and temperature in the South Fork Clearwater TMDL.

4-12 It is unclear from the DEIS tables on pages 94-101, whether the ECAs pertain to the entire subwatersheds, or just the effects of the American and Crooked River and Eastside Projects. Further, the assumption that 15% of the American River watershed, which is composed of Lodgepole pine, will add to the ECA is inaccurate. This fails to account for any trees in the understory (notably grand fir and Douglas fir) that are already established and would continue to grow.

Riparian Restoration

4-13 The Eastside Township project should incorporate additional restoration in riparian areas and the stream channel of the American River. We appreciate the fact that riparian restoration is accompanying this project, however we feel that more must be accomplished in order to meet requirements of the MFP and Refinements. Re-establishing the floodplain and recontouring the channel will drastically improve the habitat conditions in the 1.2 miles of proposed riparian channel restoration. The riparian planting will also help to improve habitat and reduce water temperatures in the American River.

However, increasing the number of stream miles where dredge piles and the channel would be manipulated to restore the floodplain and sinuosity of the river would drastically improve habitat conditions for sensitive and listed species while simultaneously helping to meet the upward trend requirement.

4-14 We also appreciate the fact that 1.35 miles of fish habitat in Queen Creek would be reconnected to the American River by culvert or bridge placement. Whichever crossing type is used, the crossing should accommodate 100-year flood events. All fords should either be closed and decommissioned, or the impacts of these fords should be reduced through the placement of culverts or bridges. Leaving fords in place will continue to result in erosion and sediment delivery, impacting fish and other aquatic life.

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Comment: 4-12
Response: Please see EIS (page 94) where the first sentence for Indicator 2 – Water Yield states, "ECA was calculated by prescription watershed for each alternative."

Table 3.0.1 lists the projects that were considered in completing the cumulative impacts analysis.

The table on page 94 (Table 3.4.5) shows the estimated equivalent clearcut acres (ECA) for the subwatersheds, with areas in square miles indicated in the first column. Alternative A is the existing condition, followed by the estimated changes from alternatives for the Eastside Project only; i.e., without the addition of the American Crooked Project. In contrast, Table 3.4.6 on page 96 reflects the existing condition and the Eastside Project combined effects of foreseeable actions. The labels on these two tables will be changed to help clarify this.

As indicated on page 94 (Indicator 2 – Water Yield) "Dead and dying lodgepole pine will continue to contribute to ECA over the next two decades. Also on page 94, third paragraph under Alternative A, we discuss dead and dying lodgepole pine and the effects to ECA. While we acknowledged that small existing trees in the understory would eventually recover ECA conditions as the stand matures, this would likely take several decades.

Comment: 4-13
Response: We acknowledge the importance of watershed restoration efforts in the upper South Fork of the Clearwater River and specifically the American River watershed. Within these areas, we have conducted or are proposing to conduct a wide variety of restoration actions without logging.

Many of the actions noted in Table 3.0.1 have or will occur in the current Eastside Project area, specifically American River Instream Improvements, Box Sing Creek channel re-connect and fish barrier removal, and American River Restoration Projects (fish barrier removal and instream habitat improvement).

The bank re-contour and riparian vegetation planting along the American River are included in all of the Eastside Project action alternatives. As shown in Appendix A, the treatments occur on all of the BLM ownership in the project area.

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4-15 When riparian restoration occurs, all fish should be captured using electro fishing and should be relocated. Additionally, nets could be placed downstream to prevent sensitive and listed fish from entering reaches of the American River where restoration is taking place to reduce mortality.

4-16 The BLM should also recreate pool habitat and place course woody debris throughout the American River. Pool habitat is basically absent from the river, and pool habitat and coarse woody debris would significantly improve habitat for sensitive and listed fish species.

4-17 While restoration acitivites occur, the BLM should monitor turbidity levels. The lethal concentration for 50% of Chinook salmon (LC50) in confined laboratory settings is 488 mg/L for 96 hours.[14] <#_ftn14> The BLM should insure that the LC50 concentration is not exceeded.

Soil Resources

Roads, OHV Trails, & Skid Trails

4-18 As reiterated throughout these comments, the most concerning aspect of the project is the high number of proposed new and temporary roads. The BLM's own analysis indicates that roads are the current primary source of sediment in the watershed.[15] <#_ftn15> Yet the project proposal for the Eastside Township logging project includes up to 15.1 miles of temporary roads, 2.12 miles of permanent roads, would designate up to 2.39 miles of OHV trails, and would only result in the decommissioning of up to 3 miles of existing roads. Although most of the road-related aspects of this project would involve temporary roads, drastic, short-term sediment yield occurs within the first year or two following construction of a road, as well as during decommissioning of the temporary roads.

4-19 Furthermore, roads are predominately used to facilitate the types of yarding methods that result in high levels of soil disturbance compared to helicopter yarding. A review of the ecological effects of roads and skid trails by Trombulak and Frissell showed that soil resource impacts related to skid trails in northeastern California persisted 40 years after the logging concluded.[16] <#_ftn16> If the BLM is to conform with the upward trend requirement in the MFP, road-related and management-related sediment must be drastically reduced. Decreasing the amount of new and temporary road construction, increasing the proportion of helicopter yarding, and increasing the amount of road decommissioning in the project area would help to reduce the effects of this project and meet the upward trend requirement.

4-20 At the very least the BLM should avoid the proposed road construction involving soils rated high for erosion potential.[17] <#_ftn17> As Trombulak and Frissell point out in their review, roads are the responsible catalyst for the majority of slope failures and gully erosion in steep,

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Comment: 4-14
Response: Thank you for your comment. The Queen Creek channel reconnect is designed to accommodate fish passage and a 100-year flow event (See Appendix I). Queen Creek reconnect design criteria are described under Alternative B on page 20. Section 3.8.1.3 discusses ford's treatment alternatives. Page 263 clearly describes the current situation and what is planned for fords. As discussed, all existing active live water fords on BLM land will either be hardened or closed as shown in Table 3.8.3.

Comment: 4-15
Response: Refer to Appendix I, for a description of proposed restoration measures. Refer to Table 2.3.1, Project Design Measures, Number 21, for additional information regarding instream work in fish-bearing streams. Relocating fish (e.g., electrofishing) out of areas where riparian restoration takes places would not be practical in a stream the size of the American River, primarily because of stream flow conditions and low conductivity. The riparian restoration primarily involves re-contouring streambanks; and seeding and planting of riparian vegetation. The restoration efforts would primarily occur in areas above the mean high water level.

Comment: 4-16
Response: We agree with your comment. Table 3.0.1 and Section 3.6.3.4-Cumulative Effects (page 172), identifies past projects BLM has undertaken to create pool habitat and place large woody debris. The BLM also plans to create pools and place woody debris in dredge mined stream reaches in American River (*American River Restoration Projects* USDI-BLM 2006), which includes stream segments within the project area.

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4-20 Cont'd forested landscapes where logging activities have occurred.[18] <#_ftn18> Ideally, all unauthorized OHV routes should be closed and rehabilitated, any skid trails should be designated, proposed new and temporary road construction should be reduced, the proportion of helicopter logging should be increased, and more roads should be decommissioned. As the BLM's own analysis points out, additional sediment delivery into the American River may adversely affect listed and sensitive fish species.[19] <#_ftn19>

Delineation of PACFISH Buffers

4-21 There was some discussion of whether or not the dredge ponds should be used in the delineation of PACFISH buffers. If peak flows in the American River are at a high enough volume such that overland flow occurs from the river into the dredge ponds or from the dredge ponds into the river, PACFISH buffers should be delineated from the outside edge of these ponds. If management- or logging-related sediment is delivered into the dredge ponds an overland flow occurs, sediment could conceivably be delivered from the dredge ponds into the American River. This conservative approach is warranted given the presence of sensitive and listed fish in the American and South Fork Clearwater Rivers.

Slopes

4-22 One conservative approach toward avoiding detrimental impacts in the project is the fact that the BLM will be applying PACFISH to all areas with high landslide hazard and mass failure potential. However, there is not a standard or guideline to be applied regarding steep slopes. The BLM should, for example, avoid logging on all slopes >35%, or at the very least avoid ground-based skidding. Reducing both above- and below-ground biomass will increase the potential for erosion and mass failure. Above-ground biomass intercepts precipitation and reduces the volume and force with which precipitation hits the soil surface. Below-ground biomass is important for holding soil in place. Therefore both above- and below-ground biomass are important on steep slopes, warranting the avoidance of logging in such locations.

Treatments

Yarding Methods

4-23 The yarding methods associated with accessing treatment units via logging roads exacerbate the effects of the roads themselves due to soil and surface disturbances. In a review of 16 different studies, Megahan et al. found that helicopter yarding resulted in an average of 4% soil disturbance compared to 9.1% for skyline, 23.9% for cable, and 33.5% for tractor yarding.[20] <#_ftn20> Where silvicultural treatments are absolutely necessary, helicopter logging should be employed to reduce soil and ground disturbance

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Comment 4:17
Response: Thank you for your comment. We acknowledge that turbidity should be monitored (see Appendix E-Monitoring Plan, page E-5). By complying with state water quality standards the LC50 concentration (488 mg/L for 96 hours) will definitely not be exceeded from any proposed BLM management actions. As stated on page E-5, there is a turbidity monitoring requirement for riparian and channel restoration actions (pre-, during, and post-) to ensure that potential project attributed turbidity or sediment impacts are minimized to native and special status fish.

Comment: 4-18
Response: A full discussion on sediment is disclosed in this EIS Section 3.4.

The effects of the new permanent roads and the use of temporary roads are disclosed along with the effects (including beneficial) of the restoration actions. The short- and long-term effects as well as cumulative effects of the action alternatives will be considered in making our decision.

The action alternatives identify from 0.6 to 1.13 miles of new permanent roads, not 2.12 as you have stated

Also see our responses comments 4-1, 4-3, 4-6, and 4-7 that address these concerns

Comment 4-19
Response: The majority of temporary roads proposed for construction occur in areas that have low sediment delivery potential to streams. A full discussion on sediment is disclosed in this EIS Section 3.4. A discussion on upward trends and the effects of the project is disclosed in Appendix H. Also see response to comment 4-1.

We acknowledge that temporary roads are proposed to facilitate use of yarding systems which are more economical that helicopter yarding. Alternatives C and D were developed to address yarding issues.

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4-23 Cont'd to limit erosion and sediment delivery. Where helicopter logging is not possible, winter logging could be applied to reduce soil disturbances when snow pack exceeds 2 feet. Furthermore, increased soil disturbance creates seed beds for the establishment of noxious weeds and invasive plants.[21] <#_ftn21> Helicopter yarding and winter logging also have the added benefit of reducing impacts to threatened, endangered, and sensitive plants such as Macfarlane's four-o'clock, Spalding's catchfly, Idaho barren strawberry, Payson's milkvetch, Case's corydalis, and Candystick.

Feathering & Diameter Limits

4-24 The main purpose for the Eastside Township logging project is to reduce hazardous fuels in the township and the Wildland Urban Interface (WUI). According to the BLM, effective fuels treatments include reducing the continuity of the forest canopy[22] <#_ftn22> . While increasing crown spacing will reduce the potential ability of a fire to 'crown' and create a high intensity fire, it is not necessary to maintain space between every crown. If every single tree crown is spaced from neighboring trees, the logging units will be left with a uniform, plantation-style appearance.

As part of the Eastside Township project, the BLM should consider employing some diameter limits. For example, 20 inches for ponderosa pine, 20 inches for Douglas-fir, 21 inches for Engelmann spruce, and 21 inches for grand fir. Individual trees of each respective species with these diameters or larger should be sufficiently self-pruned that ladder fuels are not present to carry a fire into the crown. Trees with these diameters or larger are also more likely to survive a fire. These diameter limits will retain the fire-resistant individuals, will produce a more naturally appearing treatment, and will still accomplish the objectives of the project. Although not all individuals will be uniformly spaced, 'clumps' of individuals should be spaced such that a crown fire would not carry in the logging units.

4-25 Near the edge of the units, removal of individual trees should be reduced to produce a 'feathered' appearance rather than an 'edge' effect. This pracitice will not only benefit wildlife by reducing edge effects but will also result in a more aesthetically pleasing appearance.

4-26 In lodgepole pine stands, the BLM should be particularly cautious about uniform crown spacing. This practice will make lodepole pine vulnerable to blow down during high winds. Clumping or avoiding logging in lodgepole pine altogether will maintain low levels of blow down.

OHVs

4-27 The proposal to designate up to 2.39 miles of additional OHV trails[23] <#_ftn23> as part of this project is very concerning. High road densities in this area have the real potential to encourage irresponsible OHV and

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Comment 4:20
Response: Proposed road locations are chosen based on a combination of criteria as stated in Section 3.8.1.3. As table 3.5.3 illustrates acreages involved are relatively small and there are differences between alternatives (reflecting the differences in the amount of helicopter logging).

The Eastside Project action alternatives are not proposing to log, burn, or build roads on slopes susceptible to slope failure (e.g., landslide prone).

Design criteria have been developed for this project to limit detrimental soil physical disturbance of temporary roads, skid trails and landings (refer to Table 2.3.1) and rehabilitation following use. Section 3.8.2 contains a full discussion of road decommissioning.

These and other factors were considered in alternative formulation.

Comment: 4-21
Response: This statement is does not pertain to the Eastside DEIS. This was a topic of discussion on the Whiskey South project field trip conducted in June 2006. However, PACFISH standards are used in the Eastside Project RHCA delineations. Mean high flow connected American River dredge ponds are considered in the delineation of PACFISH buffers (i.e., RHCAs). No Eastside Project logging is proposed to occur within RHCA buffers.

Comment: 4-22
Response: PACFISH buffers should minimize potential for adverse sediment delivery to live waters (see pages 158-159). Table 2.3.1 contains Project Design Measures to deal with landslide prone and slope concerns. Items 1 and 5 deal specifically with landslide prone. The MFP on page II-4 limits the use of ground based yarding systems on slopes exceeding 35%. The yarding design of the Eastside project is in conformance with the MFP. Item 6 incorporates the State of Idaho Best Management Practices, several of which relate to slope and logging practices and can be viewed at www.idl.idaho.gov/Bureau/forasst.htm. The project was designed so that sustained slopes >35% are either cable or helicopter yarded.

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motorcycle use. Spur roads lead OHV users to dead-end locations where they are more likely to pioneer new unauthorized or illegal routes. Gated roads also have the effect of encouraging OHV users to go around gates to find out what the agency is trying to prevent them from accessing. Higher densities of motorized trails coupled with irresponsible motorized use fragments wildlife habitat and incurs undue wildlife energy expenditures.

4-28 Motorized recreation also conflicts with other forms of recreation. These include hiking, mountain biking, scenic and wildlife viewing, primitive hunting, and horseback riding.

4-29 OHVs also increase the potential for the spread of noxious weeds and invasive plants. Although the BLM exercises BMPs to inspect and clean equipment before entering the field, the agency cannot reasonably expect users to inspect and clean their own equipment voluntarily.

4-30 Lastly, OHVs increase the threat of human-related fire starts. Most off-road vehicles do not have spark arresters. The fact that OHVs lead to soils disturbances, heighten the potential for the spread of noxious weeds, and increase the potential for fires indicates the clear need for a reduction in road densities in the Eastside Township Project area.

Wildlife

4-31 The main concern with wildlife also relates to the number of new roads, temporary roads, and the relative lack of road decommissioning in the Eastside Township project. As the BLM points out in its own analysis, roads in the project area will increase human/wolf interactions and reduce elk security[24] <#_ftn24> in addition to general wildlife habitat fragmentation. This is just one more reason for additional reductions in road densities in the project area.

4-32 With regard to goshawks, the BLM suggests that the guidelines for goshawks in Reynolds et al[25] <#_ftn25> are not appropriate because habitat conditions are different in the Northern Region compared to the Southwest Region.[26] <#_ftn26> However, given the absence of any management recommendations for the Northern Region, the BLM should apply the guidelines from Reynolds et al to reduce impacts to goshawks.

4-33 There is also a lack of design features in the project to reduce impacts on species that depend upon structural diversity including snags and downed woody debris. The BLM correctly points out that the lack of structural diversity is not conducive to fishers, and the removal of both green and dead trees will reduce black-backed woodpecker habitat.[27] <#_ftn27> The BLM should impose diameter limits to recruit snags and downed woody debris and implement the Forest Service, Region 1 Snag Protocol for the sake of these and other wildlife species in the project area.

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Comment: 4-23
Response: The range of alternatives was developed in response to the Purpose and Need for the Action and issues identified through scoping. (Refer to Chapters 1 and 2). The use of alternative yarding systems and timing clauses for operations was thoroughly evaluated in developing the alternatives. As displayed in Table 0.1, the amount of helicopter yarding versus other systems is substantial, as is the reduction in proposed temporary roads. Sections 2.2.4, 2.2.5, and 2.2.6 describe the alternatives, including logging methods. Table 2.3.1, items 8, 11 and 15 and page 278, 3.10.3 display the use of timing clauses to reduce or minimize impacts. Helicopter and winter logging have also been addressed in this EIS.

The Federally listed MacFarlane's four-o'clock and Spalding's catchfly do not occur, and no suitable habitat exists for these species within the project area. No logging is proposed to occur in RHCA buffers, which would protect known populations of Case's corydalis and suitable habitats (i.e., riparian). No known populations of Payson's milkvetch are in proposed logging areas. The Project Design Measures Table 2.3.1 includes actions to mitigate impacts to Candystick (item 40) and Idaho Barren strawberry (item 41) as well as addressing noxious weeds (items 33-39). Refer to Section 3.3.4 Threatened, Endangered and Sensitive Plants for additional information.

Comment: 4-24
Response: Fuels reduction includes reducing the forest canopy as well as decreasing surface fuels, lowering fuel bed depth and increasing fire-resistant species. As described in the Alternatives (2.4.4 - 2.4.6) a variety of treatment methods are proposed. The intent of treatments is to obtain the best results from a silvicultural standpoint, using a variety of treatments to fit the area. Treatments, including irregular shelterwood cuts, would achieve these variations and all action alternatives favor retention of large trees. Appendix D, Table D.4 displays the different treatment types and acreage for each alternative, based on the current size and species composition of the stands. The Treatment maps in Appendix A are illustrative of where the different methods would be applied. Section 3.3.3.2 (pages 70-71) discloses the effects to tree size class distribution which is comparable to the Historic range (see page 250).

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Roadless Area Impacts

4-34 As part of the project proposal for the Eastside Township project the BLM is proposing to construct up to 1.89 miles of road within unroaded lands adjacent to the Meadow Creek Inventoried Roadless Area (IRA)[28] <#_ftn28> . The BLM should avoid road construction and logging in these unroaded areas in order to maintain the natural integrity and wildlife habitat found there. Although the unroaded lands managed by BLM are under a different jurisdiction than the Meadow Creek IRA, the adjacency of these two areas encompasses a larger, intact area without roads. Road construction and logging in the unroaded areas will do little to meet the purpose and need of the project since the unroaded BLM land and the Meadow Creek IRA are farther from Elk City than other parts of the project area. The BLM should maintain the natural integrity and wildlife values in the unroaded area.

4-35 The inclusion of the cursory analysis of unroaded impacts from the American and Crooked River Project failed to recognize the flaws from that FEIS. As pointed out in our appeal over the American and Crooked River Project, the unroaded areas should have been included in both the 1987 Forest Plan, as well as preliminary documents related to the ongoing Plan Revision.

The analysis found that logging of uninventoried roadless areas does not harm their roadless character. This is contrary to agency history and case law, which firmly declares logging roadless areas (whether inventoried or not) is an irreversible and irretrievable commitment of resources.

The FEIS and ROD for the American and Crooked River Project failed to look at the impacts of logging on future wilderness suitability as required by law. See California v. Block.

The decision to log a Roadless area, whether inventoried or not, precludes the area from being added via the ongoing revision of the Forest Plan. The fact that it was erroneously withdrawn from the 1987 Forest Plan is important, yet the plan revision is much more critical.

In National Audubon Society v. Lyons, 46 F.3d 1437 (9th Cir. 1993) the court ruled:

'The Audubon Society alleges the Forest Service completely ignored the roadless nature of the timber sales when it prepared the environmental assessments. In its defense, the Forest Service repeats its argument that, under the OWA, it was not required to consider the roadless nature of the four timber sales. We again reject this argument, and we agree with the district court that the decision to harvest timber on a previously undeveloped tract of land is "an irreversible and irretrievable decision" which could have "serious environmental consequences." See California v. Block, 690 F.2d 753, 763 (9th Cir. 1982). National Audubon at 1448. (Emphasis added).'

In Kettle Range Conservation Group v. USFS, 971 F. Supp 480 (DCt. OR, June 17, 1997) the court again held logging in roadless areas, including ones that are uninventoried, is an 'irretrievable commitment of resources.' In

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Comment: 4-25
Response: We agree and have included irregular shelterwood treatments as part of our project. Refer to irregular shelterwood descriptions in Appendix B page B-15.

Comment: 4-26
Response: Thank you for your comment, we agree with you and described this in the alternatives.

Comment: 4-27
Response: We are proposing to convert 2.39 miles of existing road to an ATV trail in Alternative D as shown on Table 3.8.3. The road to trail conversion project would reduce the running surface of the roads, allow for reduction of chronic sediment sources (e.g., closing fords, constructing ATV bridges), and restrict full size vehicle use of these roads.

Comment: 4-28
Response: Thank you for your comment on the Eastside DEIS

Comment: 4-29
Response: Thank you for your comment. Using BMPs is expected to help reduce the spread of noxious weeds. We will continue public outreach efforts and require all motorized users to stay on existing roads and trails. Off-road vehicle use is not proposed under any of the action alternatives.

Comment: 4-30
Response: Thank you for your comment. OHVs are currently using the roads that are proposed to be converted to ATV trails. Under all action alternatives, a decrease in road density and motorized routes would occur in the long term (refer to Chapter 2, and Appendix I and J). Also see response 4-27

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this case, the logging units were alleged to constitute an uninventoried roadless area next to the Thirteenmile Roadless Area thus violating NEPA. Id at 481. This is similar to the situation in the American and Crooked River and now the Eastside Township Projects.

This finding is not new. In Wyoming Outdoor Coordinating Committee v. Butz, 484 F.2d 1244 (10th Cir. 1973) the 10th Circuit's quote of Sierra Club v. Butz 3 ELR 20071 (N.D. Cal.), allows: 'no timber cutting, road building or acts that would change the wilderness character of such areas.' Under this language, timber cutting (logging) changes roadless and wilderness character.

All cases are applicable here. The Forest and BLM fail to recognize, as case law requires, that logging Roadless areas are an irretrievable commitment of resources. This is in direct contradiction to the court findings and past agency policy.

Furthermore, the agency itself has found that logging (including helicopter logging) alters Roadless areas and wilderness character. On the Payette and Boise National Forest, salvage sales as a result of the salvage rider, which included helicopter logging, the agency concluded that the Roadless area would be negatively affected by helicopter logging under similar circumstances.

On the Middle Fork Timber Sale on the Nez Perce National Forest, the FEIS concluded logging (much of which was helicopter logging) results in irreversible and irretrievable commitments of resources. (Middle Fork FEIS, page 3-94, October 1997, Moose Creek Ranger District, Nez Perce National Forest).

There is no analysis on the shape of the area. There is no quantification of the impacts (no chart or map are included in FEIS) to Roadless areas in terms of integrity, size, naturalness, wildness, or other roadless values. How long will the impacts last from project (clearcuts, temporary roads, versus other kind of logging proposed for the area).

In essence, the cumulative effects analysis does not enlighten us on the impacts to Roadless areas because it is based upon an erroneous assumption that there are no irretrievable and irreversible commitments of resources. As such, there is no analysis to the impacts on Roadless areas.

California v. Block 690 F.2d 753 (9th Cir. 1982) laid out specific requirements for analysis of Roadless areas. Idaho Conservation League v. Mumma, 956 F.2d 1508 (9th Cir. 1992) made those applicable to site-specific analysis. In summary, they are:

a) Comprehensive descriptions of Roadless areas including the areas' unique characteristics: landmarks, rare and endangered species;
b) Assessment of wilderness value: tourism, sales of wilderness oriented recreational equipment, conservation of wildlife and flora populations, soil conservation and stability, watershed protection, clean air and water;
c) Discussion of impact of Nonwilderness designations upon each area's wilderness characteristics and values: primary and secondary impacts, methods of mitigation, and environmental damage;
d) Consideration of the effect of development on future opportunities for wilderness classification: the effect upon the benchmark characteristics identified in the Wilderness Act; and
e) An attempt to balance economic benefits of Nonwilderness designation for an area against the consequent environmental loss.

Both the American and Crooked River Project FEIS and Rod, and now the

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Comment 4:31
Response: The ability to decrease existing roads is extremely limited due to the limited BLM landownership, low amount of BLM roads in subwatersheds, and ingress and egress needs of adjacent landowners. Implementation of any of the action alternatives would reduce road densities in the long term. It is acknowledged that short term (1 – 3 years) increase in road densities would occur from action alternatives and use of temporary roads. However, public road closure actions would restrict public motorized use of these temporary roads (and will be made a design feature for the project). Long term reduction in elk security is slightly lower than existing conditions, and is primarily attributed to opening up of timber stands and size of the units and not an increase in motorized vehicle routes. The gray wolf population has steadily increased and no land use restrictions are required (see pages 200 and 201) due to wolf recovery. Page 201, states, "Watershed restoration actions, and post-harvest slash treatments are not expected to negatively impact wolves, elk or their habitats considerably regardless of alternative."

Comment: 4-32
Response: There is a conservation strategy for Idaho (Patala et al. 1995) that is being used for the Eastside Project. See page 212, regarding specific goshawk management guidance and analysis of such. No additional mitigation is deemed necessary to maintain goshawk viability in the project and analysis area, because suitable habitat is 205 percent of historical amounts in the American River watershed (USDA-FS, 1998b).

Comment: 4-33
Response: We will implement the snag management guidance in the BLM Chief Joseph MFP (1981), as amended, and the North Idaho Timber Management EIS. All action alternatives include a variety of treatments that include snag retention and recruitment. The project treats approximately 40% of the area and retains structure (not clear cuts). There will be approximately 1,907 acres untreated with increasing numbers of snags and down woody debris.

Also see response to comment 4-24.

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Eastside Township DEIS are inadequate in this analysis.

The above noted court cases require an analysis of the impacts on the areas wilderness characteristics and suitability.

It is the Forest Service itself that set up the policy of site-specific EISs on development of Roadless area in the agency appeal decisions and subsequent court decisions on the Idaho Panhandle and Flathead National Forests. In the court decision on the IPNF Forest Plan the court concluded a site-specific analysis is where the irreversible and irretrievable decision is made (Idaho Conservation League v. Mumma, 956 F.2d 1508 (9th Cir. 1992))

The above referenced case is the result of a challenge to the forest plan's analysis/evaluation/allocation of Roadless areas. The court determined that it was the site-specific decision, not the forest plan, that analyzed the impacts of development on the Roadless area and was, hence, the background document for a decision on the fate of Roadless areas. Yet here, the FEIS concludes that the value of these lands for wilderness designation won't be considered in this analysis or the ROD.

The action agencies are required to analyze the site-specific impacts to Roadless areas. The American and Crooked River Project FEIS and Eastside Township DEIS defer this decision to a broader planning stage (Forest Plan Revision), yet precludes that, by logging and building roads in these areas. This stands in contrast to what the law requires.

4-36 Finally, the DEIS fails to identify any unroaded areas adjacent to existing Forest Service roadless areas. As laid out in the 1998 PACFISH Biological Opinion, 'Wilderness, unroaded, and large blocks of primitive lands contain most of the best available remaining habitat for steelhead and salmon (Frissell 1993; Thomas et al. 1993; Eastside Forests Scientific Society Panel 1994; Rhodes et al. 1994; and Quigley and Arbelbide 1997).'

Grazing

4-37 The analysis of the existing condition and the impacts from grazing in the Eastside Township DEIS needs to incorporate a more thorough description of how grazing has influenced the American River Watershed. Disclosure and analysis of grazing in the watershed is necessary to adequately describe the cumulative effects and discern whether or not changes in grazing management are necessary. Exclusion of grazing should occur within PACFISH buffers in the project area in order to improve riparian habitat and comply with state water quality standards and TMDLs. Areas where riparian restoration is to take place should be excluded from grazing to facilitate a more rapid recovery and improve salmonid spawning and rearing habitat.

Cumulative Effects

4-38 The BLM did not disclose or analyze the effects of the Sultan Shaft, Sultan 60, Tailings 40, Borowicz 40, East Swale Salvage, Transportation Corridors and any other foreseeable projects in the DEIS (see Table 3.0.1). These projects should be incorporated and analyzed in the cumulative effects analysis in the FEIS for the Eastside Township logging project. Any other

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Comment: 4-34
Response: The 1.89 miles of proposed new road are on the Nez Perce National Forest. These roads would be temporary, comprising less than six acres of disturbance. Much of the areas have not retained high unroaded characteristics due to past activities in the area and are within the community protection area for the Erickson Ridge Subdivision.

The NPNF is currently revising the Land and Resource Management Plan (Forest Plan), and edits to the July 9, 2005 Draft Roadless Area Inventory maps have been completed. The January 2006 Proposal does not include this area in the "Areas Under Consideration for Recommendation as Wilderness (Draft Roadless Inventory)". They are still classified as Generally suitable for timber production, where timber production is a management objective, as delineated in the current Forest Plan

Comments: 4-35
Response: The areas described are not a part of the West Meadow Creek Inventoried Roadless Area (IRA). The boundaries of the IRA were defined in the Forest Plan and used in this EIS. This is the only official boundary of the IRA and, as such, the areas with unroaded characteristics are not a part of the IRA. IRAs and Areas with Potential Unroaded Characteristics were analyzed in Section 3.8.4.3. Also see responses to comments 4-2 and 4-34.

Comment: 4-36
Response: See response to comment 4-2. This EIS provides a description and analysis of the areas having possible unroaded characteristics. Refer to Sections 3.8.4.3, pages 266-270. Map 15 in this Final EIS has been updated to show these areas.

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projects

[1] <#_ftnref1> Quigley, T.M., Haynes, R.W., and R.T. Graham. 1996. Integrated scientific assessment for ecosystem management in the interior Columbia Basin and portions of the Klamath and Great Basins. GTR. PNW-GTR-382. Portland, OR. USDA, Forest Service. Pacific Northwest Research Station.

[2] <#_ftnref2> Lee, D.C., Sedell, J.R., Rieman, B.E., Thurow, R.F., and J.E. Williams. 1997. Broadscale assessment of aquatic species and habitats. In T.M. Quigley and S.J. Arbelbide. Eds. An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. GTR. PNW-GTR-382. Portland, OR. USDA, Forest Service. Pacific Northwest Research Station.

[3] <#_ftnref3> DEIS, p. 92.

[4] <#_ftnref4> Ibid, p. 27.

[5] <#_ftnref5> Ibid, p. 89.

[6] <#_ftnref6> Ibid, pp. 98, 99.

[7] <#_ftnref7> Ibid, p. 101.

[8] <#_ftnref8> Ibid, p. 87.

[9] <#_ftnref9> Ibid, p. 91.

[10] <#_ftnref10> Ibid, p. 93.

[11] <#_ftnref11> Ibid, pp. 94, 96.

[12] <#_ftnref12> Ibid, p. 170.

[13] <#_ftnref13> NOAA-NMFS. 1995. Biological Opinion on the Land and Resource Management Plans for the Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests.

[14] <#_ftnref14> NOAA-NMFS. 2005. Endangered Species Act - Section7 Consultation Biological and Conference Opinion

Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the American and Crooked Rivers Project, Nez Perce National Forest. Citing Stober et al. 1981; Newcombe and MacDonald 1991; Waters 1995.

[15] <#_ftnref15> DEIS, p. 114.

[16] <#_ftnref16> Trombulak, S.C., and C.A. Frissell. 2000. Review pf ecological effects of roads on terrestrial and aquatic communities. Conservation Biology. 14(1): 18-30.

[17] <#_ftnref17> DEIS, p.118.

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Comment: 4-37
Response: The issue analyzed in this EIS was the effect the vegetation and fuels project would have on livestock grazing as an authorized use. Effects of livestock grazing within the project area were not identified as a major issue because there are only two grazing allotments on BLM land involving 60 AUMs of use. Grazing impacts to various resources is included in the description of existing conditions and impacts analysis.

Section 3.6.2 (pages 140-154) discloses the existing conditions that include the impacts of grazing as well as other uses. Section 3.12 (page 282) describes the current grazing uses and states that livestock grazing can be limited to avoid conflicts with the project. A design feature that calls for livestock restrictions following restoration activities has been added to Table 2.3.1.

Comment: 4-38
Response: The projects listed in your comments were categorically excluded from NEPA analysis because the actions are listed as either a Departmental or BLM Categorical Exclusion (CX). CXs are categories of actions that Federal agencies have determined do not have a significant effect on the quality of the human environment, either individually or cumulatively, and for which neither an EA nor an EIS is required (40 CFR 1508.4). Therefore, the projects you mention were not included in Table 3.0.1 which displays projects considered for cumulative impacts analysis. However, they were taken into account in assessing the current situation.

Page 53 identifies these projects as fuel treatment projects which support the overall goal of the Eastside Project. These projects are primarily located in the Little Elk Creek watershed, with the exception of 10 acres located in the Middle American River subwatershed. BLM only proposes to treat 20 acres within the Little Elk watershed. For all of the action alternatives proposed in Little Elk Creek, modeled sediment yield increase is only 0.1 percent.

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[18] <#_ftnref18> Trombulak, S.C., and C.A. Frissell. 2000. Review pf ecological effects of roads on terrestrial and aquatic communities. Conservation Biology. 14(1): 18-30.

[19] <#_ftnref19> DEIS, p. 170.

[20] <#_ftnref20> Megahan, W.F. 1981. Nonpoint source pollution from forestry activities in the western United States:

Results of recent research and research needs. P. 92-151 in Proc. U.S. forestry and water

quality: What course in the 80's? Water Pollution Control Federation. Washington, D.C.

[21] <#_ftnref21> Trombulak, S.C., and C.A. Frissell. 2000. Review pf ecological effects of roads on terrestrial and aquatic communities. Conservation Biology. 14(1): 18-30.

[22] <#_ftnref22> DEIS, p. 54.

[23] <#_ftnref23> Ibid, p. 266.

[24] <#_ftnref24> Ibid, pp. 202, 251.

[25] <#_ftnref25> Reynolds, R.T., Graham, R.T., Reiser, M.H., Bassestt, R.L., Kennedy, P.L., Boyce, D.A. Jr., Goodwin, G., Smith, R., and E.L. Fisher. 1992. Management recommendations for the northern goshawk in the southwestern U.S.. GTR-RM-217. Fort Collins, CO: USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station.

[26] <#_ftnref26> DEIS, p. 211.

[27] <#_ftnref27> Ibid, pp. 226, 242.

[28] <#_ftnref28> Ibid, p. 270.

Eastside Township DEIS.doc

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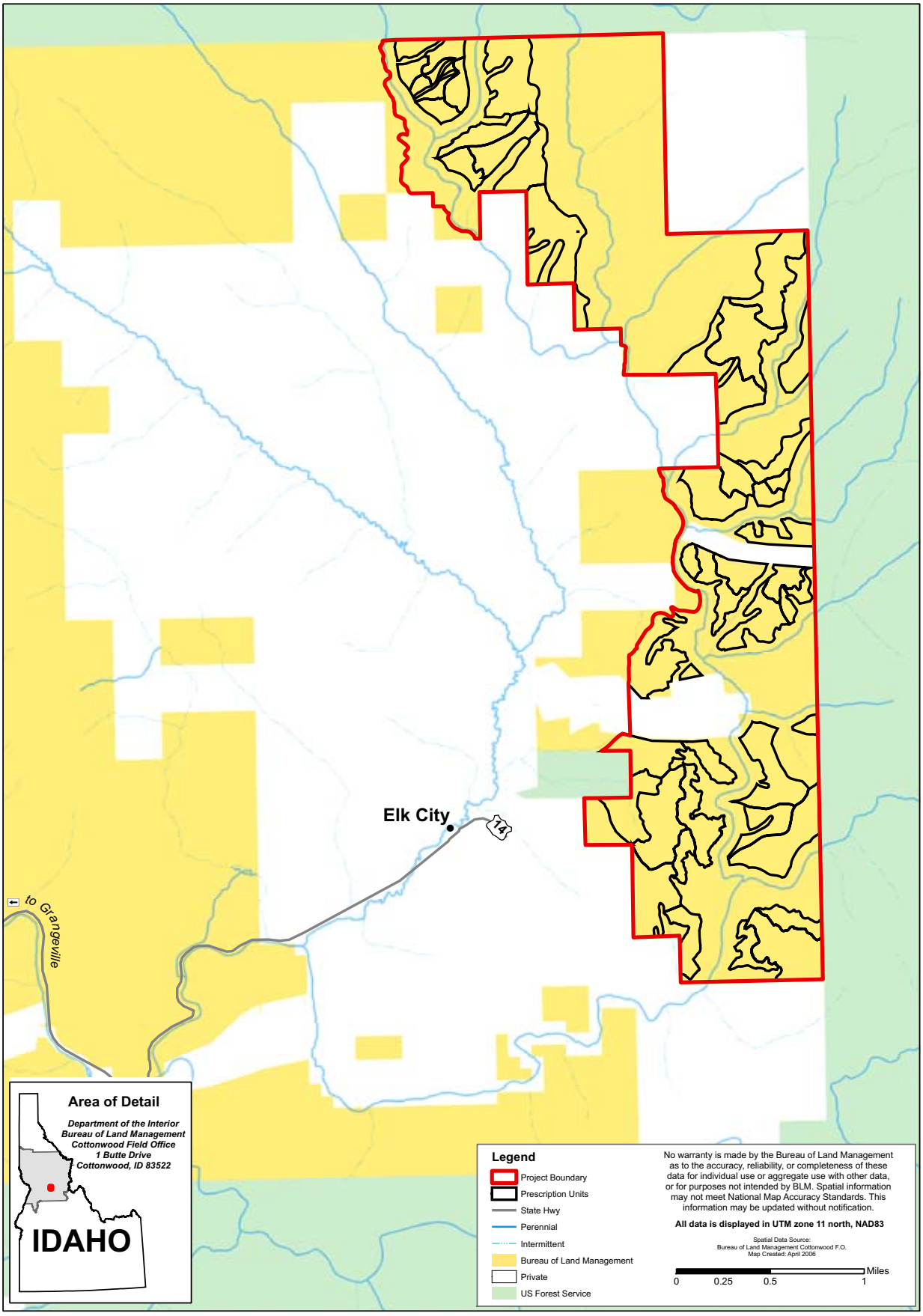
EASTSIDE PROJECT AREA

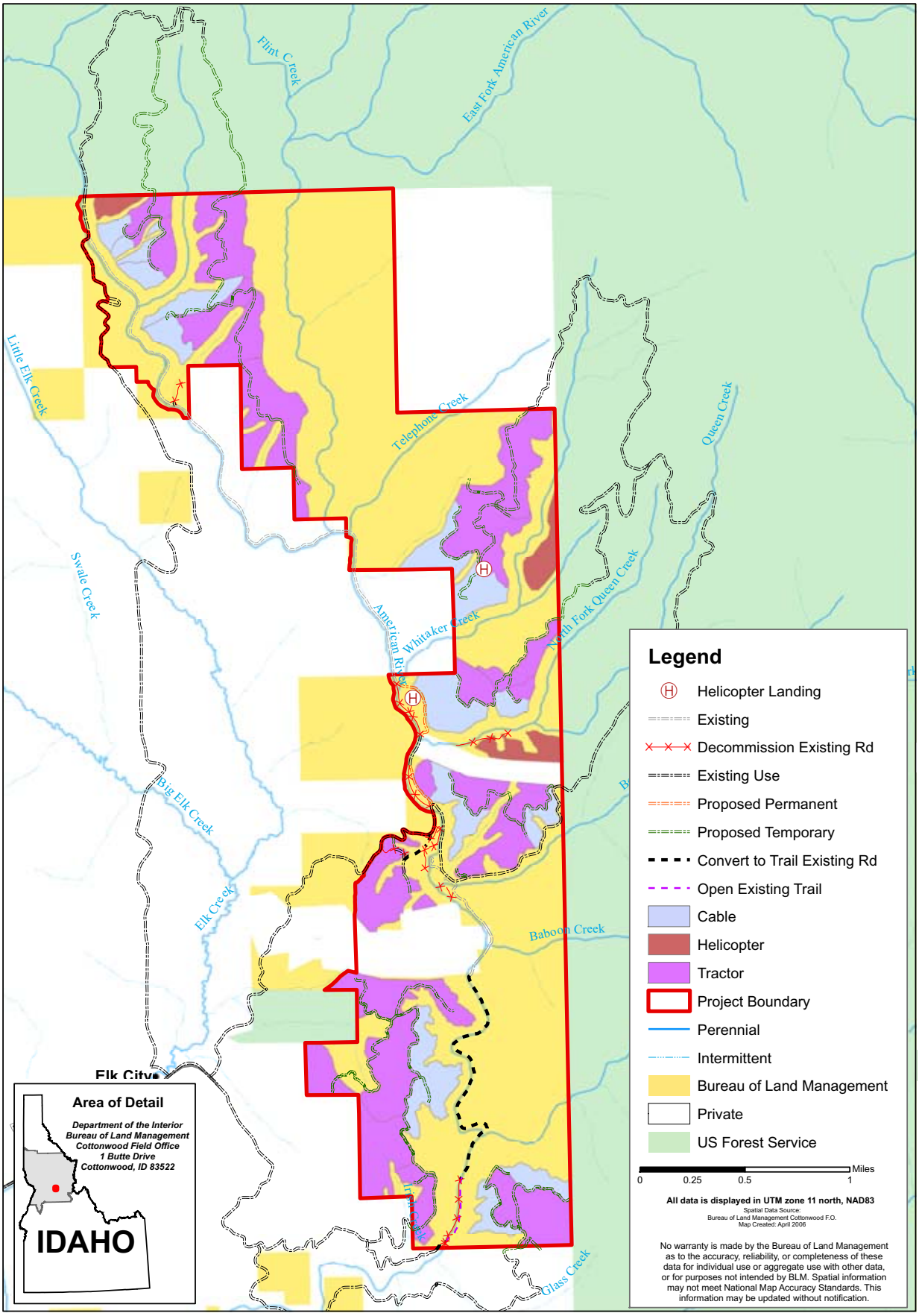
Vicinity Location Map

Map 1



Map 2

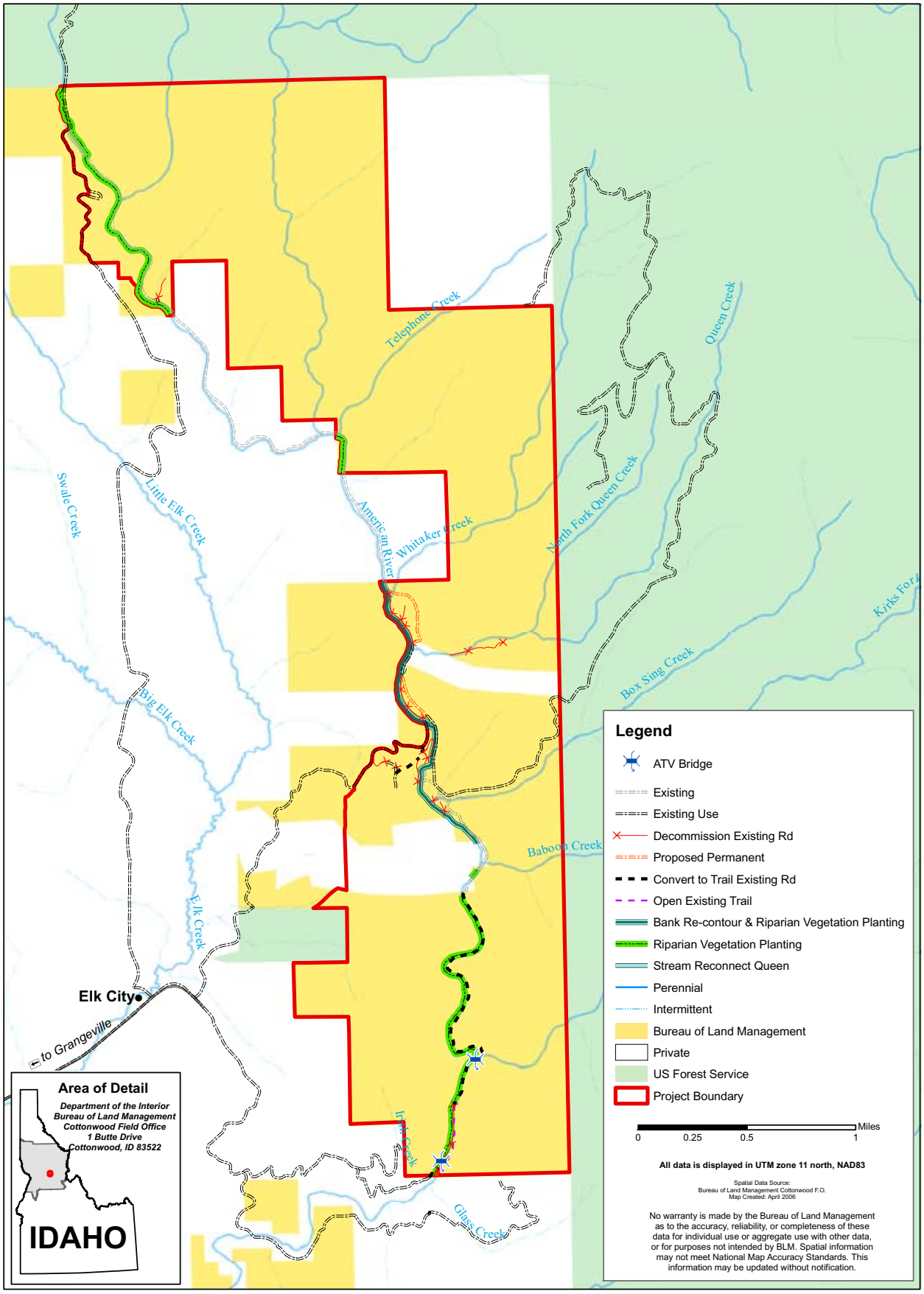
EASTSIDE PROJECT AREA
Alternative B Logging Methods



Map 3

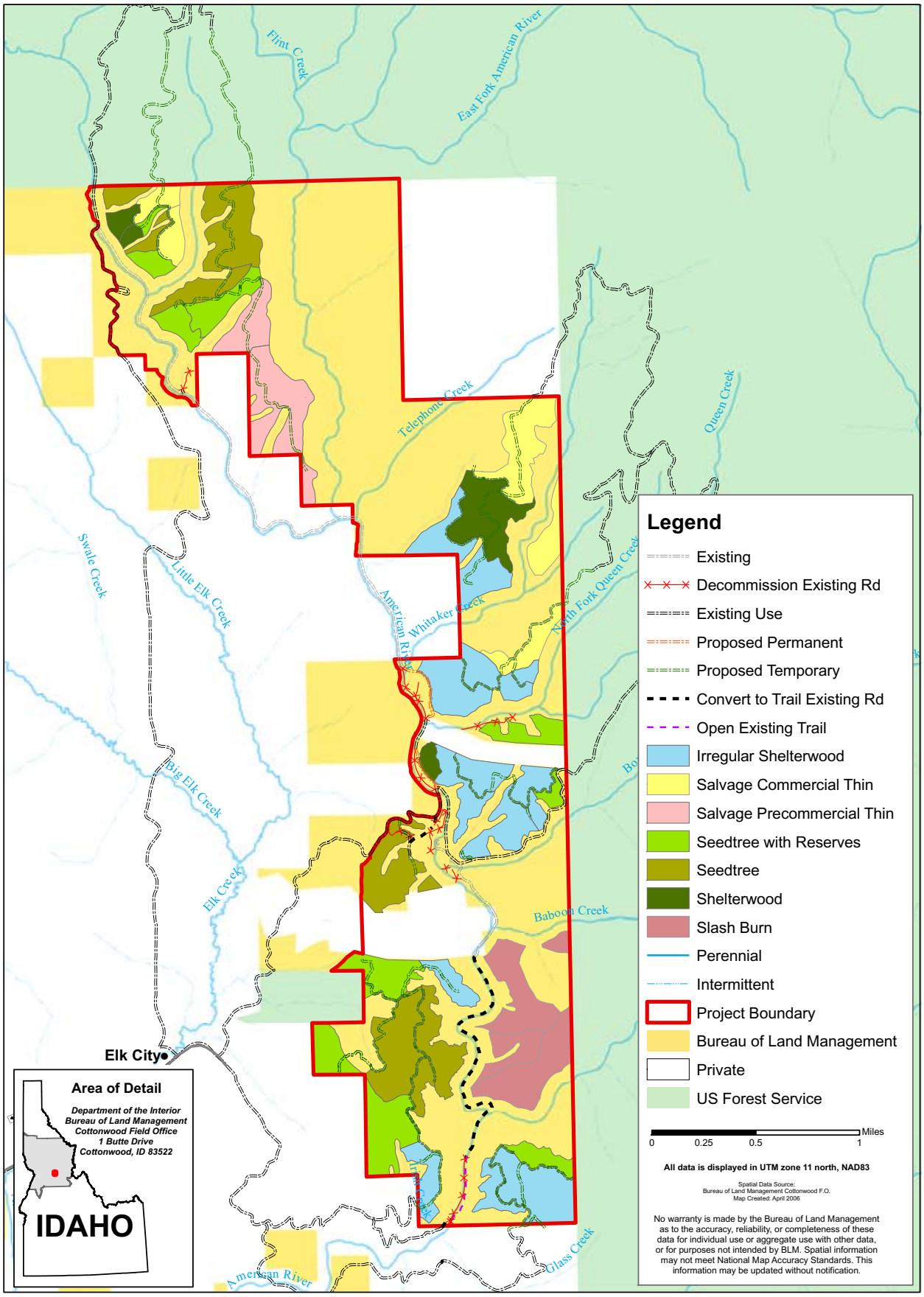
EASTSIDE PROJECT AREA

Alternative B Restoration



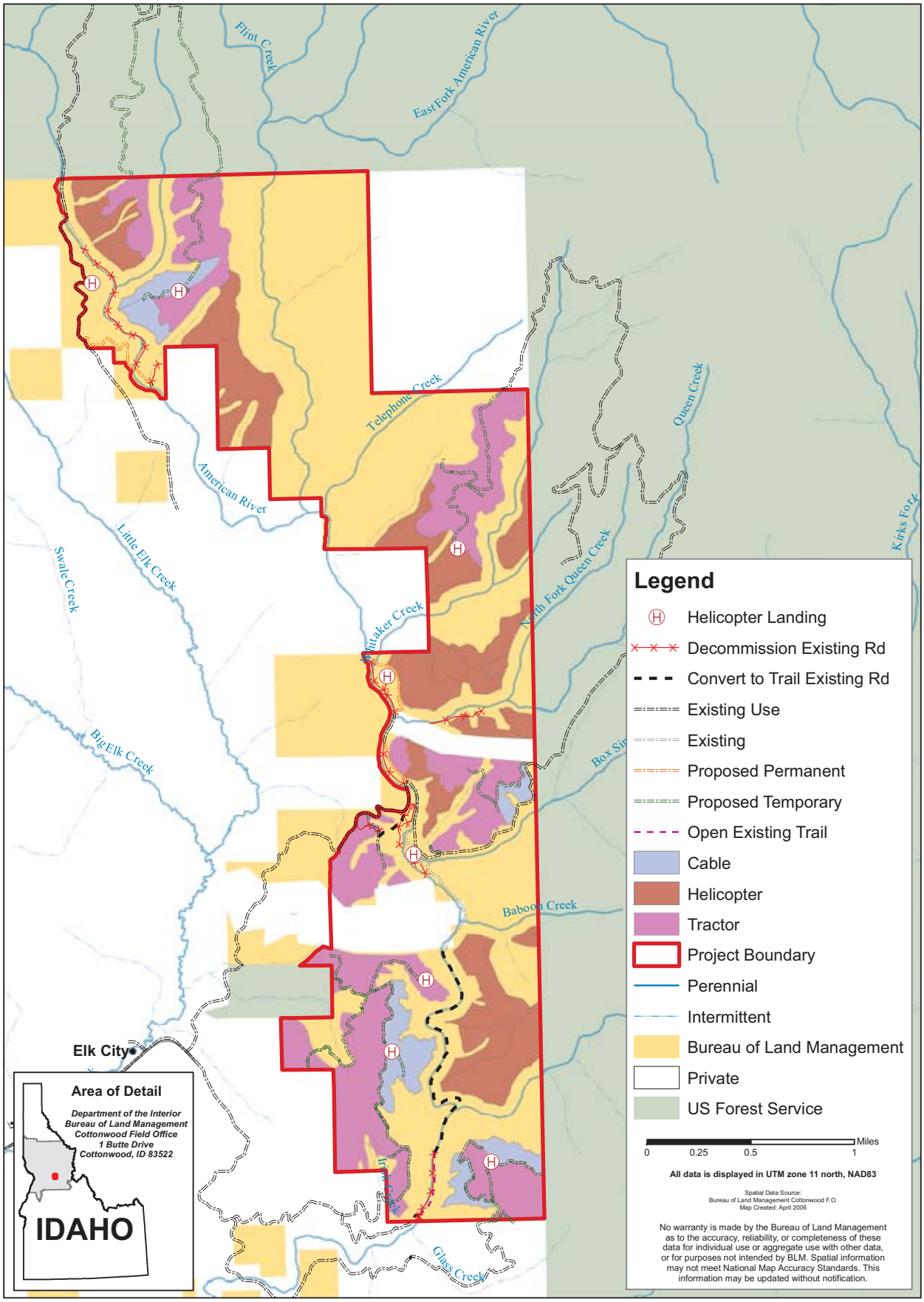
Map 4

EASTSIDE PROJECT AREA
Alternative B Treatments



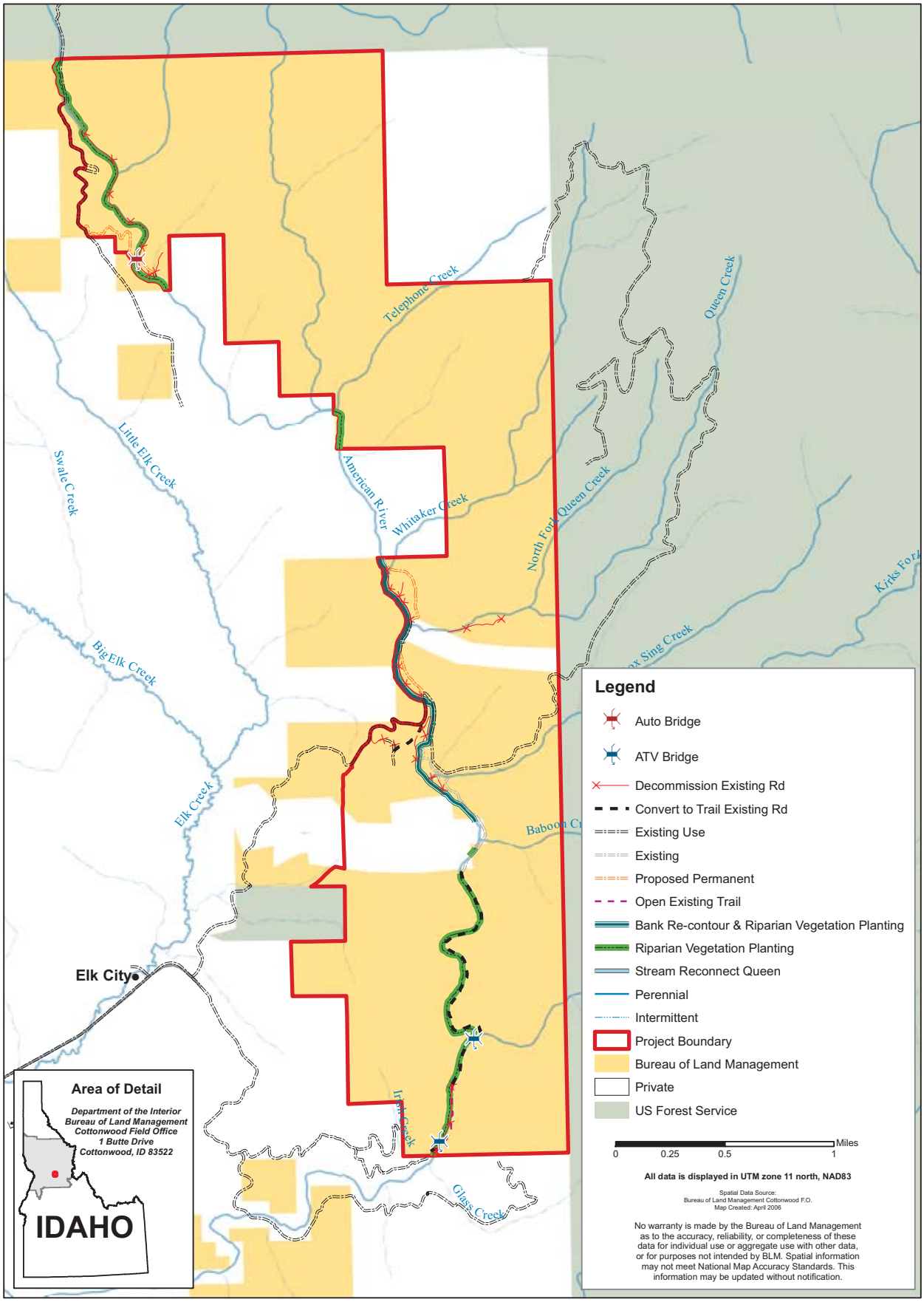
Map 5

EASTSIDE PROJECT AREA
Alternative C Logging Methods



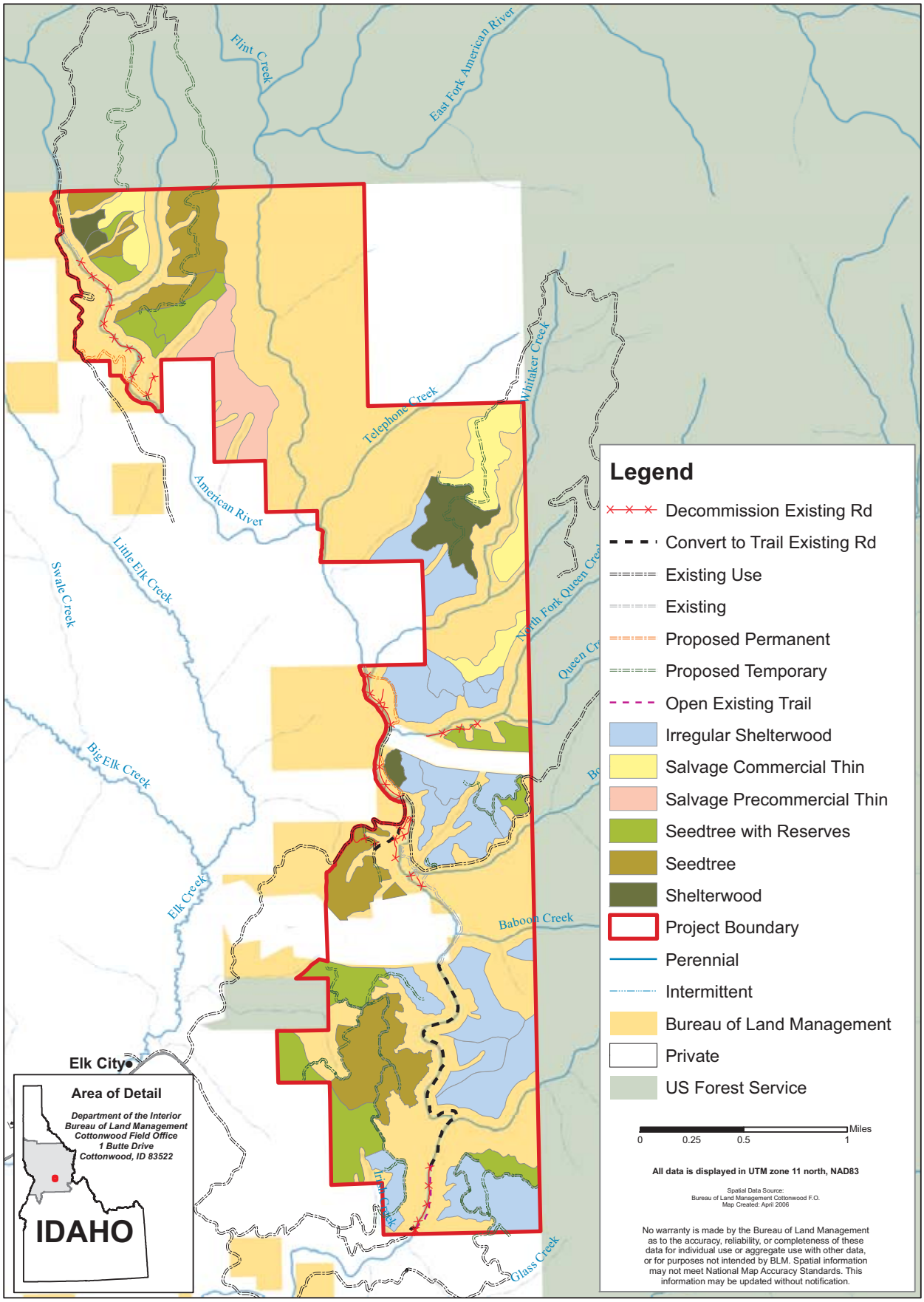
Map 6

EASTSIDE PROJECT AREA
Alternative C Restoration



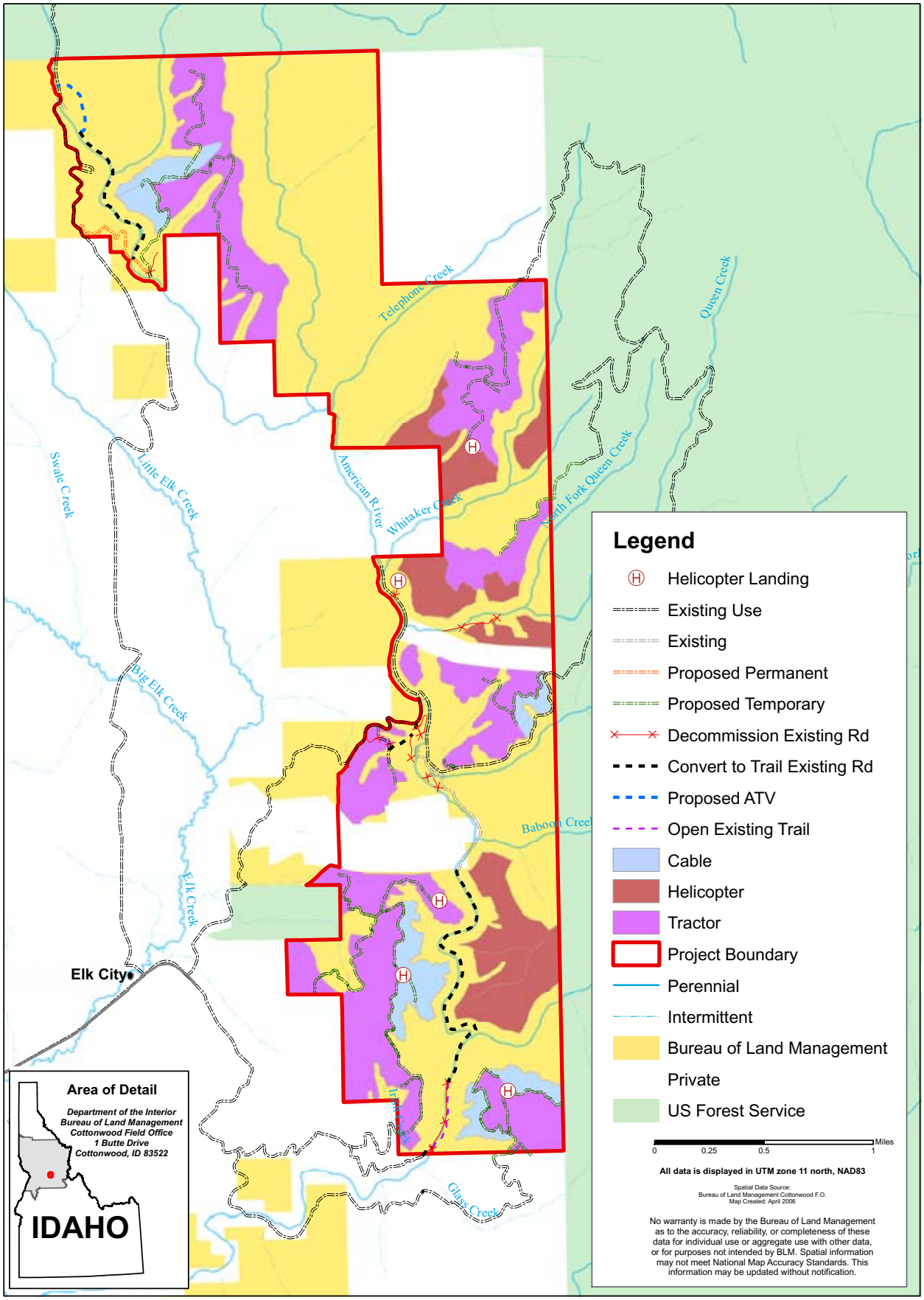
EASTSIDE PROJECT AREA
Alternative C Treatments

Map 7



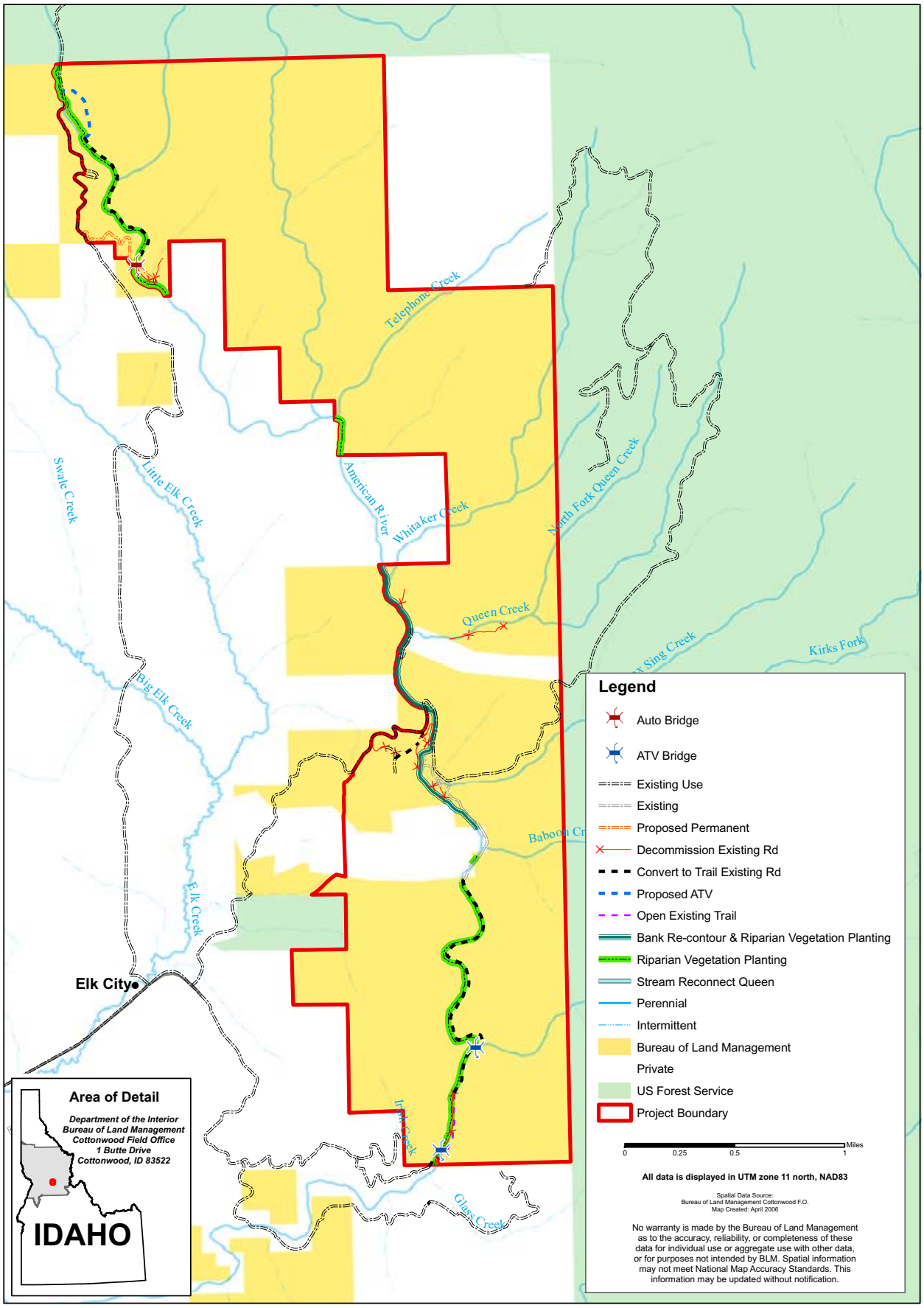
Map 8

EASTSIDE PROJECT AREA
Alternative D Logging Methods



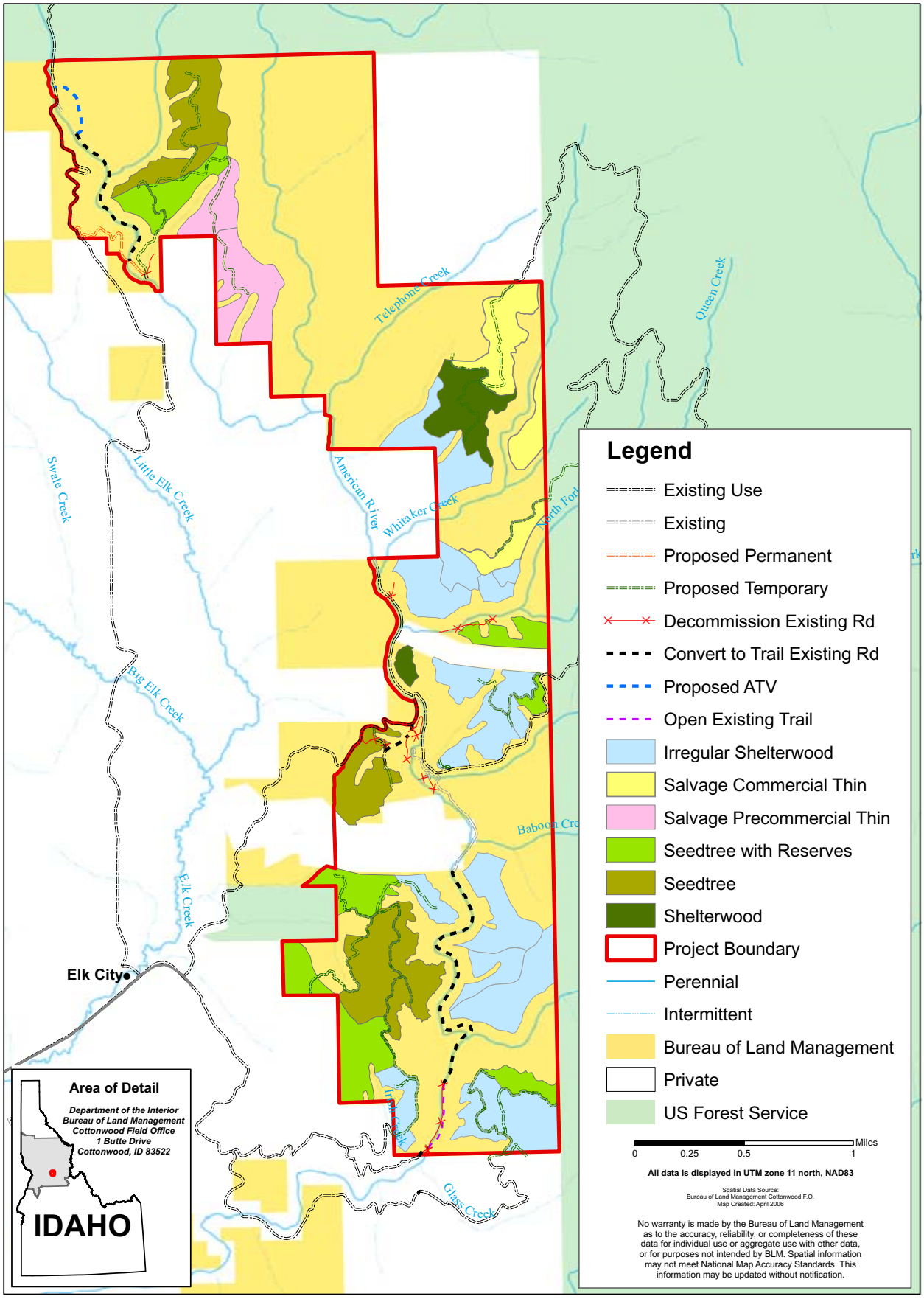
Map 9

EASTSIDE PROJECT AREA
Alternative D Restoration



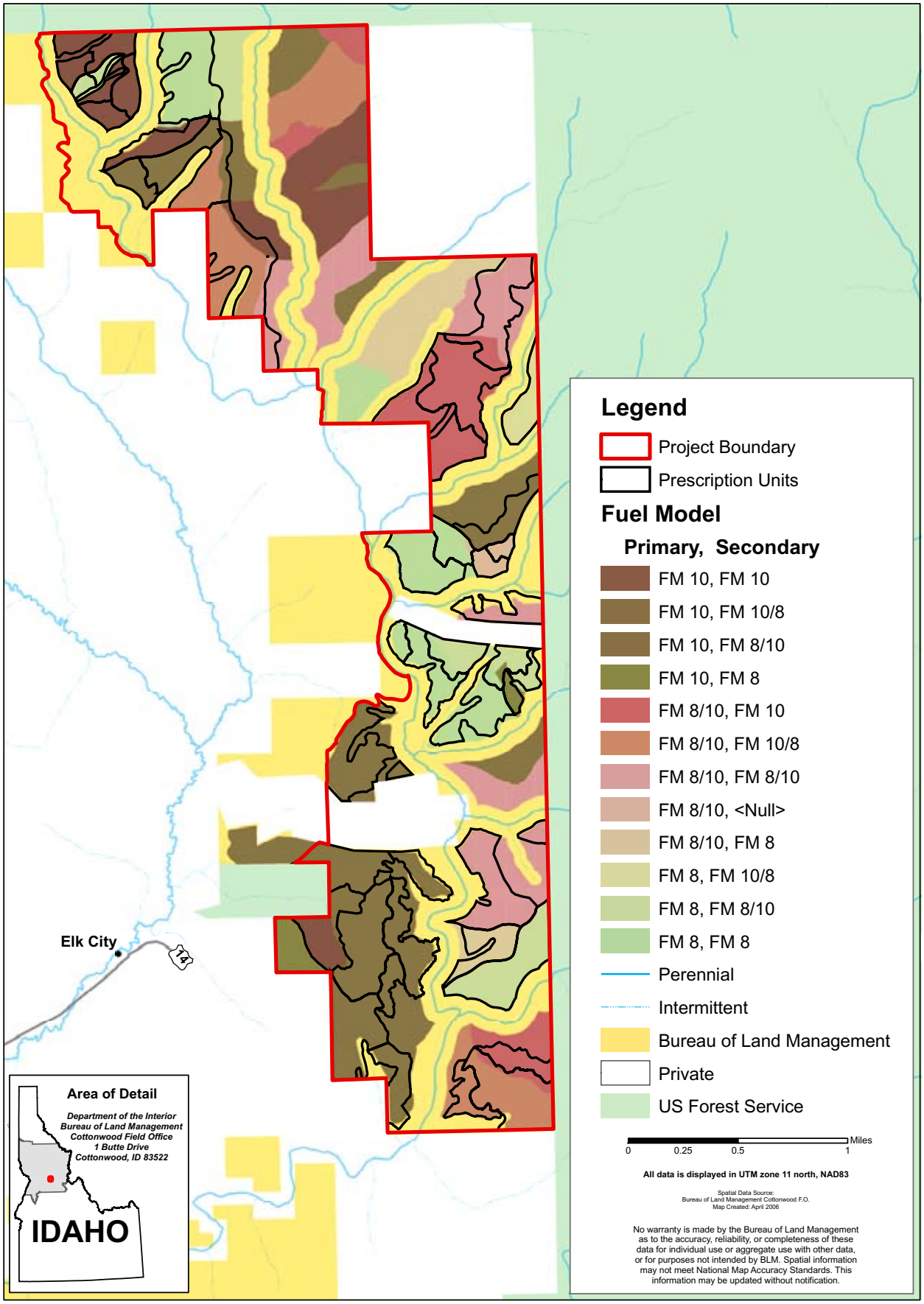
Map 10

EASTSIDE PROJECT AREA
Alternative D Treatments



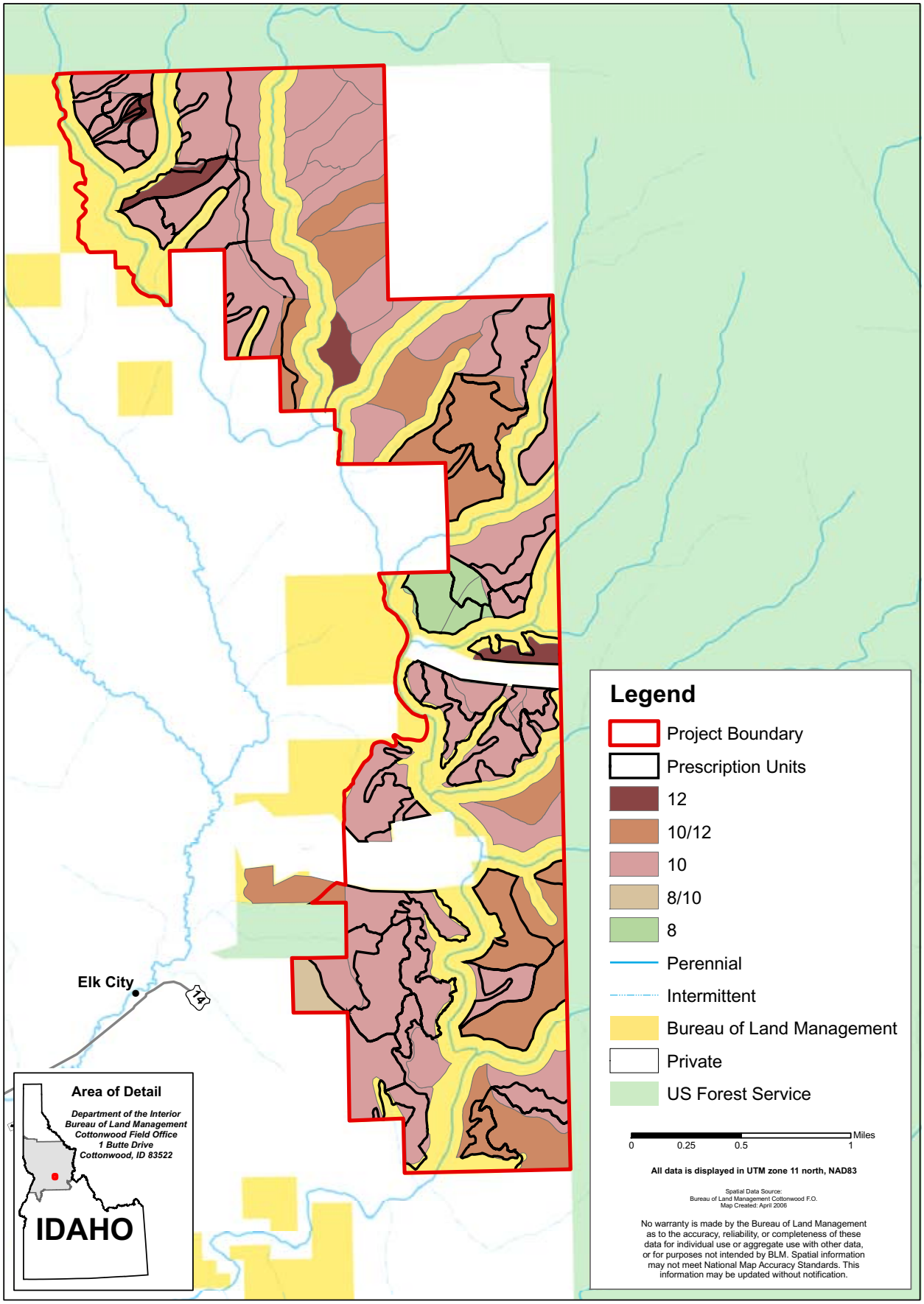
Map 11

EASTSIDE PROJECT AREA
Current Fuel Model



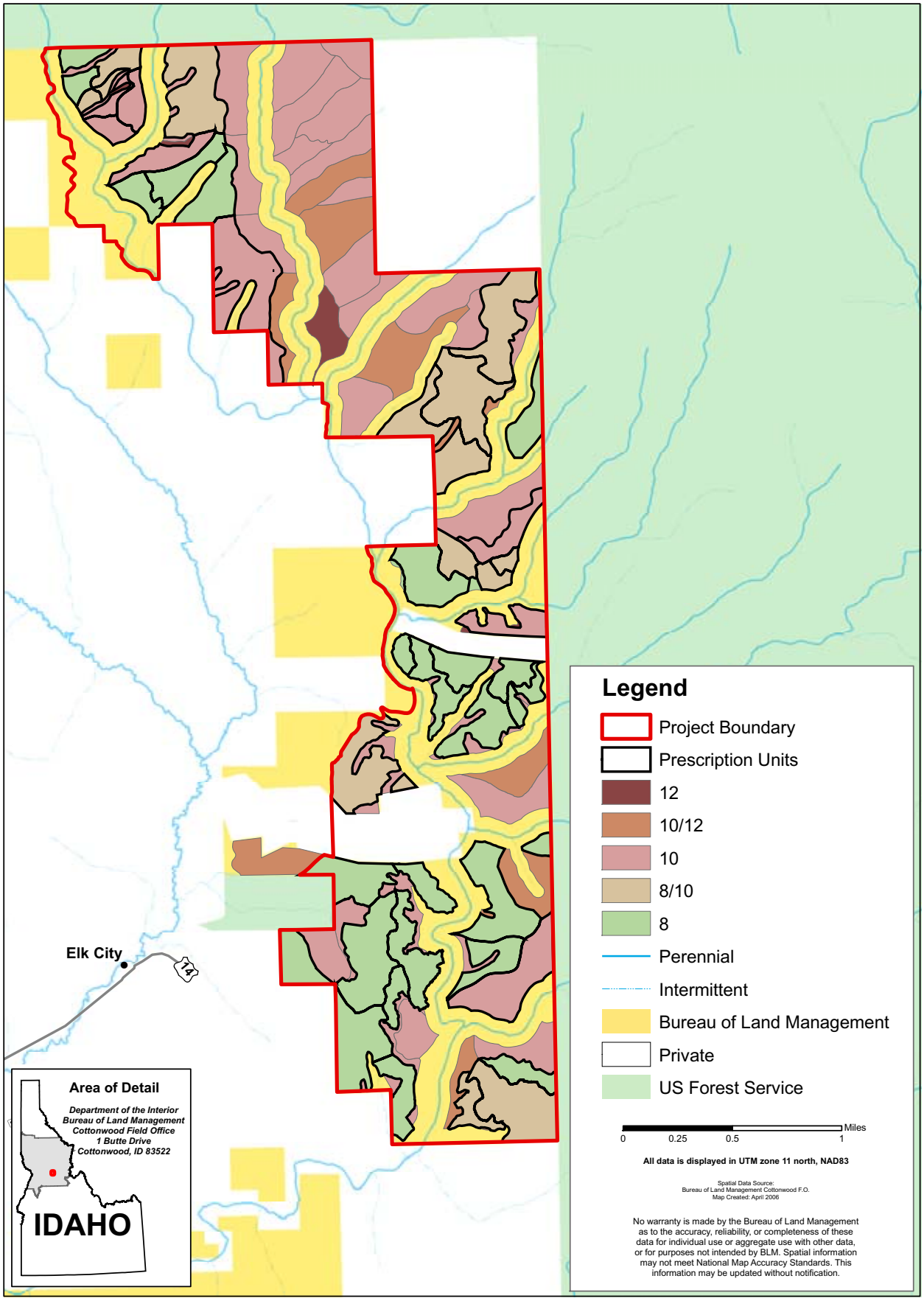
Map 12

Eastside Project Area Predicted Fuel Model for Year 2015 Without Treatment



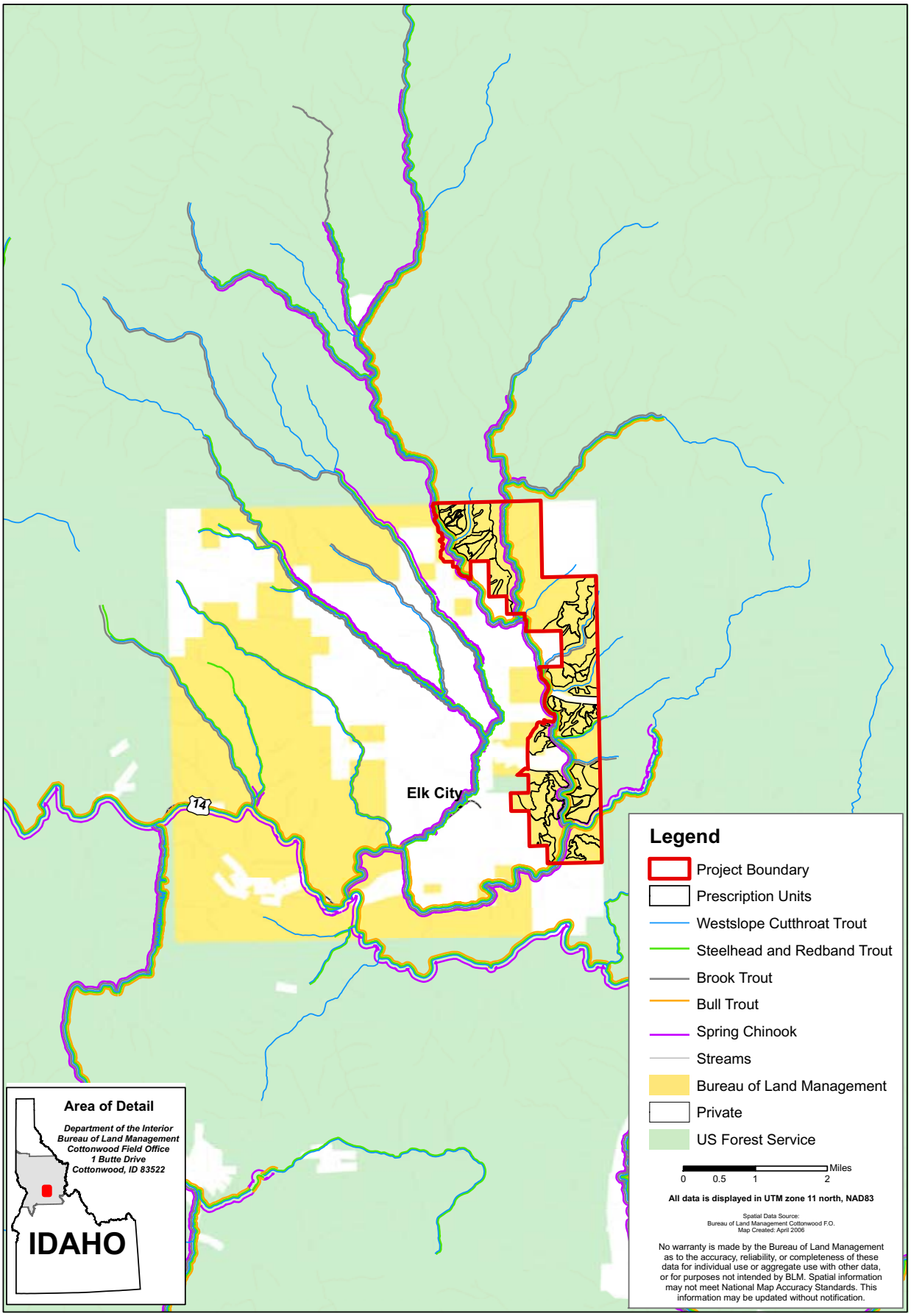
Eastside Project Area
Predicted Fuel Model for Year 2015 With Treatment

Map 13



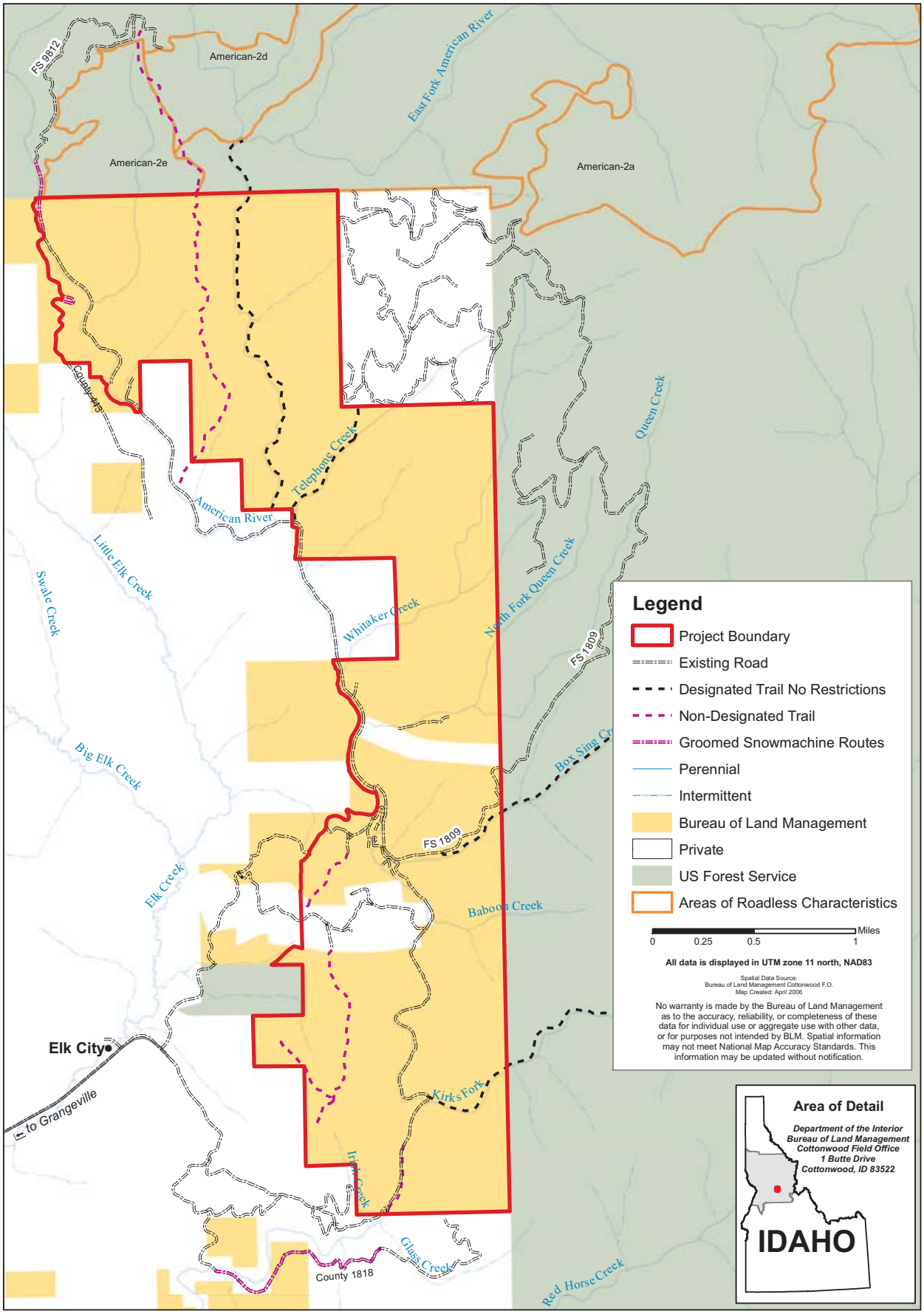
Map 14

EASTSIDE PROJECT AREA
Fish Distribution



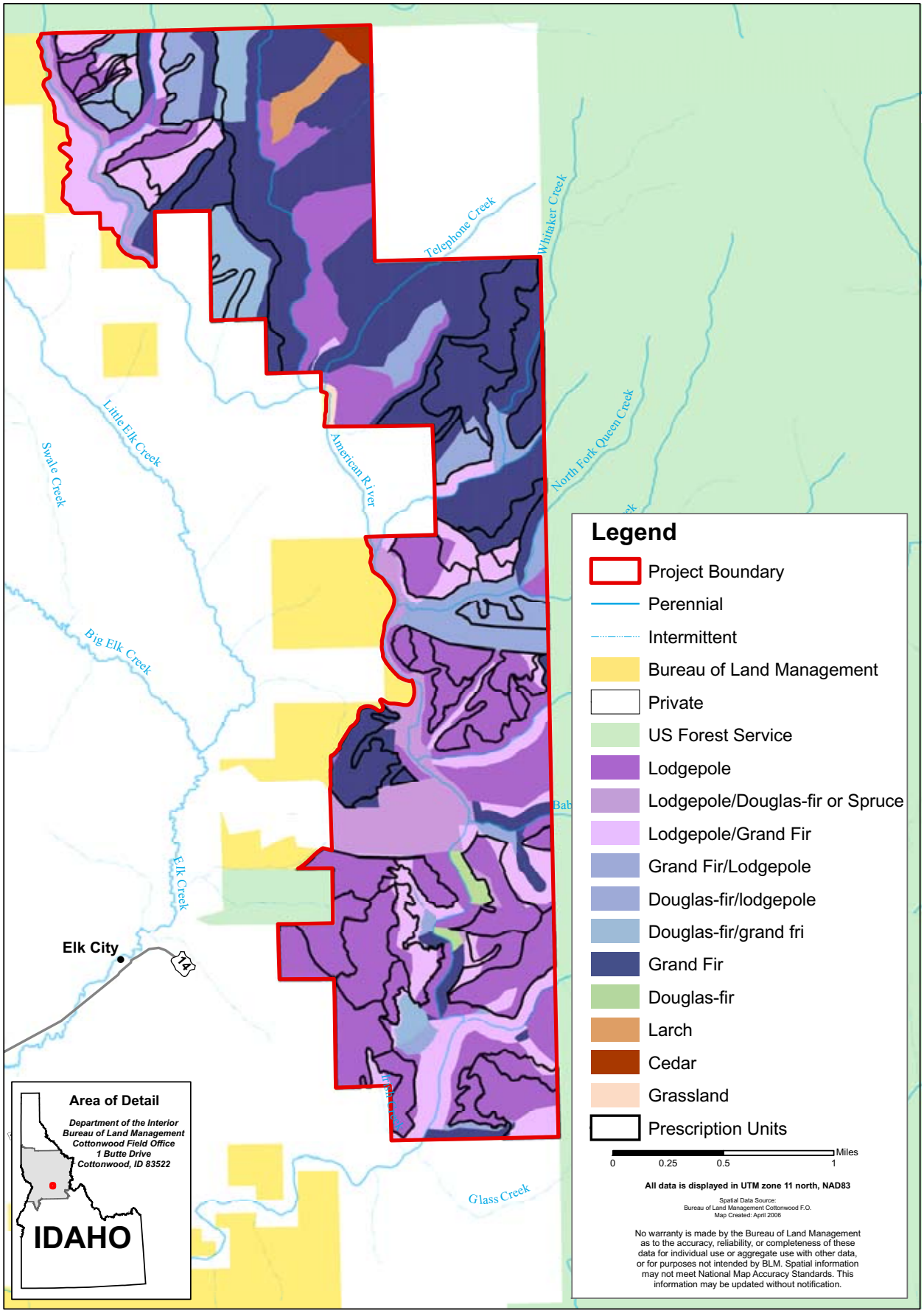
Map 15

EASTSIDE PROJECT AREA
Road and Trail Network



EASTSIDE PROJECT AREA
Vegetation Composition

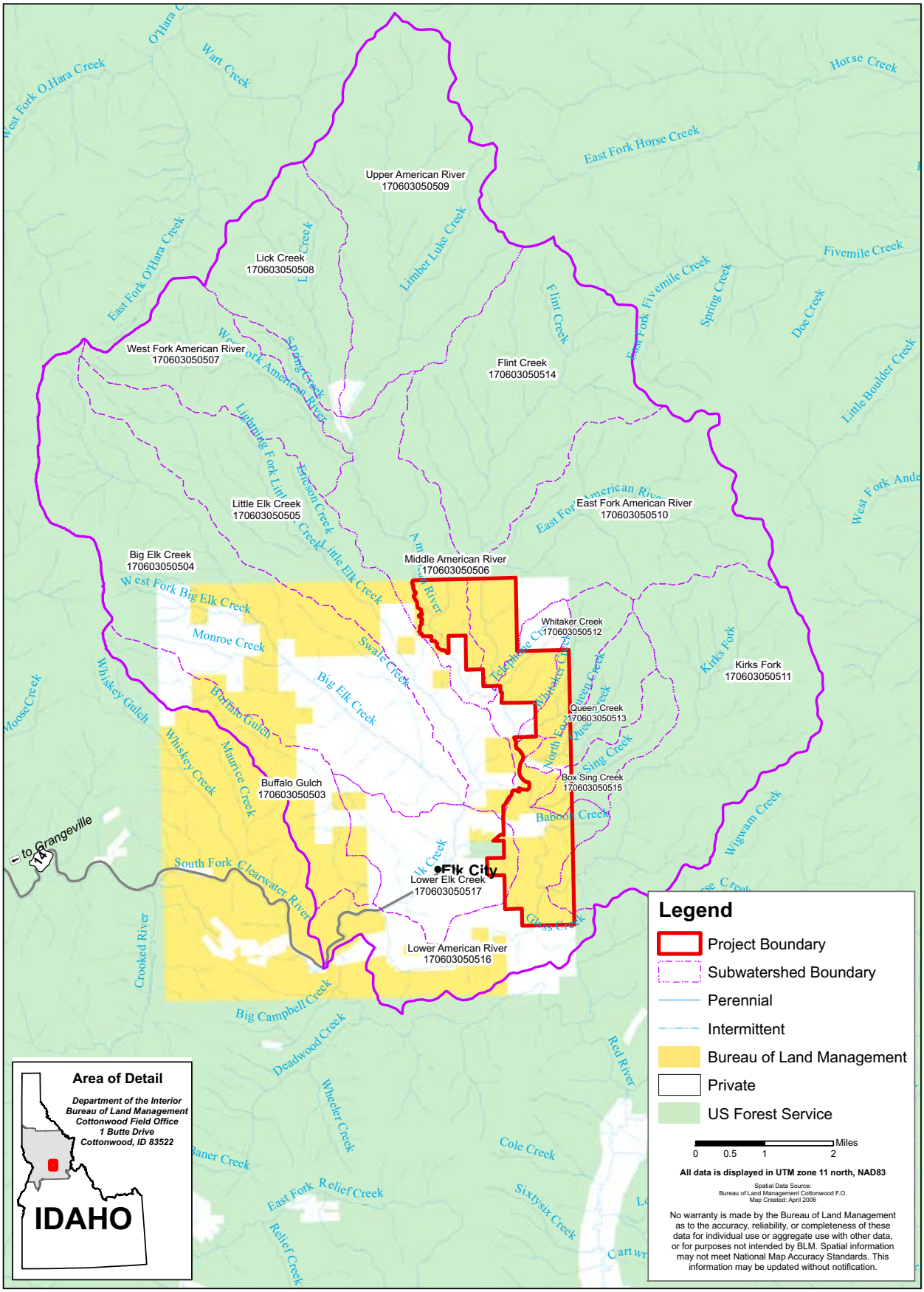
Map 16



EASTSIDE PROJECT AREA

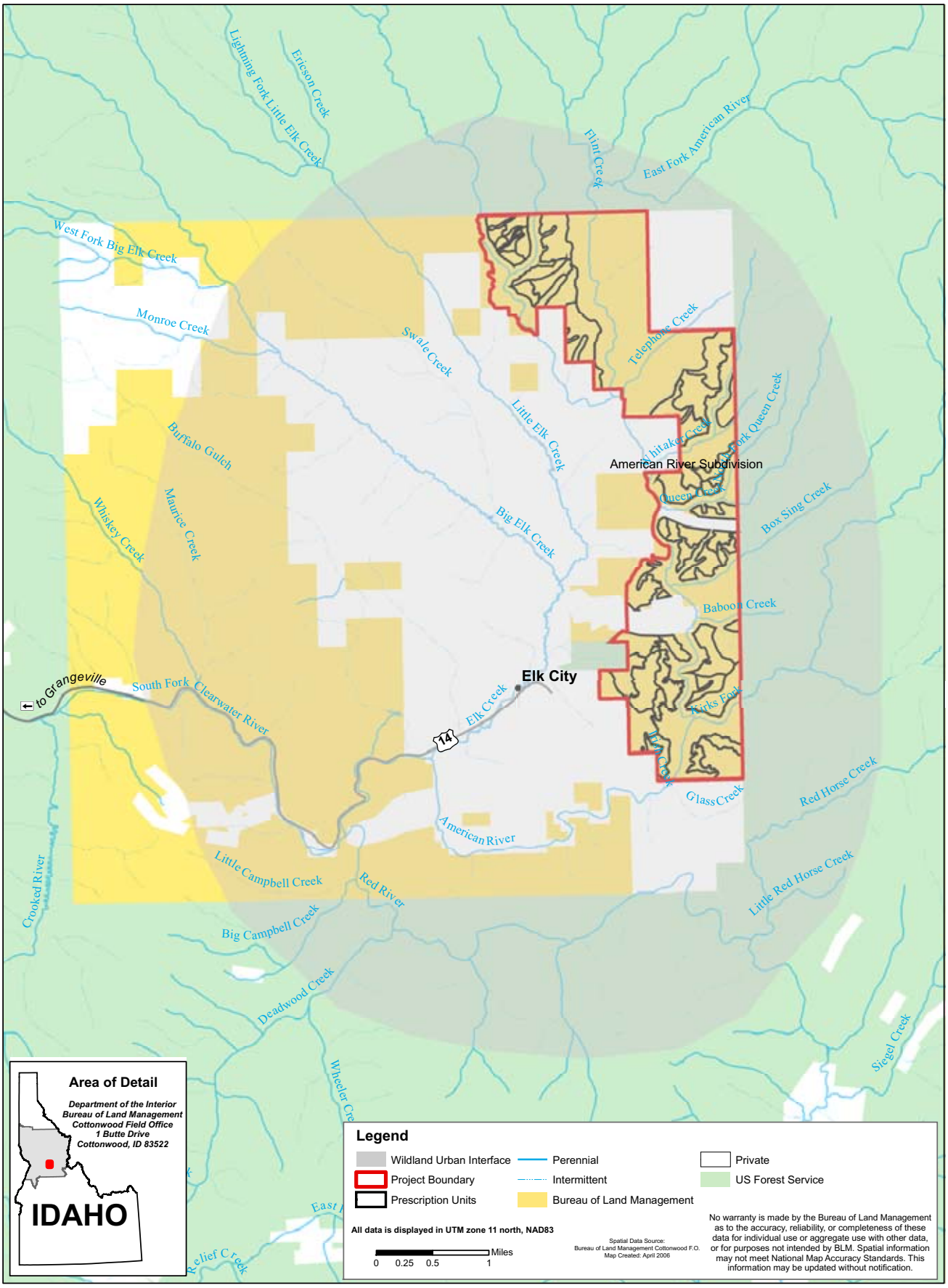
American River Watershed
Elk City Township and
Stream Network

Map 17



EASTSIDE PROJECT AREA
Wildland Urban Interface

Map 18



Appendix B – Glossary

Term	Definition
Abiotic	Non-living. Climate is an abiotic component of ecosystems.
Active Nest	A nest with an adult pair present at least one year within a period of five consecutive years.
ADA	American with Disabilities Act
Affected environment	The natural environment that exists at the present time in an area being analyzed. The environment of the area to be affected or created by the alternatives under consideration.
Age class	An age grouping of trees of according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1–20 years or 21–40 years.
Air Quality	Refers to air standards for various classes of air as designated by the Clean Air Act, P.L. 88-206: Jan. 1978. Airshed Basic geographic units in which air quality is managed.
Airshed	A geographic area that shares the same air.
Alternative	A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision.
Alternative, No Action	An alternative that maintains current established trends or management direction.
Ammocoetes	The larval form (ammocoete) of Pacific lamprey. The ammocoete generally spends 4- 7 years burrowed in the stream substrate prior to undergoing a physiological process which prepares the juvenile (macrothalmia) for migration and adaptation to salt water.
Anadromous Fish	Fish that migrate from salt water seas up fresh water streams to reproduce.
Animal Unit Month (AUM)	The quantity of forage required by one mature cow and her calf (or the equivalent, in sheep or horses, for instance) for one month.
Apparent Naturalness	Roadless area characteristic defined as an indicator of whether an area appears natural to most people who are using the area. It is a measure of importance of visitors' perception of human impacts to the area. There may be some human impact, but it would not be obvious to the casual observer and the area would have the appearance of being affected only by the forces of nature.
AQMP	Air Quality Management Plan
AQRVs	Air Quality Related Values

Term	Definition
Aquatic Ecosystem	A stream channel, lake or estuary bed, the water itself, and the biotic communities that occur therein.
Aspect	The direction a slope faces. A hillside facing east has an eastern aspect.
ATV	All terrain vehicles such as motorcycles, 4-wheelers, and snowmobiles.
Authorized Officer	The Bureau of Land Management employee delegated Officer given the authority to perform a duty described in these rules. A Regional Forester, Forest Supervisor, District Ranger depending on the scope and level of the duty to be performed.
Avoided	Preventing a potential adverse effect from occurring to a cultural resource by the partial or complete redesign or relocation of a proposed land use.
Background Viewing Area	A landscape viewing area visible to a viewer from approximately three to five miles to infinity.
BACT	Best Available Control Technology
Bark beetle	An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs. Bark beetles are important killers of forest trees.
Basal area (BA)	The area of the cross section of a tree trunk near its base, usually 4½ feet above the ground. Basal area is a way to measure how much of a site is occupied by trees. The term basal area is often used to describe the collective basal area of trees per acre.
Best Available Science	The Responsible Official has considered the best available science, also considering public input, competing use demands, budget projections, and other factors. Consideration of science has included: Surveying a wide range of available scientific information, including both published material, historical data, and agency surveys and reports to develop a comprehensive basis for analysis of important issues. Using best available data and models at appropriate scales, on the basis of internal review and consultation. Evaluating and disclosing limitations of data and models. Evaluating and disclosing substantial risks associated with project actions based on that science, and identifying the ecosystem components at risk. Considering and disclosing uncertainties and opposing viewpoints in scientific literature pertinent to project development and effects analysis. Independent peer review and other appropriate review to evaluate the application of science. These considerations are adapted from proposed Forest Planning Rule 219.11: Consideration of science in planning; Federal Register Volume 59, No. 126: Notice of interagency cooperative policy on information standards under the Endangered Species Act; Final ESA Consultation Handbook, March 1998, pages 1–6 on best available scientific and commercial data; and relevant court decisions. Each consideration is discussed in the individual resource analysis to the degree the issues merit.

Term	Definition
Best Management Practices (BMPs)	The set of management practices that, when applied during implementation of a project, ensures that water-related beneficial uses are protected and that state water quality standards are met.
Big Game	Those species of large mammals normally managed as a sport hunting resource.
Biodiversity	The variety of life in an area, including the variety of genes, species, plant, and animal communities, and ecosystems, as well as the interactions of these elements.
Biological Assessment (BA)	A stand alone document that reviews all BLM planned, funded, executed, or permitted programs and activities for possible effects on federally listed threatened, endangered, proposed, and candidate species as identified for the cumulative effects area in coordination with the USFWS. A Biological Assessment is used to satisfy consultation requirements with the USFWS for projects requiring an Environmental Impact Statement. (Reference: Sec. 7, ESA; 50 CFR, 402.12, 1508.7, 1508.25, and 1508.27.) The Biological Assessment displays the Determination of Effects for the DEIS or FEIS preferred alternative. The Determination of Effects (Salwasser, et al. Aug. 17, 1995) is limited to: (1) No Effect; (2) May effect–Not likely to adversely affect (NLAA); (3) *May effect–Likely to adversely affect (LAA); and (4) Beneficial effect. * = Considered a trigger for a significant action.
Biological Evaluation (BE)	Documentation on BLM sensitive species (animal and plant) contained within an EIS. Documentation includes a review of BLM sensitive species present, their habitat, and addresses and identifies the Determination of Effects on these species. The USFWS review of the biological evaluation is addressed through public scoping and conducted in conjunction with overall agency review of the DEIS. Reference FSM 2673.4 Biological Evaluations for Sensitive Species. Opinions in the determination of impacts to sensitive species (Salwasser, et al. Aug. 17,1995) are limited to: (1) NI = No impact; (2) MIIH = 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; (3) *WIFV = Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population of species; and (4) BI = Beneficial impact. * = Trigger for a significant action as defined in NEPA.
Biological Opinion	An official report by the US Fish and Wildlife Service (FWS) issued in response to a formal Forest Service request for consultation or conference. It states whether an action is likely to result in jeopardy to a species or adverse modification to its critical habitat.
Biomass	The total weight of all living organisms in a biological community.

Term	Definition
Biota	Living. Green plants and soil micro-organisms are biotic components of ecosystems
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
Board foot	A measurement term for lumber or timber. It is the amount of wood contained in an unfinished board 1-inch thick, 12 inches long, and 12 inches wide.
Broadcast burn	A prescribed fire that burns a designated area. These controlled fires can reduce wildfire hazards, improve forage for wildlife and livestock, or encourage successful regeneration of trees.
Buffer	A land area that is designated to block or absorb unwanted impacts to the area beyond the buffer. Buffer strips along a trail could block views that may be undesirable. Buffers may be set-aside next to wildlife habitat to reduce abrupt change to the habitat.
Bureau of Land Management (BLM)	The Department of Interior agency responsible for managing most federal government subsurface minerals.
CAA	Clean Air Act
Cable logging	Logging that involves the transport of logs from stump to collection points by means of suspended steel cables, a tower, and powered winch.
Canopy	The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.
Capability	The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.
Cavity	A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Classified Road	Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including state roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.
Clean Water Act	The Clean Water Act is the primary federal law that protects our nation's waters, including lakes, rivers, aquifers, and coastal areas.

Term	Definition
Clear cut	A harvest in which all or almost all of the trees are removed in one cutting.
Climax	The culminating stage in plant succession for a given site. Climax vegetation is stable and self-reproducing.
Closure	The administrative order that does not allow specified users in designated areas or on BLM or Forest development roads or trails.
Code of Federal Regulation (CFR)	Regulations developed at the Department level for the specific implementation of a Public Law.
Commercial Thin	A cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or to recover potential mortality, while removing a commercial product.
Composite Watershed	Watersheds that are not a single complete drainage. Current terminology refers to them as composite watersheds.
Composition	What an ecosystem is composed of. Composition could include water, minerals, trees, snags, wildlife, soil, micro-organisms, and certain plant species.
Conifer	A tree that produces cones, such as a pine, spruce, or fir tree
Connected Actions	A connected action is one type of action considered in determining the scope of the Proposed Action. Connected actions are actions that closely relate and therefore should be discussed in the same EIS (40 CFR 1508.29(i)(ii)(iii)). Actions are connected if they: (i) Automatically trigger other actions that may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of larger actions and depend on the larger action for their justification.
Connectivity	Condition in which the spatial arrangements of land cover types allows organisms and ecological processes (such as disturbance) to move across the landscape. Connectivity is the opposite of fragmentation.
Connectivity (of habitats)	The linkage of similar but separated vegetation stands by patches, corridors, or “stepping stones” of like vegetation. This term can also refer to the degree to which similar habitats are linked.
Consumptive use	Use of resources that reduces the supply, such as logging and mining
Contour	A line drawn on a map connecting points of the same elevation.
Contrast	The effect of a striking difference in the form, line, color, or texture of an area being viewed.
Corridor	Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows were wildlife feed.

Term	Definition
Cost	The negative or adverse effects of expenditures resulting from an action. Costs may be monetary, social, physical, or environmental in nature.
Council on Environmental Quality (CEQ)	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.
County Road	A road under the jurisdiction of the county.
Cover	Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders, or undercut stream banks. Animals use cover to escape from predators rest, or feed.
Cover type (forest cover type)	Stands of particular vegetation types that are composed of similar species.
Created opening	An opening in the forest cover created by the application of even-aged silvicultural practices.
Critical Habitat	Specific areas within the geographical area occupied by the species on which are found those physical and biological features (1) essential to the conservation of the species, and (2) that may require special management considerations or protection. Critical habitat shall not include the entire geographic area that can be occupied by the threatened and/or endangered species.
Crown	The part of a tree or woody plant bearing live branches and foliage. Dominant–Trees with crowns extending above the general level of the main canopy of even-aged groups of trees, and receiving full light from above and partly from the sides. Co-dominant–Trees with crowns forming the general level of the main canopy in even-aged groups of trees, receiving full light from above and comparatively little from the sides. Intermediate–Trees with crowns extending into the lower portion of the main canopy of even-aged groups of trees, but shorter in height than the co-dominants. They receive little direct light from above and none from the sides. Overtopped (Suppressed)–Trees of varying levels of vigor that have their crowns completely covered by the crowns of one or more neighboring trees.
Cultural resource	A definite location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups.
Cumulative effects	Effects on the environment that result from separate, individual actions that, collectively, become significant over time.

Term	Definition
Cumulative Effects Analysis	An analysis of the effects of the environment that results from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal), or person undertakes such other actions.
Cumulative Impact	The impact on the environment that 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.
CWA	Clean Water Act
CWE	Cumulative Watershed Effects
dbh	Diameter at Breast Height: The diameter of a tree 4½ feet above the ground on the uphill side of the tree.
DEIS	Draft Environmental Impact Statement–The draft version of the Environmental Impact Statement that is released to the public and other agencies for review and comment.
Desired future condition	Land or resource conditions that are expected to result if goals and objectives are fully achieved.
Developed Recreation	Recreation that occurs where improvements have been added to enhance recreation opportunities and accommodate intensive recreation activities in a defined area.
Diameter of Breast Height	The standard method for measuring tree diameter at 4½ feet from the ground. Also known as dbh.
Direct Effects	Effects on the environment that occur at the same time and place as the initial cause or action.
Dispersed recreation	Recreation that does not occur in a developed recreation site, such as hunting, backpacking, and scenic driving.
Displacement	As applied to wildlife, forced shifts in the patterns of wildlife use, either in location or timing of use.
Disturbance	Any event, such as forest fire or insect infestations that alter the structure, composition, or functions of an ecosystem.
Diversity	(1) The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area. (2) The distribution and abundance of different plant and animal communities and species within the area covered by a Land and Resource Management Plan.
Draft Environmental Impact Statement	(DEIS) A detailed written statement as required by Sec. 102 (2)(C) of the National Environmental Policy Act (NEPA).

Term	Definition
Duration	The length of time management activity and its impacts will be taking place.
EA	Environmental Assessment
EC	Existing Conditions
ECA	Equivalent Clearcut Area
Ecology	The interrelationships of living things to one another and to their environment, or the study of these interrelationships.
Ecosystem	An arrangement of living and non-living things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are tow of the forces that act within ecosystems.
Ecosystem management	An ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values.
Ecosystem Structure	The physical arrangement of the various components. In addition, trophic (nourishing) structure; measured in standing crop or energy fixed per unit area per unit time. May be pyramids of numbers, biomass, or energy flows.
Edge	The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand, or a ponderosa pine stand next to an aspen stand.
Effects *(also see Impacts)*	Physical, biological, social, and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect, and cumulative and may be either beneficial or detrimental. (See *Impacts*)
EIS	Environmental Impact Statement (under NEPA)
Endangered species	A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.
Endemic	Restricted to a specified region or locality.
Endemic plant/organism	A plant or animal that occurs naturally in a certain region and whose distribution is relatively limited geographically.
Enhancement	A short-term visual resource management objective aimed at increasing positive visual variety where little variety now exists.
Environmental Analysis	An analysis of alternatives actions and their predictable short- and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions. Completion of this level of analysis may result in a Decision Notice (DN) and Finding of No Significant Impact (FONSI).

Term	Definition
Environmental Assessment (EA)	A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.
Environmental Impact Statement (EIS)	A formal public document prepared to analyze and disclose the impacts on the environment of the proposed project or action and alternatives.
Environmental Justice	When environmental effects do not disproportionately affect minority or low-income communities.
EO	Executive Order
EPA	U.S. Environmental Protection Agency
Ephemeral Stream	A stream that flows only in direct response to precipitation and whose channel is at all times above the water table.
Equivalent Clearcut Area	The total area in a watershed that does or would exist in a clearcut condition.
Erosion	(1) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. (2) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity.
Erosion Hazard	The probability of soil loss resulting from complete removal of vegetation and litter. It is an interpretation based on potential soil loss in relation to tolerance values.
ESA	Endangered Species Act
Even-aged	A stand of trees that originated at a single point in time, so that the individual trees are approximately the same age or a regeneration system designed to produce such a stand.
Even-aged management	Timber management actions that result in the creation of stands of trees in which the trees are essentially the same age.
Executive Orders 11990 and 11988	The purpose of these executive orders is to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and floodplains.
Existing Old Growth	Individual stands on a national forest currently recognized as meeting the parameters of the old-growth operational definitions.
Exotic	Foreign, not native.
Fauna	The animal life of an area.
FEIS	Final Environmental Impact Statement
FEIS Database	See *Fire Effects Information System*

Term	Definition
Felling	Cutting down trees.
Final cut	The removal of the last seed bearers or shelter trees after regeneration of new trees has been established in a stand being managed under the shelterwood or seedtree system of silviculture.
Final Environmental Impact Statement (FEIS)	The final version of the public document required by NEPA.
Fire Effects Information System (FEIS)	FEIS provides up-to-date information about fire effects on plants and animals. It was developed at the United States Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory in Missoula, Montana. The FEIS database contains literature reviews, taken from current English-language literature of almost 900 plant species, about 100 animal species, and 16 Kuchler plant communities found on the North American continent. The emphasis of each review is fire and how it affects each species. Background information on taxonomy, distribution, basic biology, and ecology of each species is also included. Reviews are thoroughly documented, and each contains a complete bibliography. Managers from several land management agencies (United States Department of Agriculture, Forest Service, and United States Department of Interior, Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service) identified the species to be included in the database. Those agencies funded the original work and continue to support maintenance and updating of the database. FEIS staff accessions current English-language literature for FEIS literature reviews by searching scientific abstracts including Agricola, Current Contents, Current Titles in Wildland Fire, Ecodisc, Ecological Abstracts, Forestry Abstracts, Georef, and Water Resources Abstracts. Tables of Content from reefed scientific journals and government publication lists are also regularly searched for pertinent literature.
Fire Intensity	A fire's characteristics, or fire intensity, include flame length, rate of spread, amount and location of torching, distance a fire spots, and energy produced. This is the result of the interaction of the physical setting (composed of aspect, slope, drainage location and direction, and topographic position), weather, as well as vegetative structure, which can include homes.
Fire regime	The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire.
Fire severity ratings	Low Fire Severity: Low soil heating, or light ground char, occurs where litter is scorched, charred, or consumed, but the duff is left largely intact, although it can be charred on the surface. Woody debris accumulation are partially consumed or charred. Mineral soil is not changed. Fire severity

Term	Definition
	in forest ecosystems is low if the litter and duff layers are scorched or not altered over the entire depth. The surface is mostly black in a shrubland or grassland ecosystem, although gray ash can be present for a short time. Soil temperatures at 1 cm are less than 50 C. Lethal temperatures for soil organisms occur down to depths of about 1 cm. Moderate Fire Severity: Moderate soil heating, or moderate ground char, occurs where the litter on forest sites is consumed and the duff is deeply charred or consumed, but the underlying mineral soil surface is not visibly altered. Light colored ash is present. Woody debris is mostly consumed, except for logs, which are deeply charred. On shrubland or grassland sites, gray or white ash is present and char can be visible in the upper 1 cm of mineral soil, but the soil is not altered. Soil temperatures at the 1 cm depth can reach 100 to 200 C. Lethal temperatures for soil organisms occur down to depths of 3–5 cm. High Fire Severity: High soil heating, or deep ground char, occurs, where the duff is completely consumed and the top of the mineral soils is visibly reddish or orange on severely burned sites. Color of the soil below 1 cm is darker or charred form organic material. The char layer can extend to a depth of 10 cm or more. Logs can be consumed or deeply charred, and deep ground char can occur under slash concentrations or burned out logs. Soil texture in the surface layers is changed and fusion evidenced by clinkers can be observed locally. All shrub stems are consumed and only the charred remains of large stubs may be visible. Soil temperatures at 1 cm are greater than 250 C. Lethal temperatures for soil organisms occur down to depths of 9–16 cm. (Debano et al., 1998)
FISHSED	Guide for Predicting Salmonid Response to Sediment Yields, commonly referred as FISHSED model.
Fisheries	Resident and anadromous fish species.
Fisheries habitat	Streams, lakes, and reservoirs that support fish, or have the potential to support fish.
Flood plain	Lowland adjoining a watercourse. At a minimum, the area is subject to a 1% or greater chance of flooding in a given year.
Flora	The plant life of an area.
Forage	All browse and non-woody plants that are eaten by wildlife and livestock.
Forb	A broadleaf plant that has little or no woody material in it.
Foreground	One of the distance zones of a landscape being viewed. A distance that details can be perceived, normally within one quarter to one-half mile of the viewer. Must be determined on a case-by-case basis.
Forest	An area of trees with overlapping crowns (generally forming a 60 to 100 percent cover).
Forest cover type	See *Cover type*.

Term	Definition
Forest health	A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and the capacity of the rest to provide a sustaining flow of goods and services for people.
Forest land	Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use. Lands developed for non-forest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road clearing and powerline clearing of any width.
Forest Plan	A comprehensive management plan prepared under the National Forest Management Act of 1976 that provides standards and guidelines for management activities on the Forest.
Forest Service (FS)	The agency of the United States Department of Agriculture responsible for managing National Forests and Grasslands.
Forest Supervisor	The official responsible for administering National Forest lands on an administrative unit, usually one or more National Forests. The Forest Supervisor reports to the Regional Forester.
Form	The mass of an object or objects that appears visually unified.
Formation	A body of rock identified by lithic (stone) characteristics and stratigraphic (rock strata) position; it is prevailingly, but not necessarily tabular, and is mapable at the earth's surface or traceable in the subsurface.
FP	Forest Plan
Fragmentation	The splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat. Habitat can be fragmented naturally or from forest management activities, such as clearcut logging.
Fuel Model	Fuel models are sets of parameters that describe physical fuel properties, including fuel loading, fuel bed depth, and moisture of extinction. Each fuel model is typically used to represent a range of conditions in which fire behavior may be expected to respond similarly to changes in fuel moisture, wind, and slope. Fuel models are used as input in fire behavior prediction models.
Fuelbreak	A linear corridor in which vegetation is modified to prevent fires from easily crossing.
Fuels	Plants and woody vegetation, both living and dead, that are capable of burning.
Fuels management	The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildlife in the area would be explosive and impossible to control.
Fuelwood	Wood cut into short lengths for burning.

Term	Definition
Function	All the processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle.
FWS	U.S. Fish & Wildlife Service
Game species	Any species of wildlife or fish for which seasons and bag limits have been prescribed under state or federal laws, codes, and regulations, and that are normally harvested by hunting, trapping, and fishing.
Geology	The study of the planet Earth. It is concerned with the origin of the planet, the material and morphology of the Earth, and its history and the processes that acted (and act) upon it to affect its historic and present forms.
Geomorphic processes	Processes that change the form of the earth, such as volcanic activity, running water, and glacial action.
GIS (geographic information systems)	GIS is both a database designed to handle geographic data as well as a set of computer operations that can be used to analyze the data. In a sense, GIS can be thought of as a higher order map.
Goal	A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.
Ground fire	A fire that burns along the forest floor and does not affect trees with thick bark or high crowns.
Ground water	The supply of fresh water under the earth's surface in an aquifer or in the soil.
Group selection	A method of tree harvest in which trees are removed periodically in small groups. This silvicultural treatment results in small openings that form mosaics of age class groups in the forest.
Guilds	A group of organisms that share a common food resource.
Habitat	The physical and biological environment for a plant or animal in which all the essentials for its development, existence, and reproduction are present.
Habitat capability	The ability of a land area or plant community to support a given species of wildlife.
Habitat Management Plan	A BLM activity plan (HMP) for wildlife, fisheries, or ecological resources. The plan identifies purpose and need, objectives, management actions, and monitoring strategy.
Habitat type	A way to classify land area. A habitat type can support certain climax vegetation, both tree and undergrowth species. The habitat type can indicate the biological potential of a site.

Term	Definition
Habitat Type Group	An aggregation of habitat types with similar interpretative properties.
Heterogeneity	Dissimilar elements and non-uniform.
Hiding cover	Vegetation capable of hiding 90 percent of an adult elk or deer from human view at a distance of 200 feet or less.
High fire severity	See *Fire severity ratings*
HUC	Hydrologic Unit Code. See Hydrologic Unit
Human Environment	The factors that include, but are not limited to biological, physical, social, economic, cultural, and aesthetic factors that interrelate to form the environment.
Hydrologic Unit	A hierarchical coding system developed by the U.S. Geological Service to map geographic boundaries of watersheds of different sizes.
Hydrology	The science dealing with the study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.
ID	Interdisciplinary
Impact (also see *Effects*)	Physical, biological, social, and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect, and cumulative and may be either beneficial or detrimental.
IMPLAN Pro	An economic input / output model.
Indicator Species	A species of animal or plant whose presence is a fairly certain indication of a particular set of environmental conditions. Indicator species serve to show the effects of development actions on the environment.
Indirect Effects	Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
Instream flow	The quantity of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the National Forests, including, but not limited to fisheries, visual quality, and recreational opportunities.
Integrated pest management	A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective

Term	Definition
	use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.
Interdisciplinary team	A team of individuals with skills from different disciplines that focuses on the same task or project.
Intermittent stream	A stream that flows only at certain times of the year when it receives water from streams or from some surface source, such as melting snow.
Inventoried Roadless Area (IRA)	Unroaded areas typically 5000 acres or more that meet criteria for wilderness consideration under the Wilderness Act and that were inventoried during the Forest Service's Roadless Area and Review and Evaluation (RARE II) process, subsequent assessments, or forest planning.
Invertebrate	An animal lacking a spinal column.
IRA	Inventoried Roadless Area
Irregular Shelterwood	An irregular shelterwood system consists of individual leave-trees or small groups distributed throughout the stand, interspersed with small openings such that the adjacent trees provide shelter for various resource needs. The key characteristic of the irregular shelterwood is that, although prompt regeneration is an objective, residual trees are left for long periods beyond the regeneration phase (e.g., from 20% of the rotation to several rotations). Residual trees initiate new age classes of regeneration, accumulate wood volume increment and, if desired, achieve non-timber stand objectives.
Irretrievable	One of the categories of impacts mentioned in the National Environmental Policy Act to be included in statements of environmental impacts. An irretrievable effect applies to losses of production or commitment of renewable natural resources.
Irretrievable Effect	An irretrievable effect is one that is sustained for a certain period of time but is reversible.
Irreversible	A category of impacts mentioned in statements of environmental impacts that applies to nonrenewable resources, such as minerals and archaeological sites. Irreversible effects can also refer to effects of actions that can be renewed only after a very long period of time, such as the loss of soil productivity.
Irreversible Effects	An irreversible effect is one that cannot be reversed.
Issue	A public or agency concern or controversy about a specific action or area that is addressed in the NEPA process.
km	Kilometer
Ladder fuels	Vegetation located below the crown level of forest trees that can carry fire from the forest floor to tree crowns. Ladder fuels may be low growing tree branches, shrubs, or smaller trees.

Term	Definition
Landing	Any place where cut timber is assembled for further transport from the timber sale area.
Late Seral (successional) Stage	The stage of forest development during which the age of trees is usually greater than 80 years depending on the composition of tree species. Small gaps become more common as some trees die allowing full sunlight to reach the mid- and under stories. This stage contains the largest trees within a forest and provides the highest capability for large snags, large live cavities, and den tree production. The presence of large, downed, woody material is highest during this period. Old-growth forests occur during the later periods of the seral stage.
Litter (forest litter)	The freshly fallen or only slightly decomposed plant material on the forest floor. This layer in includes foliage, bark fragments, twigs, flowers, and fruit.
Logging slash	The residue left on the ground after timber cutting. It includes unutilized logs, uprooted stumps, broken branches, bark, and leaves. Certain amounts of slash provide important ecosystem roles, such as soil protection, nutrient cycling, and wildlife habitat.
Low fire severity	See *Fire severity ratings*
LRMP	Land & Resource Management Plan
M	Thousand. Five thousand board feet of timber can be expressed as 5M board feet.
Management action	Any activity undertaken as part of the administration of BLM land
Management Area	An aggregation of capability areas that have common management direction under the MFP and may be noncontiguous in BLM land. Consists of a grouping of capability areas selected through evaluation procedures and used to locate decisions and resolve issues and concerns.
Management Direction	A statement of multiple-use and other goals and objectives, the associated management practices identified by the BLM in the planning process.
Management practice	A specific activity, measure, course of action, or treatment.
Mass movement/wasting	The down-slope movement of large masses of earth material by the force of gravity. Also called a landslide.
Matrix	The least fragmented, most continuous pattern element of a landscape; the vegetation type that is most continuous over a landscape.
Mature timber	Trees that have attained full development, especially height, and are in full seed production.
MBF	Thousand Board Feet
MCF	thousand cubic feet
Mesic	Pertaining to or adapted to an area that has a balanced supply of water; neither wet nor dry.

Term	Definition
MFP	Management Framework Plan–this document guides the management of a particular BLM administrative area and establishes management standards and guidelines for all lands of that area.
Microclimate	The climate of a small site. It may differ from the climate at large of the area due to aspect, tree cover (or the absence of tree cover), or exposure to winds.
Mid Seral (successional) Stage	The stage of forest development during which distinct over story, mid story, and under story canopies are present. The age of trees range from about 20 years to about 90 years depending on the composition of tree species. The trees are usually greater than 10 inches in dbh. This stage provides capability for hard mast production, large standing snags, and live cavities. During this period, tree species reach economic maturity.
Mineral soil	Soil that consists mainly of inorganic material, such as weathered rock, rather than organic matter.
Mitigation	Actions taken to avoid, minimize, or rectify the impact of a land management practice.
MM	Million
MMBF	Million Board Feet
Moderate fire severity	See *Fire severity ratings*
Modification	Fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Therefore, a modification may include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive criteria apply.
Monitoring	To watch, observe, or check, especially for a specific purpose, such as to keep track of, regulate, or control (Webster's dictionary).
Monitoring and evaluation	The periodic evaluation of forest management activities to determine how well objectives were met and how management practices should be adjusted.
Montane	Relating to the zone of relatively moist, cool, upland slopes characterized by the presence of large evergreen trees as a dominant life form.
Mortality	Trees that were merchantable and have died within a specified period of time. The term mortality can also refer to the rate of death of a species in a given population or community.
Mosaic	Areas with a variety of plant communities over a landscape, such as areas with trees and areas without trees occurring over a landscape.
MOU	Memorandum of Understanding

Term	Definition
Mountain pine beetle	A tiny black insect, ranging from 1/8 to ¾ inch in size, which bores through a pine tree's bark. It stops the tree's intake and transport of the food and nutrients it must have to stay alive, thus killing the tree.
NAAQS	National Ambient Air Quality Standards
National Environmental Policy Act of 1969 (NEPA)	An act which encourages productive and enjoyable harmony between man and his environments; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality.
National Forest Management Act (NFMA)	A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest plans and the preparation of regulations to guide that development.
National Forest System (NFS)	All National Forest System lands reserved or withdrawn from the public domain of the United States; all National Forest System lands acquired through purchase, exchange, donation, or other means, and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system (16 U.S.C. 1609).
National Forest System Road (NFSR)	A Forest road under jurisdiction of the Forest Service.
National Park Service	The agency of the U.S. Department of the Interior responsible for the administration of national Parks, Monuments, and Historic Sites. It is distinct form the USDA Forest Service both administratively and by mission.
National Register of Historic Places (NRHP)	The National Register lists cultural properties found to qualify for inclusion because of their local, state, or national significance. The National Register of Historic Places is maintained by the Secretary of the Interior.
Native Species	All animal and plant species originally occurring in the area.
Natural disturbance	See *Disturbance*.
Natural Integrity	Roadless area characteristic defined as the extent to which long-term ecological processes are intact and operating. Impacts to natural integrity are measured by the presence and magnitude of human-induced change to an area. This change includes physical developments as well as activity in the area.
Natural range of variability	See *Range of variability*.

Term	Definition
Natural resource	A feature of the natural environment that is of value in serving human needs.
NEPA	National Environmental Policy Act
New Road Construction	Investment in construction of a road to provide access that adds new miles of road to the transportation system.
NEZSED	A predictive computerized model that estimates cumulative sediment production from road construction, fire, and timber harvest activities in forested watersheds.
NFMA	National Forest Management Act–this law was passed in 1976 and requires the preparation of Regional Guides and Forest Plans.
NFMP	National Forest Management Plan
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NNL	National Natural Landmark
No Action Alternative	The management direction, activities, outputs, and effects that are likely to exist in the future if the current trends and management would continue unchanged. Under NEPA, it means following the current approved MFP management direction and guidance.
No Adverse Effect	Undertaking is modified, conditions are imposed, or data recovered such that the characteristics of a cultural property that may qualify it for the National Register of Historic Places are preserved.
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
Nongame	Wildlife species that are not hunted for sport.
Notice of intent	A notice in the Federal Register of intent to prepare an environmental impact statement on a proposed action.
Noxious Weed	According to the Federal Noxious Weed Act (PL 93-629), a weed that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.
NPNF	Nez Perce National Forest
NRCS	Natural Resources Conservation Service
Objective	A concise time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning, to defining the precise steps to be taken and the resources to be used in achieving identified goals.
Off Highway Vehicle	Any motorized vehicle designed for and/or capable of travel off roads.
OHV	Off-highway vehicle

Term	Definition
Old growth	Old forests often containing several canopy layers, variety in trees sizes and species, decadent old trees, and standing and dead woody material.
Old Growth Forests	An ecosystem distinguished by old trees and related structural attributes. Old growth encompasses the later stages in a variety of characteristics including tree size, accumulation of large dead woody material, number of canopy layers, species composition, and ecosystem function. Old growth is not necessarily virgin or primeval. It can develop over time following human disturbances, just as it does following natural disturbances. Old growth encompasses both older forests dominated by early seral species and forests in later successional stages dominated by shade tolerant species.
ORV	Off-road vehicles, such as motorcycles, 4-wheel drive vehicles, and 4-wheelers
Overstory	The upper canopy layer; the plants below comprise the understory.
Ozone	Ozone, the major constituent of smog, is formed through a complex series of chemical reactions and transformations in the presence of sunlight. Ozone is a strong irritant, which attacks the respiratory system, leading to lung tissue damage. Ozone also affects materials such as surface coatings, fabrics, and rubber.
Parent materials	The mineral or organic matter from which the upper layers of soil are formed.
Partial retention	A visual quality objective, which, in general, means man's activities, may be evident but must remain subordinate to the characteristic landscape.
Particulates	Small particles suspended in the air and generally considered pollutants.
Patch	An area of homogeneous vegetation, in structure and composition.
Perennial Stream	A stream that flows continuously year round.
Personal use	The use of a forest product, such as firewood, for home use and not for commercial use.
Planning area	The BLM administrative area covered by a regional guide or MFP.
Plant Community	A group of individual plants of one or more species growing in a specific area in association with one another and with a complex of other plants and animals.
PNV	See *Present net value*.
Policy	A guiding principle upon which is based a specific decision or set of decisions.
Population	A group of individuals with common ancestry that are much more likely to mate with one another than with individuals from another such group.
ppm	part per million

Term	Definition
Precommercial thinning	Removing some of the trees from a stand that are too small to be sold for lumber or house logs, so the remaining trees will grow faster.
Predator	An animal the lives by preying on other animals. Predators are at or near the tops of food chains.
Prescribed fire	Fire set intentionally in wildland fuels under prescribed conditions and circumstances. Prescribed fire can reduce fuels, rejuvenate forage for livestock and wildlife or prepare sites for regeneration of trees.
Prescription	Management practices selected to accomplish specific land and resource management objectives.
Prescription Watershed	At the time of the BLM Management Framework Plan and Fishery/Water Quality Objective supplements (1981 and 1985), watersheds were referred to as prescription watersheds. Current nomenclature refers to those as subwatersheds.
Present net value	PNV—also called present net worth—the measure of the economic value of a project when costs and revenues occur in different time periods. Future revenues and costs are "discounted" to the present by an interest rate that reflects the changing value of a dollar over time. The assumption is that dollars today are more valuable than dollars in the future. PNV is used to compare alternatives that have different cost and revenue flows.
Prevention of Significant Deterioration (PSD)	A classification established to preserve, protect, and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance, while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources. Specific emission limitations and other measures, by class, are detailed in the Clean Air Act. (42 U.S.C. 1875 et seq.)
Primitive (P)	Those recreation activities that occur in areas characterized by an essentially unmodified natural environment of fairly large size.
Productive	The ability of an area to provide goods and services and to sustain ecological values.
Project Area	Area of specific analysis for BLM Eastside Project. proposed leasing on Sioux Ranger District of the Custer National Forest.
Proposed Action	In terms of National Environmental Policy Act, the project, activity, or action that a federal agency intends to implement or undertake and which is the subject of an environmental analysis.
PSD	Prevention of Significant Deterioration of Air Quality
psi	pounds per square inch
Public domain	The territory ceded to the Federal government by the original thirteen states, plus additions by treaty, cession, and purchase.

Term	Definition
Public involvement	The use of appropriate procedures to inform the public, obtain early and continuing public participating, and consider the views of interested parties in planning and decision making.
Public issue	A subject or question of widespread public interest relating to management of the National Forest System.
Range	Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.
Range of Alternatives	The NEPA requires the proposed action, a no action alternative, and a reasonable range of alternatives to the proposed action be addressed in an EIS.
Range of variability	Also called the historic range of variability or natural range of variation. The components of healthy ecosystems fluctuate over time. The range of sustainable conditions in an ecosystem is determined by time, processes (such as fire), native species, and the land itself. For instance, ecosystems that have a 10-year fire cycle have narrower range of variation than ecosystems with 200–300 year fire cycles. Past management has placed some ecosystems outside their range of variability. Future management should move such ecosystems back toward their natural, sustainable range of variation.
Raptor	Birds of prey, such as owls, hawks, and eagles.
RARE II	Roadless Area Review and Evaluation. The national inventory of roadless and undeveloped areas within the National Forests and Grasslands.
Reclamation	Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, revegetation, and other work such as fertilization and fencing necessary to restore it for use.
Record of Decision (ROD)	A document separate from, but associated with, an environmental impact statement, that publicly and officially discloses the responsible official's decision on the proposed action.
Recreation Opportunities	The combination of recreation settings, activities, and experiences provided by an area.
Recreation Opportunity Spectrum (ROS)	A system for planning and managing recreation resources that recognizes recreation activity opportunities, recreation settings, and recreation experiences along a spectrum or continuum of settings as follows: Primitive–Characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use is not permitted. Semi-Primitive Non-Motorized–Characterized by predominately natural or natural appearing environment of a moderate to large size.

Term	Definition
	Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but these are subtle. Motorized use is not permitted. Semi-Primitive Motorized–Characterized by a predominantly natural or natural appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but these are subtle. Motorized use is permitted. Roaded Natural–Characterized by predominantly natural appearing environment with moderate evidence of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with the evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Motorized use is permitted. Rural–Characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Urban–Characterized by a substantially urbanized environment, although the background may have natural appearing elements. Vegetative cover is often exotic and manicured. Sights and sounds of humans on-site are predominant.
Reforestation	The restocking of an area with forest trees, by either natural or artificial means, such as planting.
Regeneration	The renewal of a tree crop by either natural or artificial means. The term is also used to refer to the young crop itself.
Regional Forester	The official of the USDA Forest Service responsible for administering an entire region of the Forest Service.
Rehabilitation	A short-term visual resource management objective used to restore landscapes containing undesirable visual or other resource impacts to the desired visual or other acceptable quality level.
Remoteness	A characteristic of an area defined as the perceived condition of being secluded, inaccessible, and "out of the way.” Topography, vegetative screening, distance from human impacts, distance from sights and sounds of man, and difficulty of travel all contribute to remoteness.
Removal cut	The removal of the last seed bearers or shelter trees after regeneration is established.
Residual stand	The trees remaining standing after an event such as selection cutting.

Term	Definition
Resilience	The ability of an ecosystem to maintain diversity, integrity, and ecological processes following a disturbance.
Responsible line officer	The Forest Service Bureau of Land Management employee who has the authority to select and/or carry out a specific planning action.
Responsible official	The Forest Service Bureau of Land Management employee who has been delegated the authority to carry out a specific planning action.
Restoration (of ecosystems)	Actions taken to modify an ecosystem to achieve a desired, healthy, and functioning condition.
Restore	To bring back to a former or original condition or appearance.
Revegetation	The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as seedbed preparation, reseeding, and mulching.
Riparian	Riparian areas consist of terrestrial and aquatic ecosystems, those lands in a position to directly influence water quality and water resources, whether or not free water is available. This would include all lands in the active flood channel and lands immediately upslope of stream banks. These areas may be associated with lakes, reservoirs, marshes, streams, bogs, wet meadows, and intermittent or permanent streams where free and unbound water is available.
Riparian Area	The area along a watercourse or around a lake or pond.
Riparian Areas	Geographically delineable areas with distinctive resource values and characteristics that comprise the riparian ecosystems.
Riparian Ecosystem	a) Ecosystems transitional between terrestrial and aquatic ecosystems. Also streams, lakes, wet areas, and adjacent vegetation communities and their associated soils that have free water at or near the surface. b) Those assemblages of plants, animals, and aquatic communities whose presence can either be directly or indirectly attributed to factors that are water influenced or related. c) Interacting system between aquatic and terrestrial situations, identified by soil characteristics and distinctive vegetation that requires or tolerates free or unbound water.
Riparian Zone	An area of vegetation adjacent to an aquatic ecosystem. It has a high water table, certain soil characteristics, and some vegetation that requires free (unbound chemically) water or conditions that are more moist than normal. This zone is transitional between aquatic and upland zones.
RN	Roaded Natural
Road	A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be permanent, or temporary.
Road Decommissioning	Activities that result in the stabilization and restoration of unneeded roads to a more natural state.

Term	Definition
Roaded Natural	A recreation opportunity classification term for describing a land area that has predominately a natural appearing environment with moderate evidence of sights and sounds of humans. Concentration of users is moderate to low. Roads of better than primitive class are usually within 0.5 mile. A broad range of motorized and non-motorized activity opportunities is available. Management activities are present and harmonize with the natural environment.
Roadless	Refers to the absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
Rotation	The number of years required to establish and grow timber crops to a specific condition of maturity.
Run-off	The portion of precipitation that flows over the land surface or in open channels.
Sapling	A loose term for a young tree more than a few feet tall and an inch or so in diameter that is typically growing vigorously.
Scale	In ecosystem management, it refers to the degree of resolution at which ecosystems are observed and measured.
Scoping/Scoping Process	An early and open public involvement process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Identifying the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrowing the scope of the Environmental Impact Statement accordingly. (Ref. CEQ Regulations, 40 CFR 1501.7.)
Sediment	Solid mineral or organic material that is transported by air, water, gravity, or ice.
Seedtree	A *seed tree system* is defined as a silvicultural system in which selected trees or tree groups are left standing after the initial harvest, to provide a seed source for natural regeneration. After natural regeneration is achieved, the seed trees may or may not be removed.
Semi-primitive	A recreation opportunity classification term for describing land areas that have very few management controls lying between 0.5 mile and 3 miles from the nearest point of motor vehicle access, excepting four-wheel drive roads and trails, with mostly natural landscapes and some evidence of other people.
Semi-Primitive Motorized (SPM)	A land area classified as semi-primitive that may have primitive roads present and where motorized use is permitted. Settings, activities, and opportunities are affected accordingly though there is still a moderate probability of experiencing isolation from sights and sounds of humans.

Term	Definition
Semi-Primitive Non-Motorized (SPNM)	A land area classified as semi-primitive that has a natural environment and motorized use is not permitted. Non-motorized status increases the probability of experiencing isolation, independence, and closeness to nature. Challenge and risk are generally high. Resource management may be present; however, natural appearance is still maintained.
Sensitive Species	Plant or animal species susceptible or vulnerable to activity impacts or habitat alterations. Species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species. The sensitive species designation is normally used for species that occur on Bureau administered lands for which BLM has the capability to significantly affect the conservation status of the species through management. The State Director may designate additional categories of special status species as appropriate and applicable to his or her state's needs.
Seral	The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession.
Shelterwood	A cutting method used in a more or less mature stand, designed to establish a new crop under the protection of the old.
Significant Impact/Effect	An impact or effect is significant when it is projected to meet or exceed threshold standards, while considering how substantial the impact or effect is, considering its context and intensity.
Silviculture	The art science that promotes the growth of single trees and the forest as a biological unit.
Size class	One of the three intervals of three stem diameters used to classify timber in the Forest Plan database. The size classes are: Seedling/Sapling (less than 5 inches in diameter); Pole timber (5–7 inches in diameter); Saw timber (greater than 7 inches in diameter).
Skidding	Hauling logs by sliding, not on wheels, from stump to a collection point.
Skyline logging	A logging system used to remove timber from steep slopes. Logs are brought up-slope on a suspended cable, or skyline. Since the weight of the log is completely or partially supported by the cable, there is little disturbance to soil or other vegetation.
Slash	The residue left on the ground after timber cutting or left after a storm, fire, or other event. Slash includes logs, uprooted stumps, broken or uprooted stems, branches, bark, etc.
Slash filter windrow	Woody debris (slash) placed along a slope to trap and hold sediment coming off a hill or road above.
Slope	The amount or degree of deviation from the horizontal or vertical. Concerning visual or scenic resources, as slope increases, views into a site and the size of the disturbance increase. Generally, the steeper slopes are more visible due to their location in the landscape.

Term	Definition
Slump	A landslide where the underlying rock masses tilt back as they slide from a cliff or escarpment.
Snag	A standing dead tree. Snags are important as habitat for a variety of wildlife species and their prey.
Soil compaction	The reduction of soil volume. For instance, the weight of heavy equipment on soils can compact the soil and thereby change it in some ways, such as in its ability to absorb water.
Soil productivity	The capacity of a soil to produce a specific crop. Productivity depends on adequate moisture and soil nutrients, as well as favorable climate.
Solitude	A personal, subjective value and roadless area characteristic defined as isolation from the sights, sounds, presence of others, and the developments of man. A primitive recreation experience includes the opportunity to experience solitude, a sense of remoteness, closeness to nature, serenity, and spirit of adventure.
Special Features	Unique geological, biological, ecological, cultural, or scenic features located in a roadless area. Unique fish and animal species, unique plants or plant communities, potential Research Natural Areas, outstanding landscape features such as unique rock formations, and significant cultural resource sites are some of the items that should be considered when analyzing this element.
Stand	A group of trees that occupies a specific area and is similar in species, age, and condition.
Standards and guidelines	Requirements found in a forest plan which impose limits on natural resource management activities, generally for environmental protection.
Stewardship	Caring for the land and its resources to pass healthy ecosystems to future generations.
Stewardship Contracting	The primary objective of a stewardship project is to achieve one or more of the land management goals that meet local and rural community needs. These goals, as identified in the authorizing legislation (Section 323 of Public Law 108-7), may include but are not limited to: • Road and trail maintenance or obliteration for improved water quality; • Soil productivity, habitat for wildlife and fisheries, or other resource values; • Setting of prescribed fires to improve composition, structure, condition, and health of stands or to improve wildlife habitat; • Removing vegetation or other activities to promote healthy forest stands, reduce fire hazards or achieve other land management objectives; • Watershed restoration and maintenance; • Restoration and maintenance of wildlife and fish habitat; and

Term	Definition
	• Control of noxious and exotic weeds and reestablishing native plant species. Stewardship contracting projects are defined as those activities used to accomplish one or more of the goals noted above and where the BLM would enter into contract or agreement for services to achieve land management goals as well as meet local and rural community needs. In addition, a source for performance under a contract must be selected on a best value basis. The legislation authorizes trading goods for services, and multi-year contract authority greater than five years but not to exceed ten years.
Stocking level	The number of trees in an area as compared to the desirable number of trees for best results, such as maximum wood production.
Stream order	A numbering system used to classify streams by their position relative to other streams. The Strahler system is the most commonly used. First order streams are the smallest unbranched tributaries. Second order streams are formed at the confluence of two first order streams. Third order streams are formed at the confluence of two second order streams. This pattern continues downstream until a stream enters an ocean or other sink. [Adapted from: American Geological Institute. 1962. Dictionary of Geological Terms.]
Stringer	A strip of vegetation different form surrounding vegetation, such as a stringer of aspen in an area of spruce.
Structure	How the parts of ecosystems are arranged, both horizontally and vertically. Structure might reveal a patter, or mosaic, or total randomness of vegetation.
Subwatershed	A subdivision within a watershed.
Succession	The natural replacement, in time, of one plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.
Successional stage	A stage of development of a plant community as it moves from bare ground to climax. The grass-form stage of succession precedes the woody shrub stage.
Suitability	The appropriateness of certain resource management to an area of land. Suitability can be determined by environmental and economic analysis of management practices.
Sustainability	The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.
Sustainable	The yield of a natural resource that can be produced continually at a given intensity of management is said to be sustainable.

Term	Definition
Sustained yield	The yield that a renewable resource can produce continuously at a given intensity of management.
Target	The BLM's annual goals for accomplishment for natural resource programs. Targets represent the commitment the BLM has with Congress to accomplish the work Congress has funded, and are often used as a measure of the agency's performance.
Temporary Road	Roads authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be part of the transportation system and not necessary for long-term resource management.
Terrestrial	Living or growing in or on the land.
TES	Threatened, Endangered and Sensitive (Species)
Texture	Detail of landscape that varies with distance.
Thinning	A cutting made in an immature stand of trees to accelerate growth of the remaining trees or to improve the form of the remaining trees.
Threatened Species	Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, and that has been designated in the Federal Register by the Secretary of the Interior as a threatened species.
Tiering	Refers to the elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an environmental impact statement of broader scope. For example, a project environmental assessment could be tiered to the Forest Plan EIS.
Timber production	The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For purposes of this subpart, the term "timber production" does not include production of fuelwood.
Tractor logging	A logging method that uses tractors to carry or drag lots from the stump to a collection point.
Treatment area	The site-specific location of a resource improvement activity.
TSI	Timber Stand Improvement–Actions to improve growing conditions for trees in a stand, such as thinning, pruning, prescribed fire, or release cutting.
Unclassified Road	Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travel-ways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon termination of the authorization.
Underburn	A burn by a surface fire that can consume ground vegetation and "ladder" fuels.

Term	Definition
Understory	The trees and other woody species that grow under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.
Uneven-aged	A stand of trees in which the individual trees originated over a long period of time and, thus, differ widely in age; a regeneration system designed to produce such a stand.
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
Vegetation management	Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.
Vegetation Response Unit (VRU)	Ecological land units that have unique patterns of habitat types groups (potential vegetation), terrain, and historic fire regimes.
Vegetation type	A plant community with distinguishable characteristics.
Viability	The likelihood of continued existence in an area for some specified period of time.
Viable population	The number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations that are adequately distributed throughout their range.
Viewshed	A total landscape as seen from a particular viewpoint.
Visual (or Scenic) Resource	The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal of the unit.
Visual Resource Management (VRM)	A classification that establishes the "visual landscape" as a basic resource, treated as an essential part of the land. The visual resource management classification provides a framework to inventory the visual resource and provides measurable standards for its management.
VRM	Visual Resource Management
Water table	The upper surface of groundwater. Below it, the soil is saturated with water.
Water yield	The runoff from a watershed, including groundwater outflow.
Watershed	The entire region drained by a waterway (or into a lake or reservoir. More specifically, a watershed is an area of land above a given point on a stream that contributes water to the streamflow at that point.
WEPP	The Water Erosion Prediction Project (WEPP) model is a process-based, distributed parameter, continuous simulation, erosion prediction model.
Wetlands	Areas that are permanently wet or are intermittently covered with water.

Term	Definition
Wilderness	An area of undeveloped federal land designated Wilderness by Congress, retaining its primeval character and influence, without permanent improvements or human habitation, protected and managed to preserve its natural conditions and that (1) generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable, (2) has outstanding opportunities for solitude or primitive and unconfined recreation, (3) has at least 5,000 acres or is of sufficient size to make practical its preservation and use in an unimpaired condition, and (4) also may contain features that are of ecological, geological, scientific, educational, scenic, or historical value. These characteristics were identified by Congress in the Wilderness Act of 1964.
Wildfire	Any wildland fire that is not a prescribed fire.
Wildland Urban Interface	An area within or adjacent to an at-risk community identified within recommendations to the Secretary of Agriculture in a Community Wildfire Protection Plan, OR In the case of any area for which a Community Wildfire Protection Plan is not in effect: An area extending ½ mile from the boundary of an at-risk community; An area with 1½ miles from the boundary of an at risk community, including land that 1) Has a sustained steep slope that creates the potential for wildland fire behavior endangering the at-risk community, 2) Has a geographic feature that aids in creating an effective firebreak, such as a road or ridgetop.
Wildlife	Mammals, birds, reptiles, amphibians, and invertebrates.
Windthrow	Trees uprooted by wind.
Woodlands	An open stand of trees with crowns not usually touching (generally forming a 25 to 60 percent cover).
WUI	See *Wildland Urban Interface.*
Yarding	Moving the cut trees form where they fell to a centralized place (landing) for hauling away from the stand.

Appendix C – References

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Appendix D – Treatments by Alternative

The following tables represent the units for the project area. The unit is the number assigned to the stand being treated. The T Code is the prescription type. The codes are:

Table D.1

T Code	Treatment
4113	Clearcut
4114	Clearcut with reserves
4131	Shelterwood Cut
4133	Irregular shelterwood
4134	Seed tree cut with reserves
4220	Thinning
4230	Sanitation (Salvage)
4260	Human caused fire

Table D.2

Abbreviation	Fuels Treatment
Ex. Pile	Excavator piling of fuels throughout unit in preparation for burning
Underburn	A light broadcast burn under existing forest canopy, with limited damage to existing trees
Broadcast	A prescribed burn with no piling, wind rowing and limited concern for existing vegetation
Hand Pile	Hand piling of fuels throughout unit in preparation for burning

The percent (%) stands for canopy cover removed that was used for ECA and NEZSED modeling. Type = the logging system. Biomass utilization may occur in excavator pile units, lessoning the amount of excavator piling needed. The alternatives are the associated actions that will be treated and the acres column is the size of the unit. If there is a blank in the Unit row under the alternative, this means that unit will not be treated under that alternative.

Table D.3

Alternative B					
Unit	T Code	Type	%	Fuels	Acres
1	4131	Helicopter	80	Hand Pile	11
2	4220	Ground	70	Ex. Pile	14
3	4131	Cable	80	Underburn	10
4	4134	Ground	80	Underburn	4
5	4134	Cable	80	Underburn	5
6	4220	Ground	70	Ex. Pile	16
7	4131	Cable	80	Underburn	8
8	4134	Cable	80	Underburn	11
9	4134	Ground	90	Ex. Pile	61
10	4131	Cable	80	Underburn	23
11	4134	Ground	80	Underburn	27
12	4134	Cable	80	Underburn	16
13	4230	Ground	50	Ex. Pile	32
14	4230	Ground	50	Ex. Pile	68
15	4230	Ground	50	Ex. Pile	9
16	4220	Ground	70	Ex. Pile	45
18	4131	Ground	90	Ex. Pile	60
19	4133	Cable	90	Underburn	28

Alternative C				
Unit	T Code	Type	Fuels	Acres
1	4131	Helicopter	Hand Pile	11
2	4220	Ground	Ex. Pile	14
3	4131	Cable	Underburn	10
4	4134	Ground	Underburn	4
5	4134	Cable	Underburn	5
6	4220	Ground	Ex. Pile	16
7	4131	Cable	Underburn	8
8	4134	Cable	Underburn	11
9	4134	Ground	Ex. Pile	61
10	4131	Cable	Underburn	23
11	4134	Ground	Underburn	27
12	4134	Cable	Underburn	16
13	4230	Ground	Ex. Pile	32
14	4230	Ground	Ex. Pile	68
16	4220	Ground	Ex. Pile	45
18	4131	Ground	Ex. Pile	60
19	4133	Helicopter	Underburn	28

Alternative D				
Unit	T Code	Type	Fuels	Acres
9	4134	Ground	Ex. Pile	61
10	4131	Cable	Underburn	23
11	4134	Ground	Underburn	27
12	4134	Cable	Underburn	16
13	4230	Ground	Ex. Pile	32
14	4230	Ground	Ex. Pile	68
16	4220	Ground	Ex. Pile	45
18	4131	Ground	Ex. Pile	60
19	4133	Helicopter	Underburn	28

Alternative B					
Unit	T Code	Type	%	Fuels	Acres
20	4133	Cable	90	Underburn	26
21	4220	Helicopter	70	Hand Pile	24
22	4220	Ground	70	Ex. Pile	24
23	4133	Ground	90	Ex. Pile	18
24	4133	Cable	90	Underburn	40
25	4133	Cable	90	Underburn	10
26	4133	Ground	90	Ex. Pile	6
27	4134	Helicopter	80	Hand Pile	19
28	4133	Cable	90	Underburn	25
29	4134	Ground	80	Ex. Pile	9
30	4133	Ground	90	Ex. Pile	21
31	4134	Cable	80	Underburn	8
32	4133	Cable	90	Underburn	7
33	4133	Ground	90	Ex. Pile	41
34	4131	Ground	80	Ex. Pile	57
35	4131	Ground	80	Ex. Pile	3
36	4260		90	Broadcast	6
37	4260		90	Broadcast	25
38	4260		90	Broadcast	57
39	4134	Ground	80	Ex. Pile	35
40	4133	Ground	100	Ex. Pile	14
41	4131	Ground	80	Ex. Pile	60
42	4131	Cable	80	Underburn	40

Alternative C				
Unit	T Code	Type	Fuels	Acres
20	4133	Helicopter	Underburn	26
21	4220	Helicopter	Hand Pile	24
22	4220	Ground	Ex. Pile	24
23	4133	Ground	Ex. Pile	18
24	4133	Helicopter	Underburn	40
25	4133	Helicopter	Underburn	10
26	4133	Ground	Ex. Pile	6
27	4134	Helicopter	Hand Pile	19
28	4133	Cable	Underburn	25
29	4134	Ground	Ex. Pile	9
30	4133	Ground	Ex. Pile	21
31	4134	Cable	Underburn	8
32	4133	Cable	Underburn	7
33	4133	Ground	Ex. Pile	41
34	4131	Ground	Ex. Pile	57
35	4131	Ground	Ex. Pile	3
36	4133	Helicopter	Broadcast	6
37	4133	Helicopter	Broadcast	25
38	4133	Helicopter	Broadcast	57
39	4134	Ground	Ex. Pile	35
40	4133	Ground	Ex. Pile	14
41	4131	Ground	Ex. Pile	60
42	4131	Cable	Underburn	40

Alternative D				
Unit	T Code	Type	Fuels	Acres
20	4133	Helicopter	Underburn	26
21	4220	Helicopter	Hand Pile	24
22	4220	Ground	Ex. Pile	24
23	4133	Ground	Ex. Pile	18
24	4133	Helicopter	Underburn	40
25	4133	Helicopter	Underburn	10
26	4133	Ground	Ex. Pile	6
27	4134	Helicopter	Hand Pile	19
29	4134	Ground	Ex. Pile	9
30	4133	Ground	Ex. Pile	21
31	4134	Cable	Underburn	8
32	4133	Cable	Underburn	7
33	4133	Ground	Ex. Pile	41
34	4131	Ground	Ex. Pile	57
37	4133	Helicopter	Broadcast	25
38	4133	Helicopter	Broadcast	57
39	4134	Ground	Ex. Pile	35
40	4133	Ground	Ex. Pile	14
41	4131	Ground	Ex. Pile	60
42	4131	Cable	Underburn	40

Alternative B					
Unit	T Code	Type	%	Fuels	Acres
43	4131	Cable	80	Underburn	12
44	4134	Ground	80	Ex. Pile	49
45	4133	Ground	100	Ex. Pile	28
46	4134	Cable	80	Underburn	18
47	4133	Ground	90	Ex. Pile	59
48	4133	Cable	90	Underburn	11
49	4134	Ground	80	Ex. Pile	24
50	4133	Ground	90	Ex. Pile	17
51	4260		90	Broadcast	52
Eastside Total Acres					**1293**

Alternative C				
Unit	T Code	Type	Fuels	Acres
43	4131	Cable	Underburn	12
44	4134	Ground	Ex. Pile	49
45	4133	Ground	Ex. Pile	28
46	4134	Cable	Underburn	18
47	4133	Ground	Ex. Pile	59
48	4133	Cable	Underburn	11
49	4134	Ground	Ex. Pile	24
50	4133	Ground	Ex. Pile	17
51	4133	Helicopter	Broadcast	52
Eastside Total Acres				**1284**

Alternative D				
Unit	T Code	Type	Fuels	Acres
43	4131	Cable	Underburn	12
44	4134	Ground	Ex. Pile	49
45	4133	Ground	Ex. Pile	28
46	4134	Cable	Underburn	18
47	4133	Ground	Ex. Pile	59
48	4133	Cable	Underburn	11
49	4134	Ground	Ex. Pile	24
50	4133	Ground	Ex. Pile	17
51	4133	Helicopter	Broadcast	52
Eastside Total Acres				**1171**

Table D.4

Totals by T Code				
		Alt B	Alt C	Alt D
4113	Clearcut			
4114	Clearcut with reserves			
4131	Shelterwood Cut	284	284	252
4133	Irregular shelterwood	351	491	460
4134	Seed tree cut with reserves	286	286	266
4220	Thinning	123	123	93
4230	Sanitation (Salvage)	109	100	100
4260	Man caused fire	140		

Appendix E – Monitoring Plan

Regeneration and Survival Success Monitoring

Program: Forest Management

Monitoring Item: Artificial regeneration

Objective: To assess the survival and stocking rates following tree planting in regeneration units.

Parameters: Regeneration establishment and survival checks.

Methodology: Install and measure 1/100 acre plots per standard protocols.

Frequency/Duration: First, third, and fifth year following planting

Data Storage: Field office files

Analysis/Report: Silvicultural and reforestation reports

Priority: High

Personnel: Forestry staff

Cost: Average $30/acre times the number of acres planted

Fuel Condition _____

Program: Fuels Management

Monitoring Item: Fuel condition; burn unit design; biomass utilization

Objective: To assess the implementation of fuel reduction objectives, keeping prescribed fire within designated unit boundaries, and reducing excavator piling resulting from biomass utilization.

Parameters: Post treatment fuel model; burned area survey; acres excavator-piled

Methodology: Install and measure fuel inventory plots per standard protocols, patrol unit firelines, and observe and map actual burned area, evaluate biomass opportunities.

Frequency/Duration: 30 days following treatment

Data Storage: Field office files

Analysis/Report: Fuel reduction accomplishments (NFPORS)

Priority: High

Personnel: Fuels Staff

Cost: Average $30/acre times the number of acres planted

Vegetation

Program: Noxious Weeds

Monitoring Item: Inventory activity areas for weed occurrence

Objective: To survey and document new and spreading populations of noxious weeds in the treatment area.

Parameters: Weed occurrence

Methodology: Visual survey of disturbed areas for weed occurrence

Frequency/Duration: Two years following treatment

Data Storage: Field Office Files

Analysis/Report:

Priority: High

Personnel: All field staff

Cost: Average $30/acre times the number of acres planted

Water Quality

Program: Water Quality

Monitoring Item: Implementation of BMPs, project design features and mitigation

Objective: To determine if stated measures were implemented and if they were effective as designed.

Parameters: Were the BMPs, PDFs, and mitigation implemented and effective feedback information to IDTs for future project design?

Methodology: Site visit, pre- and post-monitoring of site conditions

Frequency/Duration: Before, during, and post implementation. Post implementation should continue for up to five years to track effectiveness.

Data Storage: Field Office Files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design.

Priority: High

Personnel: Hydrologist, Biologist

Water Quality

Program: Water Quality

Monitoring Item: Temperature; turbidity; active erosion/sediment

Objective: To determine change in condition over time.

Parameters: Use standard DEQ protocol for monitoring turbidity at mixing zone.

Methodology: Regularly record temperatures and prepare trend analysis for riparian restoration projects. During project implementation that involves actions below mean high water or instream activities that may affect turbidity, monitor during project implementation, and pre- and post-project turbidity levels. Monitor activities within riparian habitats where project related soil/vegetation disturbance has potential to reach water. Monitor implementation and effectiveness of erosion control design features. Continue monitoring existing permanent monitoring stations; install temporary monitoring stations for periodic evaluation. Document erosion control implementation and effectiveness.

Frequency/Duration: Temperature is recorded daily and data retrieved monthly (summer months). Monitoring should continue for foreseeable future to discern trends. Turbidity monitoring conducted during, pre-, and post-project construction periods. Erosions control implementation and effectiveness monitoring conducted during project implementation and post-project monitoring as needed until appropriate site stabilization is achieved.

Data Storage: Field office files

Analysis/Report: Provide summary reports to track changes resulting and trend for project design and compliance with water quality standards.

Priority: High

Personnel: Fisheries Biologist

Roads

Program: Restoration

Monitoring Item: Decommissioned roads and fish habitat

Objective: To ensure decommissioned roads are removed to designed standards and are, in fact, no longer passable, and to assess changes to fish habitat conditions and document trend.

Parameters: Percent woody material on former surface, depth of decompaction, recontouring percent complete (if applicable)

Methodology: On-site measurements and visual observation

Frequency/Duration: Post implementation

Data Storage: Field office files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design. Provide feedback to regulatory agencies on effectiveness of treatments.

Priority: High

Personnel: Contract Administrator

Cultural _____

Program: Cultural Resource Protection

Monitoring Item: Installation of protective measures at ditch crossings, recording features prior to implementation

Objective: To protect documented resources.

Parameters: Parameters are provided in the design feature table.

Methodology: Visual observation

Frequency/Duration: During and post implementation

Data Storage: Field office files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design. Provide feedback to regulatory agencies on effectiveness of treatments.

Priority: High

Personnel: Archeologist, Contract Administrator

Fish Habitat

Program: Fish Habitat

Monitoring Item: Fish habitat features: cobble embeddedness; LWD; pool:riffle; surface fines; width:depth

Objective: To assess changes to fish habitat conditions and document trend.

Parameters: Parameters are identified for each feature in the *Matrix and Pathways of Indicators.*

Methodology: Use standard protocols for each monitoring type.

Frequency/Duration: Before, during and post implementation. Post implementation should continue for up to five years to track effectiveness.

Data Storage: Field office files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design. Provide feedback to regulatory agencies on effectiveness of treatments.

Priority: High

Personnel: Fisheries Biologist

Fish Habitat

Program: Fish Habitat

Monitoring Item: Stream channel morphology, stream bank condition, and riparian re-vegetation attributes following crossing replacement or ford decommissioning and restoration

Objective: To assess changes to fish habitat conditions and document trend.

Parameters: Parameters are identified for each feature in the *Matrix and Pathways of Indicators.*

Methodology: Use standard protocols for each monitoring type.

Frequency/Duration: Post implementation. Monitoring should continue periodically for up to ten years to track effectiveness.

Data Storage: Field Office Files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design. Provide feedback to regulatory agencies on effectiveness of treatments.

Priority: High

Personnel: Fisheries Biologist

Fisheries

Program: Fish Genetics

Monitoring Item: Genetic testing of isolated/semi-isolated Westslope cutthroat trout populations

Objective: To assess the genetic composition and any changes that occur through following reconnection of the Queen creek channel to American River.

Parameters: Parameters are identified for collection of genetic material.

Methodology: Use standard protocols for each monitoring type.

Frequency/Duration: Pre- and post-implementation. Post-implementation should continue periodically to assess changes over time.

Data Storage: Field office files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design. Provide feedback to regulatory agencies on documented impacts.

Priority: Moderate

Personnel: Fisheries Biologist

Wildlife Habitat

Program: Wildlife Habitat

Monitoring Item: Green tree, snag replacement, snags and down woody retention guidelines

Objective: To assess changes to forest structure and assure conformance with developed guidelines.

Parameters: Green tree retention parameters vary by treatment unit and would be derived from the silvicultural prescription. Snags guidelines are included in the MFP. Down woody material is based on recommendations in the Soils Section.

Methodology: Use standard protocols for each monitoring type.

Frequency/Duration: Post implementation

Data Storage: Field office files

Analysis/Report: Provide summary reports and recommendations to IDTs developing future projects to ensure continually improving project design.

Priority: High

Personnel: Forester

Wildlife Habitat

Program: Wildlife Habitat

Monitoring Item: Road restrictions for temporary roads

Objective: To ensure gates, signs, and closures are effective to restrict public vehicle use or other non-authorized uses of temporary roads during the duration of the contract.

Parameters: Document that gates are installed immediately after temporary roads are constructed. Monitor road closure facilities (gates, signs) are in place and functional during project duration.

Methodology: Documentation of gate installation and effectiveness in project inspector's field notes/diary.

Frequency/Duration: Project implementation

Data Storage: Field office files

Analysis/Report: Provide summary reports of gate/closure construction and periodic monitoring.

Priority: High

Personnel: Forester, Biologist

TES Plants

Program: Threatened and Endangered Species

Monitoring Item: Retention of live lodgepole pine near candystick populations

Objective: To ensure habitat components are retained.

Parameters: Green lodgepole pine retention should be implemented near documented populations or any newly discovered populations.

Methodology: Visual observation

Frequency/Duration: During and post implementation

Data Storage: Field office files

Analysis/Report: Monitoring report to FWS

Priority: High

Personnel: Forester, Botanist/Ecologist

Appendix F – Descriptions of Fuel Models_____

Fuel Model descriptions taken from Aids to Determining Fuel Models for Estimating Fire Behavior by Hal E. Anderson, 1982. Each fuel model is typically used to represent a range of fuel conditions in which fire behavior may be expected to respond similarly to changes in fuel moisture, wind, and slope.

Fuel Model 1: Fire spread is governed by the fine herbaceous fuels that have cured or are nearly cured. Fires move rapidly through cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area.

Fuel Model 2: Fire spread is primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, in addition to litter and down-down stemwood from timber overstory contributes to the fire intensity. Such stands may include clumps of fuels that generate higher intensities and that may produce firebrands.

Fuel Model 3: Fires in this fuel are the most intense of the grass group and display high rates of spread under the influence of wind. The fire may be driven into the upper heights of the grass stand by the wind and cross standing water. Stands are tall, averaging about 3 ft., but may vary considerably. Approximately one-third or more of the stand is considered dead or cured, and maintains the fire.

Fuel Model 4: Fire intensity and fast-spreading fires involves the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Besides flammable foliage, dead woody material in the stands significantly contributes to the fore intensity.

Fuel Model 5: 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 not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Shrubs are generally not tall, but have nearly total coverage of the area.

Fuel Model 8: Slow-burning ground fires with low flame heights are the rule, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and some twigs since little undergrowth is present in the stand.

Fuel Model 10: The fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Dead down fuels include greater quantities of 3-inch or larger limbwood resulting from overmaturity or natural events that create a large load of dead materiel on the forest floor. Crowning out, spotting, and torching of individual trees is more frequent in this fuel situation, leading to potential fire control difficulties. Any forest type may be considered if heavy down material is present; for example insect or disease ridden stands, wind-thrown stands, overmature stands with deadfall, and aged slash from light thinning or partial cutting.

Fuel Model 12: The visual impression is dominated by slash and much of it is less than 3 inches in diameter. Fires are rapidly spreading with high intensities capable of generating firebrands. When a fire starts, it is generally sustained until a fuel break of change in fuels is encountered.

Appendix G – Modeling Assumptions

Site-specific activities can readily be evaluated using the Forest Vegetation Simulator (FVS) and the Fuel and Fire Effects extension (FFE) of FVS to quantify vegetation and fuel succession following fire or fuels treatments.

The following excerpt has been adapted from the Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity (Graham, McCaffrey and Jain 2004). It gives a good description of the predictive strengths and weaknesses associated with Modeling. These are applicable to the use of the FFE-FVS modeling done on the Eastside Project.

Uncertainties in Predicting Fire Behavior

While we have a good general understanding of the factors that govern fire behavior, the interactions among these factors and the way in which fire behaves on the landscape are highly complex. As a result, fire behavior and severity can be understood and predicted in general terms, but exact predictions are not possible. Different models have been developed that are widely used and useful to assist in managing fires and developing fuel treatment plans. However, there are key uncertainties in how the simplifying assumptions of models affect their accuracy and as well as uncertainties that result from difficulties of providing adequate input data to operate the models. The limitations to predictions using models can be categorized as:

- **Model assumptions and limitations.** Because all models are abstractions of reality and not reality itself, there are many limitations to the predictions resulting from the models. By necessity, models simplify much of what really happens in order to facilitate the user's understanding of the process. In addition, many models are developed to reflect weather conditions that are "normal" and not extreme; therefore, their predictions do not reflect these types of events (Albini 1976, Van Wagner 1977, Rothermel 1983, Andrews 1986).
- **Unknowable fire environment at the time wildfires encounter treatments.** Even if models were nearly perfect, we would never be able to predict the exact conditions of a wildfire that would encounter a fuel treatment and serve as the performance measure. For example, the weather and wind conditions at a particular time, the attendant ignition location and direction of fire movement through the treatment, the degree of variability in the treatment conditions at the time of the fire—all these determine the performance of a fuel treatment in terms of the changes to fire behavior and effects.
- **Coarse data descriptions of fuels and environmental conditions.** The data for model input for the Eastside Project came from stand exam data which is better than most fuels maps. Even so this scale is still too coarse to reflect variability within some of the area, such as heavy fuel concentrations or thickets of trees. Such fine-scale variability could be important and may have important consequences to fire growth over landscapes, but it is unknowable for fire modeling. Our fuel data today tend to smooth out variation in order to represent the "average" condition. However, the average fuel condition does not produce the average fire behavior response because fire behavior responds nonlinearly to changes in fuels and weather.

A key area of uncertainty is in how to determine thresholds of treatment for different fuels when they are encountered by wildfire. Even though models cannot predict how a given structure created by a fuel treatment will fare when a wildfire encounters it, they can predict a range of conditions under which fuel conditions will modify fire behavior and/or severity. In general, models are effective in showing the contributions to the fire hazard made by the different fuel strata—that is, the surface fuels, ladder fuels, and crown fuels. However, each stratum affects fire behavior differently and there is uncertainty about how much treatment is needed in each stratum to achieve desired results.

Appendix H – Support Information for the Watershed and Fisheries Analysis _____

Introduction

The following support information for the watershed and fisheries analysis includes information specific to the Eastside Project and where appropriate support documentation from the American and Crooked River Project (USDA-FS 2005).

Fisheries/Water Quality Objectives

The Chief Joseph Management Framework Plan (USDI-BLM, 1981) and supplement guidance (USDI-BLM, 1985, 1989a, and 1989b) identifies fisheries/water quality objectives by prescription watersheds for the Cottonwood Field Office management area. Figure H.1 below, and the following Table H.1 identifies eight prescription watersheds that would be affected by the proposed actions. The Elk Creek prescription watershed (17060305-05-17) is primarily private lands and did not meet criteria for a BLM prescription watershed (USDI-BLM, 1989a), however, it does occur in the composite watershed for Lower American River (see Figure H.1), which will be assessed for cumulative affects.

Fish/water quality objectives displayed on the following page provide management direction in terms of maximum sediment yield over baseline conditions that can be approached or equaled for a specified number of years per decade, ranging from one to three times. Watersheds with fish/water objectives of 80 or 90 percent are allowed one entry per decade and those with 70 percent are allowed three entries per decade. All objectives are relative to full habitat potential of 100 percent.

Since 1992 additional standards and guidelines have been developed, primarily as a result of the various listing of anadromous and resident fish. NFMS (1996) has developed a matrix of pathways and indicators of watershed conditions that have been modified and locally adapted by the Central Idaho Level 1 team for chinook salmon, steelhead trout, and bull trout (USDA-FS and USDI-BLM, 1998)

Table H.1 Fisheries and Water Quality Objectives for Prescription Subwatersheds within the Eastside Project Analysis Area

Prescription Watershed	Prescription Watershed Name	Beneficial Use[1]	Current Fishery Habitat Condition (%)	Fishery/ Water Quality Objective (% Habitat Potential)[3]	Sediment Yield Guideline (% Over Baseline)	Entry Frequency Guideline (Per Decade)
17060305-05-06	Middle American R.	A	65%[2]	80%	30%[4]	1
17060305-05-16	Lower American R.	A	60%[2]	80%	30%[4]	1
17060305-05-10	E. Fk. American R.	A	80%[2]	90%	30%[4]	1
17060305-05-12	Whitaker Creek	R	70%	70%	60%	3
17060305-05-13	Queen Creek	R	70%	70%	60%	3
17060305-05-15	Box Sing Creek	A	65%[2]	70%	60%	3
17060305-05-11	Kirks Fork	A	75%[2]	80%	30%	1
17060305-05-05	Little Elk Creek	A	60%[2]	80%	30%	1

[1] A = Anadromous Fishery; R = Resident Fishery; MW = Municipal Watershed

[2] These streams are below carrying capacity because of a lack of diversity and/or instream cover. This problem may be attributed to dredge mining, livestock grazing, and or excessive sediment from roads, timber harvest, or development. Timber management and other land uses can occur in these drainages, concurrent with habitat improvement efforts, as long as habitat improvement efforts show a positive upward trend.
Within the project area, legacy effects from some land uses, such as historic dredge mining and roading have resulted in adverse impacts to stream channels, riparian habitats, and floodplains. Recovery is often slow and long term, and in some cases will require significant habitat improvement efforts. The BLM has been implementing a variety of land management and restoration actions to support improving trends within the American River drainage. BLM past, present, and actions identified for the foreseeable future have included instream restoration, riparian restoration, culvert replacements, road restoration, improved livestock management.

[3] All objectives are relative to full biological potential of 100 percent in reference to pristine conditions.

[4] These prescription watersheds, unlike most, are not true watersheds. By definition, a true watershed includes all the lands draining through a stream reach. These footnoted watersheds drain only part of such a hydraulic unit and generally contain the downstream reaches of relatively large streams. For sediment yield analysis on these downstream reaches, all upstream prescription watersheds are combined into a true watershed. Sediment yield guidelines (Column 6) apply only to true watersheds. Entry frequency guidelines (Column 7) apply to prescription watersheds regardless of whether they are true watersheds.

The watershed numbering and nomenclature system has evolved over the past twenty years. At the time of the BLM Management Framework Plan and Fishery/Water Quality Objective supplements (1981 and 1985), the Hydrologic Unit Code (HUC) system was nationally coordinated to the 4th code HUC (e.g. South Fork Clearwater River subbasin = 17060305). Efforts are currently underway to nationally coordinate HUCs to the 6th code level. This analysis relies on the older codes.

At the time of the BLM Management Framework Plan and Fishery/Water Quality Objective supplements (1981 and 1985), watersheds were referred to as prescription watersheds. Current nomenclature refers to those as subwatersheds.

Prescription watersheds such as Lower American River and Middle American River pose a unique situation in that they are not a single complete drainage (see footnote above). Current terminology refers to them as composite watersheds. The maps below show how composite and pure watersheds are related in the project area.

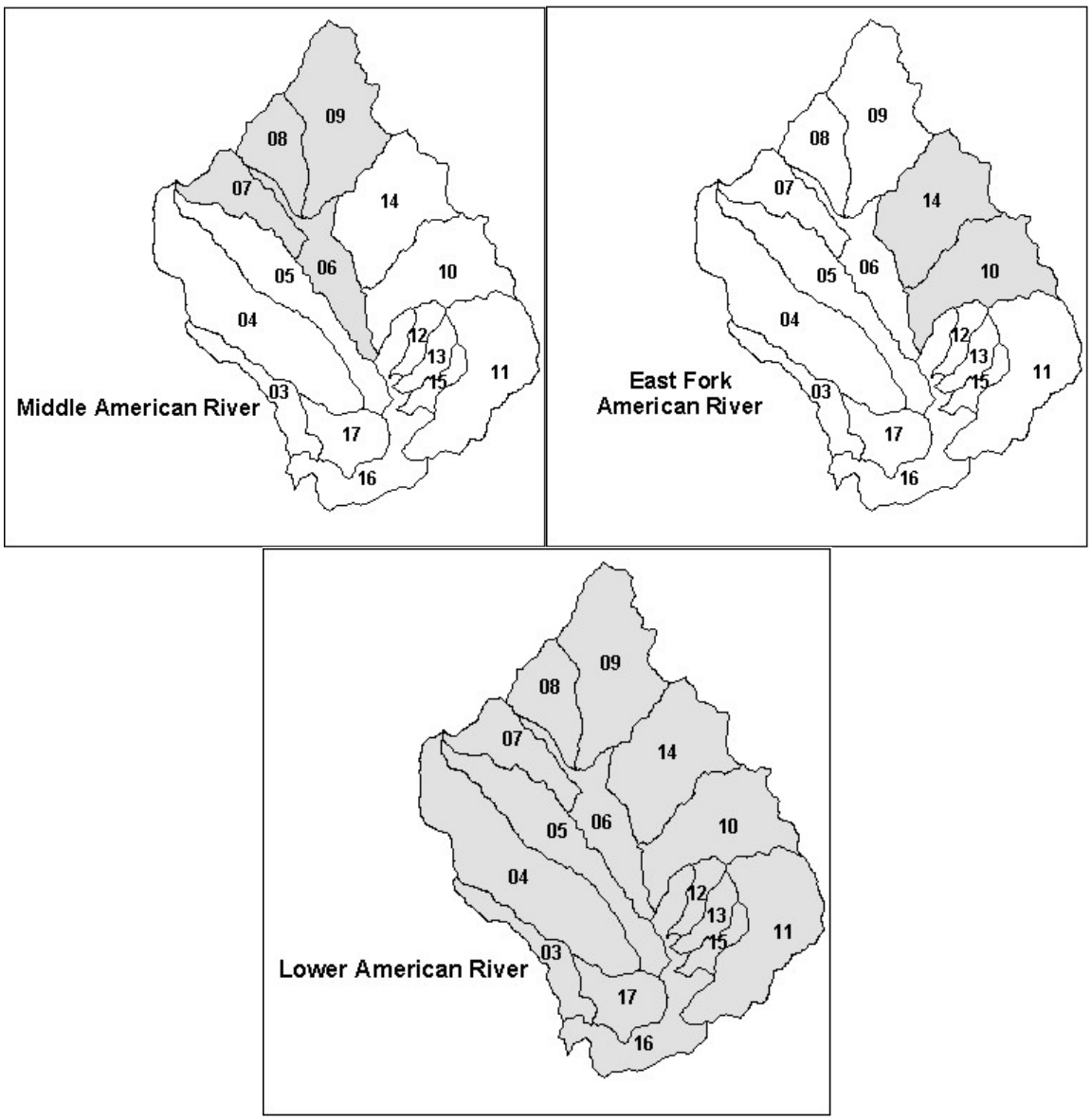

Figure H.1 Composite v, Pure Watersheds – American River

For purposes of water yield (ECA) and sediment yield (NEZSED) analysis, composite watersheds are compiled into larger pure watersheds. This is done in order to maintain integrity with the assumptions used to develop the ECA and NEZSED procedures. Both of these models assume the water yield and sediment yield reflect the conditions in the entire pure watershed above the analysis point (also known as pour point).

Each of the maps above shows the relationship between composite and pure watersheds for American River watersheds. Using Lower American River as an example, when ECA or NEZSED results are reported, they include all of the shaded subwatersheds. For more detail on the watershed boundaries and associated stream systems, see Maps 14 and 17.

Upward Trend

The Chief Joseph Management Framework Plan (USDI-BLM 1981) and supplement guidance (USDI-BLM, 1985, 1989a, and 1989b) provide direction that timber harvest in sediment-limited watersheds that

do not meet their Fisheries/Water Quality objectives, as listed in above in Table H.1, would occur only where concurrent watershed improvement efforts result in a positive upward trend in habitat condition. Many of the area streams do not meet their objectives and are in this category. Those are the watersheds with footnote 2 in Table H.1 above.

An upward trend can be supported by limiting new disturbances, allowing natural recovery to occur, restricting or modifying existing land uses, and/or implementing restoration activities that would improve aquatic and/or riparian habitats. In addition to Eastside Project restoration actions, upward trend can also be supported by other ongoing and planned BLM management actions (See Table H.5 FEIS) The FS also has conducted or is proposing a variety of projects that support improvement of water quality and aquatic habitats in the upper South Fork of the Clearwater River and American River.

BLM land ownership within many subwatersheds often comprise a small percentage of the total acreage, consequently, restoration opportunities may be very limited. In such watersheds, Eastside Project proposals are designed so that such would minimize impacts to aquatic habitats and water quality, and not preclude achievement of long term improving trends (attributed to BLM management actions) in subwatersheds that are below identified objectives.

The Desired Future Condition (DFC) Tables

To estimate natural fish habitat potential and quantify existing stream conditions as required by the Management Framework Plan, the Cottonwood Field Office is using Desired Future Condition (DFC) tables (USDI-BLM, 1989b) which have been further adapted from a model developed on the Clearwater National Forest (Espinosa, 1992). The DFC tables identify specific conditions and channel types found within the Cottonwood Field Office management area using a habitat quality index. Values for the habitat parameters are quantified in a set of desired future condition (DFC) tables. The DFC tables list the specific fish habitat parameter and a value or range that a stream should have in order to be at a given percentage of the streams potential and to meet the fisheries objectives for that watershed. The DFC values, habitat parameter data and their relationships are stratified by channel types and fish species. The values for the fish habitat parameters listed in the DFC tables are considered achievable for streams under natural conditions in the absence of major disturbances or are reflective of what good fish habitat should be. Most of the habitat parameters are consistent for each species, and they vary slightly by channel type. Past work has shown a need to adjust some of the elements to better-fit natural conditions and what is achievable. The DFC for acting and potential woody debris in a low gradient meadow channel is often used as an example of this. Under natural conditions trees may not be common along the channel and active and potential large woody debris may not be prevalent along specific stream reaches. Natural deposited sediment may also be at higher levels because of the existing soil and substrate conditions stream channel type, parent geologic material, and landscape characteristics.

PACFISH (1995) Supplement to BLM Management Framework Plan

The PACFISH Environmental Assessment (USDI-USDA 1995) supplemented the BLM Management Framework Plan. PACFISH establishes riparian goals, riparian management objectives (RMOs), and defines riparian habitat conservation areas (RHCAs). It includes specific direction for land management activities within riparian areas adjacent to streams, lakes, wetlands, and landslide-prone terrain. Riparian goals establish an expectation of the characteristics of healthy, functioning watersheds, riparian areas, and fish habitat. The goals direct the BLM to maintain or improve habitat elements such as water quality, stream channel integrity, instream flows, riparian vegetation, and several others.

Riparian management objectives (RMOs) for stream channel condition provide the criteria against which attainment, or progress toward attainment, of the riparian goals is measured. They include habitat attributes such as number of pools, amount of large wood in the channel, stability of the stream banks, and width-to-depth ratio. The areas adjacent to streams and wetlands (RHCAs) were established in

PACFISH to maintain the integrity of aquatic ecosystems. Healthy riparian areas are essential to maintaining or improving the quality of fish habitat in streams. This analysis will use a combination of DFC and RMO values to define desired and existing conditions in watersheds where activities occur.

Direction in PACFISH specific to Timber Management/Silviculture includes the following:

Prohibit timber harvest, including fuel woodcutting, in RHCAs, except in the following conditions:

- Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuel wood cutting in RHCAs only where present and future debris needs are met, where cutting would not retard or prevent attainment of RMOs, and where adverse effects on anadromous fish can be avoided.
- Apply silviculture practices for RHCAs to acquire desired vegetation characteristics where needed to attain RMOs. Apply silviculture practices is a manner that does not retard attainment of RMOs and that avoid adverse effects on listed anadromous fish.

Direction in PACFISH specific to Fire/Fuels Management and relevant to this project includes the following:

- Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of RMOs, and to minimize disturbance of riparian ground cover and vegetation.
- Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function, listed anadromous fish, or designated critical habitat.

Direction in PACFISH specific to Roads Management and relevant to this project includes the following:

- For each existing or planned road, meet the RMOs and avoid adverse effects on listed anadromous fish by: (a) completing Watershed Analyses prior to construction of new roads or landings in RHCAs, (b) minimizing road and landing locations in RHCAs, (c) initiating development and implementation of a Road Management Plan or a Transportation Management Plan, and (d) avoiding sediment delivery to streams from the road surfaces.
- Determine the influence of each road on the RMOs.
- Construct new, and improve existing culverts, bridges, and other stream crossing to accommodate a 100-year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions.
- Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

Direction in PACFISH specific to Recreation Management and relevant to this project includes the following:

- Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of RMOs and avoids adverse effects on listed anadromous fish. Relocate or close recreation facilities where RMOs cannot be met or adverse effects on listed anadromous fish avoided.
- Adjust dispersed and developed recreation practices that retard or prevent attainment of RMOs or adversely affect listed anadromous fish. Where adjustment measures such as

education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting RMOs and avoiding adverse effects on listed anadromous fish, eliminate the practice or occupancy.

Direction in PACFISH specific to Fisheries/Wildlife Restoration includes the following:

- Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of RMOs.

Channel Morphology and Sediment Routing

Stream gradient is an important parameter that has implications for sediment transport and deposition. It is also related to fish habitat quality, since many species prefer lower gradient stream reaches for certain life stages. Lower gradient reaches on 3rd to 5th order streams in the project area are particularly well-suited for chinook salmon and steelhead spawning. The data below were compiled with GIS methods using the 1:24,000 scale NHD stream layer and 30 meter DEM data.

Table H.2 Percent Stream Length by Gradient Classes – American River

Watershed Name	Stream Miles	<2%	2-4%	4-10%	10-20%	20-40%	>40%
Middle American River[1]	12.8	45	12	34	9	0	0
East Fork American River[1]	19.6	12	12	28	39	9	0
Whitaker Creek	4.6	6	2	46	33	12	0
Queen Creek	4.8	6	12	67	16	0	0
Box Sing Creek	4.1	11	6	36	46	0	0
Kirks Fork	26.8	8	8	37	35	11	1
Lower American River[1]	17.7	53	4	12	29	2	0

[1]Data compiled for composite watersheds, not pure watersheds

Sediment Routing

Sediment routing considers the disposition of sediment within the watershed system, including processes of erosion, deposition, storage and transport. It includes upslope and instream components. The upslope component includes initial detachment, erosion and delivery efficiency. The instream component includes suspended and bedload sediment yield, as well as substrate deposition and composition. The instream component also includes consideration of streamflow and channel morphology, both of which influence the capability of the stream to transport or deposit sediment.

Erosion and Delivery Processes

The erosion process initiates with detachment of material. Detachment can occur through weathering processes such as frost heave or raindrop impact. Erosion can occur as dry ravel, surface erosion (e.g., sheet, rill and gully) and mass erosion (e.g. debris avalanches, slumps and earthflows). The rate of each is dependent on climate, landforms, geology, soils and exposure of mineral soil. For freshly exposed materials, surface erosion is probably the dominant process in the American River landscape. Transport occurs when rainfall or snowmelt generate water in sufficient quantities to carry the detached materials.

In most cases, a large proportion of eroded material is stored on the landscape without being delivered to the channel system. Storage can take place in hollows and flats or behind obstructions. It can also occur on slopes if the water transporting the material infiltrates. Delivery efficiency has been estimated for each landtype on the NPNF, which is also applicable to the Eastside Project. Sediment is considered to be delivered to the channel system when it reaches a stream with defined bed and banks. Within the sediment model, this is assumed to occur at a catchment area of 1 mi^2 (USDA-FS, 1981).

Instream Processes

Once sediment is delivered to the channel system, it is subject to transport or deposition. Transport can occur as suspended or bedload sediment. Fine materials, such as clay, silt and fine sand are transported in the water column as suspended sediment. This material usually travels through the system rapidly and only deposits in still water. It contributes to the turbidity that is seen during runoff events. During active runoff periods the travel time of suspended sediment through the American River watershed and out of the South Fork Clearwater River subbasin is less than 24 hours. Monitoring at gauging stations in nearby Red River indicated that suspended sediment constitutes about 40 percent to 60 percent of the annual sediment yield (Gloss, 1995). Recent analyses with a larger dataset suggest that suspended sediment may be a higher proportion of total sediment yield.

Bedload sediment moves along the channel bottom and typically consists of medium and coarse sand, gravel and cobble. Boulders may occasionally move as bedload, but only for short distances in any given event. Bedload transport and deposition is a complex and intermittent process. It is highly dependent on stream energy in terms of streamflow and channel morphology. Under given conditions of streamflow, a river could transport or deposit bedload sediment in different reaches or habitat units, depending on gradient and cross-sectional characteristics. Bedload transport is an episodic process that occurs at higher streamflows, with the majority occurring at discharges approaching bankfull and above. Under low and moderate flow conditions, very little if any bedload is in transport.

Materials of various sizes are deposited between episodes of transport. Deposition can involve fines (i.e. sand) intruding into coarse substrates or covering the stream bottom. When large amounts of coarse substrates are deposited, aggradation and changes in bedforms can result. In some cases this can lead to further adjustments, such as bank erosion and changes in channel morphology. Storage of deposited sediment within a given habitat unit or reach may be relatively short, for example between flow events or seasons. In other cases, storage can be on the order of years to indefinitely.

Stream gradients for the American River watershed are described above in Tables E.3 and E.4. Lower gradient reaches are particularly susceptible to sediment deposition and relatively long term storage. With regard to sediment deposition and transport, one classification system suggests that channels with <3 percent gradient can be considered response reaches and channels with >3 percent gradient can be considered either transport or source reaches (Montgomery and Buffington, 1993).

In subwatersheds affected by project activities in American River, Middle American and Lower American both have >45 percent of their channel system with gradient <2 percent. Conversely, the other subwatersheds all have >60 percent of their channel system with gradient >4 percent.

Flow Regime

The flow regime for American River is similar to the upper South Fork Clearwater River. The data represented below were collected by the USGS just upstream of the mouth of Crooked River. Though discontinued in 1974, this stream gage was re-established in 2002 and is currently in operation.

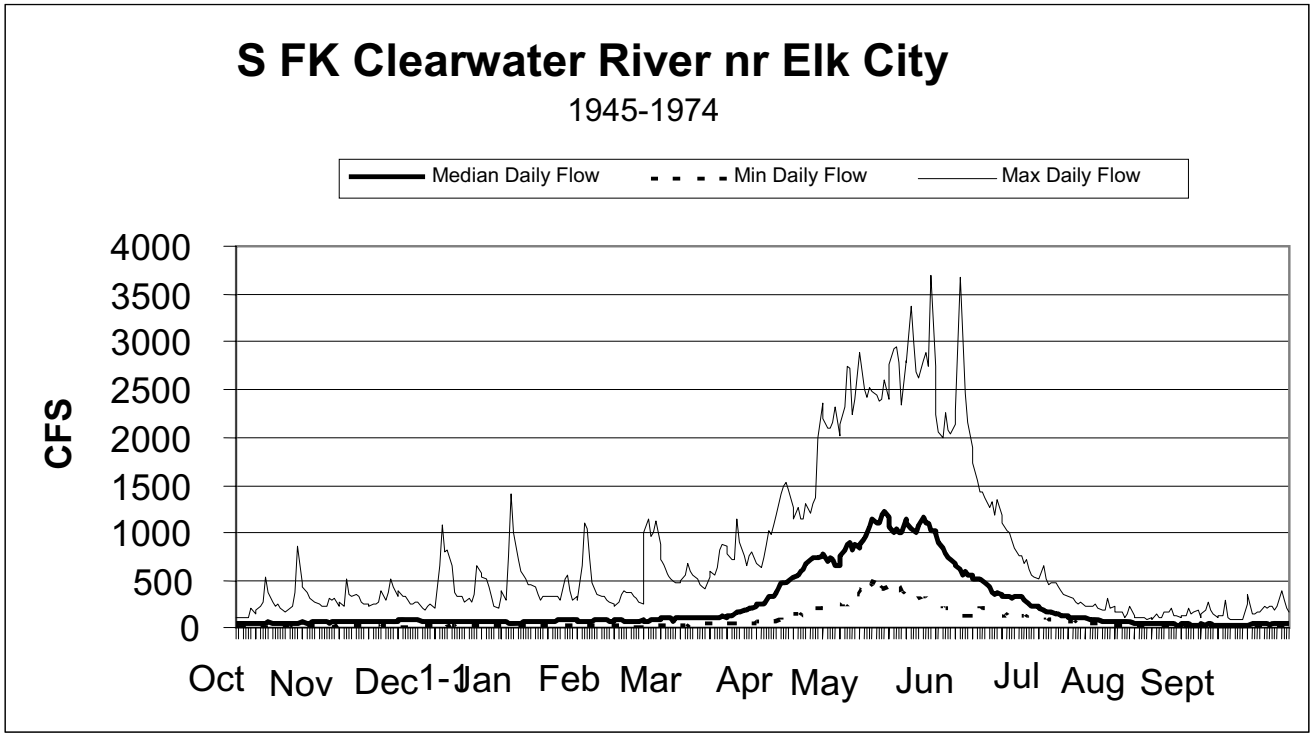

Figure H.2 Annual Hydrograph

Aquatic Model Disclosures

This section discloses the assumptions, limitations, management thresholds, and field tests associated with the three aquatic effects models used in the Eastside project analysis. The models are Equivalent Clearcut Area (ECA), NEZSED, and FISHSED.

Equivalent Clearcut Area (ECA)

The ECA model procedures are derived from Forest Hydrology, Part II (USDA-FS, 1974). Equivalent Clearcut Area (ECA) analysis is a tool used to index the relationship between vegetation condition and water yield from forested watersheds. The basic assumptions of the procedure are that removal of forest vegetation results in water yield increases and that ECA can be used as an index of these increases. Depending on the interaction between water yield, sediment yield, and stream channel conditions, such increases could have impacts on stream channels.

Water yield increases can be directly modeled, but equivalent clearcut area (ECA) is often used as a surrogate. The ECA model is designed to estimate changes in mean annual streamflow resulting from forest practices or treatments (roading, timber harvest, and fires), which remove or reduce vegetative cover, and is usually expressed as a percent of watershed area (Belt, 1980). The index takes into account the initial percentage of crown removal and the recovery through regrowth of vegetation since the initial disturbance. For purposes of this assessment, ECA will be used to index changes in water yield through time based on timber harvest and roading disturbances.

There are a number of physical factors that determine the relationship between canopy conditions and water yield. These include interception, evapotranspiration, shading effects and wind flux. These factors affect the accumulation and melt rates of snow packs and how rainfall is processed. The ECA analysis takes into account the initial percentage of crown removal and the recovery through vegetative re-growth since the initial disturbance in the case of timber harvest or fire. Within the habitat types being treated

under this project, the time frame for complete ECA recovery to occur is estimated to be 65 to 85 years (USDA-FS, 1974).

Additional factors affecting water yield include compacted surfaces due to roads, skid trails, and landings. Existing and new roads are considered as permanent openings in the ECA model. Decommissioned roads are considered as openings, so the road decommissioning projects do not contribute to reductions in ECA.

The ECA model does not directly account for the effects of peak flows. Peaks flows in the project area are nearly always associated with spring snowmelt, at times accompanied by rainfall. This can be seen in Figure H.2. Winter rain-on-snow events are historically rare and only infrequently exceed the spring runoff peak. About 3 percent of annual peak flow events have occurred during the winter months of November through March (USDA-FS, 1998). The effects of peaks flows are considered using stream channel and streambank evaluations and professional judgment in the interpretation of ECA effects on stream channels.

Various ECA thresholds of concern have been in use in the Northern Region since the 1960s (Gerhardt, 2000). Early cutting guides recommended a limit of 20-30 percent ECA within a watershed (Haupt, 1967). More recently, ECA thresholds have been rejuvenated through consultation under the Endangered Species Act.

Recently, concern over water yield changes relative to stream channel condition has focused on smaller headwater catchments. Research in the nearby Horse Creek watershed study have demonstrated instantaneous peak flow increase up to 34 percent and maximum daily flow increases up to 87 percent, resulting from road construction and timber harvest in small catchments (King 1989). Recent observations have suggested that channel erosion from these streams may be contributing to increased bedload sediment in the 3rd order receiving channel (Gerhardt, 2002).

The studies by Belt (1980) and King (1989) have also served as field tests of the ECA procedure. Belt concluded that the ECA procedure is a rational tool for evaluation of hydrologic impacts of forest practices. King recommended local calibration of the model and a greater emphasis on conditions in 1st and 2nd order headwater streams.

Water yield analysis was conducted in smaller drainages (i.e., 1st and 2nd order streams) for several reasons:

1. To compare with findings from King (1993) and Troendle and King (1987);
2. To focus and conduct analyses in drainages that have proposed management activities;
3. Often smaller 1st and 2nd order stream may be potential source areas for sediment and are A type streams. Consequently, stability evaluation of these channel types is important for analyses purposes.

ECA levels above 25 percent were used to determine potential damage to stream channels as a result of increase water yield from timber harvest. This was then compared with respective channel types and channel stability ratings to determine the likelihood of observable channel change. ECA levels above 40 percent were determined to likely have observable channel changes. The 40 percent is based on the Idaho State Cumulative Effects Process hydrologic rating. (Idaho Department of Lands 1995)

The percent increase in ECA levels was used to determine an increase in risk, relative to each alternative, of causing channel changes as a result of timber harvest or other activities that increase ECA. The relative ECA risk is also assessed in conjunction with respective channel types and channel stability rating

NEZSED

Sediment yield is defined as the movement of sediment past a point in the stream system over a certain time period. Sediment yield can be sampled in the field utilizing a variety of methods. The most common method consists of sampling suspended sediment, bedload sediment, and stream discharge. Sediment yield can also be modeled using one of several approaches.

NEZSED is a computer model tiered to the R1R4 guidelines (Cline et al., 1981), developed by hydrologists and soil scientists from the Intermountain Research Station and the Northern and Intermountain Regions of the Forest Service. The model estimates the average annual natural or base rate of sediment yield, and surface erosion sediment yield produced from roads, logging, and fire. The model is limited in that it does not consider the effects of activities on mass erosion greater than 10 cubic yards. It also does not include the effects of grazing and most instream and mining activities. Effects of land uses other than roads, logging and fire are analyzed using other information and techniques.

For this analysis, NEZSED was used to model timber harvest, temporary road construction, reconstruction of existing roads and road decommissioning. Activities under this project that are not modeled are riparian restoration and streambank, recontouring, and construction of a re-connect channel for Queen Creek. The effects of these other activities were considered in the overall aquatic analysis and conclusions.

Though the model shows annual variations in response to land use, it does not estimate variations due to climate or weather events. NEZSED is not an event-based model in that sediment yield does not vary in accordance with specific assumed runoff or erosion events. It estimates average annual sediment yields. However, modeling coefficients are the result of a research base that includes the cumulative result of individual storm and runoff events. Thus, the effects of storm events are incorporated into the model coefficients, though the model results are expressed in terms of average annual yields.

Though NEZSED does not model large activity-related mass erosion events, effects of such events are considered in the effects analysis. This is done through mapping of landslide prone terrain and avoidance of areas deemed to possess high hazard and mitigation of areas deemed to possess moderate hazards. Mass erosion occurrences were also noted during field inventories.

Routing of sediment through the stream channel system is a known limitation of the R1R4 Guidelines, including the NEZSED application. The routing procedure in R1R4 is an adaptation of empirical relationships derived by Roehl (1962). It reduces the percentage of sediment to a point in the channel through application of a channel sediment routing coefficient. The sediment yield rate decreases with increasing watershed area. This simplification of a complex process is overcome through application of professional judgment and interpretation. Also, when used in conjunction with the FISHSED model, sediment routing is empirically considered, since the calibration of FISHSED was done by regressing measured sediment substrate values against modeled sediment yields.

Management thresholds for sediment yield were established in the Chief Joseph Management Framework Plan (USDI-BLM, 1981) and supplement guidance (USDI-BLM, 1985, 1989a, and 1989b). These include sediment yield guidelines, expressed as peak year percent over base sediment yield, and entry frequency guidelines, expressed as the number of times per decade that sediment yield guidelines can be equaled. For the Eastside project, these guidelines are found in Table H.1 above.

NEZSED has been tested against field sampled data in several studies at three scales of watersheds across the Nez Perce National Forest (Gerhardt, 2005). The first study compared measured and modeled natural sediment yields at fifteen small watersheds that are tributaries to Horse Creek, which is a tributary of the Meadow Creek watershed draining into the Lower Selway Subbasin (Gerhardt and King, 1987). These watersheds ranged in size from 0.08 to 0.57 square miles. Annual sediment yield was sampled with sediment detention basins, suspended sediment samples, and streamflow gauging. Of the fifteen tributaries sampled, the model over-predicted sediment yield on nine sites and under-predicted on six sites. The mean result was that the model over-predicted by about 23 percent.

The second study evaluated data from eight stream gauging stations on the Nez Perce National Forest, ranging in size from 5.7 to 113 square miles. Three of these were located within the South Fork Clearwater Subbasin (Gloss, 1995). At six stations, the field data consisted of suspended and bedload sediment samples, along with streamflow gauging. At two stations, sediment yield was estimated through

the use of sediment detention basins and streamflow gauging. This study found that NEZSED under-predicted sediment yields at six stations and over-predicted at two stations, when compared to observed data from field sampling during water years 1986 through 1993. For the three stations within the South Fork Clearwater Subbasin, field-sampled sediment yields averaged about 30 tons/mi²/yr. and modeled sediment yields averaged about 12 tons/mi²/yr. In general, the model predicted better in average to below average water years, and more significantly under-predicted in above average water years.

A third study to test the NEZSED model compared field sampled and modeled sediment yield at the subbasin scale, using data from the South Fork Clearwater and Selway Rivers. Sampling in both rivers occurred between 1988 and 1992 and consisted of 52 suspended sediment samples. The South Fork data were collected at the Mt. Idaho Bridge, near the forest boundary where the watershed area is about 830 square miles. When calculated as annual sediment yield, these data suggest an annual sediment yield at this site of 17,880 tons/year, or about 22 tons/mi²/yr. Sediment yield predictions at this site, based on NEZSED, were estimated to be 15,080 tons per year, or about 18 tons/mi²/yr (USDA-FS, 1998).

The Selway River data were collected at the USGS gage near Ohara Creek, where the watershed area is about 1910 square miles. When calculated as annual sediment yield, these data suggest a sediment yield at this site of 54,900 tons/year, or if adjusted to the mouth, 55,700 tons/year. The watershed area at the mouth is 1974 square miles, so the sediment production is 28 tons/mi²/yr. Sediment predictions based on modeled sediment at the mouth of the Selway River were 54,400 tons/year or about 27.5 tons/mi²/yr (USDA Forest Service 2001).

A fourth study (Thomas and King 2004) tested NEZSED against measured data at stream gages in Red River and South Fork Red River. Results showed that NEZSED predicted 74 percent and 89 percent, respectively, of field-sampled sediment yield over a 16-year period at these two gauging stations. The model results were closer to measured values at these two stations than found in the Gloss study.

FISHSED

The Guide for Predicting Salmonid Response to Sediment Yields in Idaho Batholith Watersheds (Stowell, et.al., 1983, aka the FISHSED model) has been used in this project to predict the effect of sediment yields on stream habitat and fish populations. This model is based on assumptions and has limitations.

The assumptions of the FISHSED model are listed in Appendix A of the model documentation (Stowell et al., 1983). Some of the key assumptions with influence on the limitations of this model include: 1) on those Management Units or Forests in which mass erosion is a significant hazard, predicted sediment yield will include a mass erosion component. The Eastside Project does not occur in a landscape where mass erosion is a significant hazard; 2) The relative response of salmonid fish populations to increased levels of sediment and percent fines in the substrate as depicted in laboratory studies approximates the response under natural conditions. The model documentation (p. 6) describes studies that support this assumption and others that show some differences.

The FISHSED model has other recognized limitations including: 1) the model simplifies an extremely complex physical and biological system and is developed from limited scientific knowledge (p. 2). The complex sequence of sediment movement, from the slopes to the channel, transport down, and deposition in a channel reach, and its effect on fish habitats and populations, have not been fully described (p. 5); 2) the method was developed for watersheds and fish species associated with the Idaho Batholith (p. 4), using data from the Clearwater and Nez Perce National Forest. Given the source of the original data, the model is applicable to the Eastside Project; 3) the specific fish response curves in this model were partially developed from laboratory experiments and may constitute only partial simulation of natural conditions (p. 6); 4) the model evaluates embryo survival, winter carrying capacity, and summer rearing capacity. While invertebrate insect abundance may be directly affected by sediment, the relationship between sediment deposition and invertebrate production is not included in the model (p.10); 5) the utilization of channel types to stratify fish response, particularly with respect to the modeling of "A"

channel types, may not realistically represent changes in fish habitat (p. 21); 6) the model does not include a "recovery function" that predicts the changes in substrate condition based on natural flow events; 7) the model was calibrated to the original Nez Perce Forest sediment model and landtypes, which have been updated since model development. Limited testing and validation of the model has been conducted by the Cottonwood Field Office; and 8) the model outputs are reasonable estimates, but are not absolute numbers of high statistical precision (p. 6). As appropriate given this limitation, the model outputs have been used by the fisheries biologists in this project in combination with sound biological judgment.

WEPP

Disturbed WEPP (Elliott et al. 2000) is an interface to the Water Erosion Prediction Project (WEPP) soil erosion model to allow users to easily describe numerous disturbed forest and rangeland erosion conditions. The interface presents the results as a summary and extended WEPP outputs, and also presents the probability of a given level of erosion occurring the year following a disturbance. Disturbed WEPP is linked to the Rock:Clime climate generator with a database of climate statistics for more than 2600 weather stations.

Disturbed WEPP is one in a series of the USDA Forest Service's Internet-based computer programs based on the Agricultural Research Service's WEPP model. Disturbed WEPP is designed to predict runoff and sediment yield from:

- young and old undisturbed forests
- prescribed and wild forest fires
- skid trails and harvested forests
- rangelands with short grass, tall grass, and shrub plant communities
- any condition with little soil disturbance (no tillage) but a definable amount of soil residue cover (such as parks, pastures, no till agriculture)

Disturbed WEPP is not intended for:

- tilled agricultural conditions (use USDA-ARS templates (WEPP 1999))
- sites where soil is severely disturbed or compacted, such as roads and trails (use WEPP:Road), construction sites, heavily-used playgrounds or trampled rangelands,

Disturbed WEPP allows the user to specify the characteristics of the site in terms of

- climate
- soil texture
- local topography
- plant community
- surface residue cover

Forest Erosion Processes: Forests generally have very low erosion rates unless they are disturbed. Common disturbances include prescribed and wild fire, and harvesting operations. The impact of these operations, however, last only for a short time, perhaps one or two years. After that, the rapid regrowth of vegetation soon covers the surface with plant litter, and potential erosion is quickly reduced. In one study, Robichaud and Brown (1999) reported that erosion rates dropped from almost 40 Mg ha (40,000 kg ha; 19.6 tons acre) the first year after a fire to 2.3 Mg ha (2,300 kg ha; 1.1 tons acre) the second, and 1 Mg ha (1000 kg ha; 0.5 ton acre) the third year. The regrowth of vegetation and subsequent increase in canopy and ground cover overshadow any differences due to climate variation among the years. For any one of the given years, however, the potential erosion depends on the climate.
If the year is normal or dry, then it is unlikely for there to be any significant erosion. If the year has above average precipitation, however, then there could be significant soil erosion. With such variation from one

year to the next, the concept of "average annual erosion" is not appropriate as there is no such thing as an "average" year. The erosivity of a given year is either above average, or below average. A more appropriate analysis of soil erosion following a forest disturbance may be the probability of a given level of erosion occurring. For example, some recent estimates of runoff and erosion after a wild fire required an estimation of a 5-year return period event (an exceedance probability of 0.20).

The WEPP model (Flanagan and Livingston, 1995) is a physically-based soil erosion model that can provide estimates of soil erosion and sediment yield considering the specific soil, climate, ground cover, and topographic conditions. It was developed by an interagency group of scientists including the U.S. Department of Agriculture's Agricultural Research Service (ARS), Forest Service, and Natural Resources Conservation Service; and the U.S. Department of Interior's Bureau of Land Management and Geological Survey.

WEPP simulates the conditions that impact erosion--such as the amount of vegetation canopy, the surface residue, and the soil water content for every day in a multiple-year run. For each day that has a precipitation event, WEPP determines whether the event is rain or snow, and calculates the infiltration and runoff. If there is runoff, WEPP routes the runoff over the surface, calculating erosion or deposition rates for at least 100 points on the hillslope. It then calculates the average sediment yield from the hillslope.

The WEPP model allows a hillslope to be divided into segments with similar soils and vegetation, called overland flow elements. Disturbed WEPP assumes there are two overland flow elements. This allows users to specify a buffer strip below a skid trail, prescribed fire, or harvesting activity in forests. In rangelands, the user may wish to describe different vegetation in the riparian area than in the upland areas.

Disturbed WEPP Assumptions: Because WEPP is process-based, it can be applied to conditions where the necessary input data are known. WEPP is difficult to apply, however, because of the amount of input data required. To simplify the application of WEPP to forest and rangeland conditions anywhere in the U.S., a custom interface was developed.
Soil properties are based on research findings from Forest Service research (Robichaud, 1996) and USDA Agriculture Research Service (ARS) (Flanagan and Livingston, 1995, Franks et al., 1998). The soil file database includes four textural categories. Within each of these categories, there is a separate set of erodibility values for each of the eight types of vegetation or disturbance. Thus, the database has a total of 32 soil/vegetation conditions.

Disturbed WEPP gives both an average annual erosion, as predicted by most USLE-based erosion technologies, and the probability of a given annual erosion rate following a disturbance. The average annual erosion is more appropriate for application to rangelands, whereas the probabilities of annual erosion are more applicable to disturbed forest conditions, where a forest quickly revegetates following a disturbance.

To estimate an average annual erosion, Disturbed WEPP generates a stochastic climate for the climate selected, for the number of years specified. The WEPP model then runs a daily simulation for the specified period of time, and calculates the average annual runoff, erosion, and sediment yield values.

To determine the probability values, Disturbed WEPP is run for the number of years requested, and the annual values of runoff, erosion, and sediment yield are generated by WEPP. Disturbed WEPP then sorts the annual values by magnitude.

For a 50-year run, the largest values estimate a 50-year return period (or 0.02 probability of occurring) value; the second largest, a 25-year return period; the fifth largest a ten-year return; and the 20th largest a 2.5-year return period.

The average value is the same as a 2-year return period regardless of the number of years of simulation selected.

Forest Assumptions: For forest conditions, there are two levels of forest age: 5-year-old and 20-year-old. By the time a forest reaches 20 years of age, the impact of the canopy and residue accumulation is sufficient to provide as much erosion protection as can be achieved from vegetation.
The 5-year-old forest is considered a reasonable condition to describe a forest that has been heavily logged, leaving some side trees and considerable groundcover, or to describe a forest one to two years after a prescribed fire, or two to three years after a wild fire.

The skid trail condition describes a compacted, bladed skid trail with very little cover.

The prescribed burn and wildfire conditions contain soil properties similar to those observed in research (Robichaud, 1996).

Climate: Several climates (Birmingham, AL; Flagstaff, AZ; Mount Shasta, CA; Denver, CO; Moscow, ID; and Charleston, WV) are listed in the climate list as stock climates for Disturbed WEPP. These climates are provided to allow the user to quickly select a regional climate for an initial run.

Most users will prefer to use the Rock:Clime weather generator to select desired climates from the 2,600 sets of climate statistics in the database.

Users may select several nearby climates to determine the sensitivity of their site to climate effects. Up to five sets of custom climate statistics may be selected for the Disturbed WEPP interface.

Thirty years of simulation is generally adequate for average values, and 50 or 100 years for Return Period Analyses.

The user must specify the number of years of simulation. For climates with more than 500 mm of precipitation, 30 years of simulation is generally adequate to obtain an estimate of the average annual erosion, and 50 years is adequate for the probability distribution of erosion.

For drier climates, 50 or more years of simulation may be needed to achieve an average value, and 100 years for the probability of a given amount of erosion occurring. In dry climates, there are more years with little or no erosion, so a greater total number of years is necessary to ensure that there have been an adequate number of wet years for the analysis. The maximum number of years in Disturbed WEPP is 200.

Users may wish to carry out some preliminary runs for some typical local climates to determine how many years of run are necessary for their conditions to ensure a stable average erosion value.

The ARS CLIGEN weather generator uses the climate statistics from the selected station to generate a daily weather sequence for the number of years specified. The WEPP model reads the generated daily weather to predict the erosion for the specified conditions.

Soil Texture: The erosion potential of a given soil depends on the vegetation cover, the surface residue cover, the soil texture, and other soil properties that influence soil strength. Because research in forest and range conditions is limited and data are not available to support a detailed database, only four soil textures (sand, silt, clay, and loam) are listed for Disturbed WEPP. The specific soil properties associated with each selection can be seen by selecting the desired soil and vegetation, and clicking the Soil Texture title. As new information is accumulated, the values of the soil parameters and new soil options may be added to the database.
To fully describe each set of soils for WEPP requires 24 soil parameter values. Further details describing these parameters are available in the WEPP Technical Documentation (Alberts et al., 1995).

Vegetation Treatment: There are eight categories of vegetation or treatment. A default cover is associated with each vegetation treatment, but users are encouraged to alter this value to suit site conditions. The vegetation treatments are:

- Twenty-year old forest
- Five-year old forest
- Shrub dominated rangeland
- Tall-grass dominated rangeland
- Short-grass dominated rangeland
- Low severity fire
- High severity fire
- Skid trail

These categories can describe a wide range of forest and rangeland conditions. The selection of a given vegetation treatment alters these key input values for the WEPP model:

- Plant height, spacing, leaf area index and root depth
- Percent of live biomass remaining after vegetation
- Soil rill and interrill erodibility and hydraulic conductivity
- Default radiation energy to biomass conversion ratio

The user has the option to alter the desired amount of cover, which increases the range of conditions that can be described. Disturbed WEPP is very sensitive to cover, so this value should be carefully selected. The user may wish to consider several cover amounts to understand the impacts of varying cover on the resulting soil erosion.

Predicting Erosion from Regeneration: After a disturbance in a forest, the vegetation regenerates. The vegetation treatments in Disturbed WEPP allow users to analyze the erosion in the years following regeneration.
Cover (%): The percent cover for a given vegetation is predicted by the WEPP model as a function of a biomass conversion ratio, the percent of biomass remaining after senescence, and the residue decomposition rate. These values are stored in the Disturbed WEPP database, and are entered in the WEPP management file for each WEPP run. The biomass conversion ratio is estimated from the percent cover by the relationship:

$$\text{Ratio} = 8.17 * \exp(0.031 * \text{Cover} - 0.0023 * \text{Precipitation})$$

where Ratio is the biomass conversion ratio in the WEPP Management input file for the respective overland flow element, between 1 and 1,000; Cover is the percent cover entered on the input screen, with a maximum value of 100 percent; and Precipitation is the average annual precipitation for the selected climate in mm, with a maximum value of 450 mm.

The percent cover also varies with the distribution of precipitation, daily temperature values, and soil water content throughout the growing season. In some cases, average cover may be over-predicted, in others under-predicted. The predicted cover for a given set of conditions can be observed by selecting the desired vegetation, entering the desired cover, specifying at least 10 years of simulation. The WEPP model will then be run for the specified number of years, the average erosion values calculated, and the average above ground live biomass and percent cover determined from the daily values.

If the resulting average cover is too low or too high, the value entered on the input screen can be adjusted by trial and error until the desired cover is predicted by WEPP. The user should make a note of the input value necessary to achieve the desired cover for his/her conditions.

Topography – Slope: The topographic input for Disturbed WEPP includes two gradient or slope entries for the top element and two for the bottom. If the first element starts at the top of the hill, the first slope is zero. The final slope is the steepness at the bottom of the hillslope. The other two slopes are the steepness at the centers of the respective elements. Disturbed WEPP calculates an average of these two values for the steepness where the two elements intersect. Generally, WEPP is not real sensitive to detailed

variations in slope. The overall average slope, and the slope at the bottom of the hill are the two most important variables that impact slope.

Area and Width: The area of the slope is also required by Disturbed WEPP. The program divides this area by the length of the hill to estimate an average width of hillslope. The predicted soil erosion rates are presented in tonnes per hectare (tons per acre), so the total erosion, or total sediment delivery from the hillslope is the result of these predictions multiplied by the area.

Aquatic Trend Analysis

Introduction to Trend Analysis

To assess the expected trend in aquatic habitat condition, from the variety of influences both quantitative and qualitative, the activities and their expected contribution to aquatic condition are summarized in a table below. The following table H.3 is a summary of the expected influence of the alternatives on the aquatic conditions in the American River watersheds respectively. It does not represent an assessment of cumulative effects, or expected trend within specific subwatersheds. Various activities are considered with respect to the variety of aquatic processes that they potentially affect. For additional information and specific summary of restoration projects refer to Appendix I – Watershed and Fisheries Restoration.

The contribution to the overall aquatic condition is estimated in terms of positive influence (denoted by "+") where the activity is expected to contribute to an improvement in condition, and a negative influence (denoted by "-") where the activity is expected to contribute to degradation in aquatic condition. The amount of influence a specific activity is expected to have on the overall aquatic condition (either positive or negative) is represented by a ranking of high (H), moderate (M), or low (L). Activities rated "High" are those that are expected to have potential for detectable effect at the watershed scale (considering both scope and magnitude). Those rated as "Moderate" are those activities that are expected to have a measurable or detectable local effect (i.e. at the subwatershed or stream reach scale), but result in a negligible effect at the watershed scale. Those activities rated "Low" are expected to have only a negligible effect at the stream reach, subwatershed, and watershed scale.

All of the processes potentially affected by an activity are listed in the table. No ranking represents "no expected" influence on conditions from this project. A negligible positive influence (denoted by "+Negl.") where the activity is expected to contribute minimal or minor improvement in condition, and a negligible negative minor influence (denoted by "-Negl.") where the activity is expected to contribute to minimal or minor degradation in condition. The expected contribution of a specific activity on aquatic condition is considered both in terms of short-term and long-term. Short-term influence is judged to be the immediate results of implementing the activity, generally expected to be around a 5-year timeframe. Long-term influence is judged to be the influence the activity will have on aquatic condition as a result of changes in processes and resource conditions that will over time result in changes in aquatic habitat condition. The timeframe for this influence is greater than 5 years.

Table H.3 American River Aquatic Trend Analysis

Action	Process Affected	Characteristic Indicator	Alt. A Short Term	Alt. A Long Term	Alt. B Short Term	Alt. B Long Term	Alt. C Short Term	Alt. C Long Term	Alt. D Short Term	Alt. D Long Term
Vegetation Treatments	Surface Erosion	Sediment		-L	-L		-L		-L	
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process		-L	-L		-L		-L	
	Riparian Shading	Riparian Condition & Water Temp.				+L		+L		+L
	LWD Recruitment	Potential LWD				+L		+L		+L
Temporary Road Construction	Surface Erosion	Sediment			-M		-L		-L	
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process			-L		-L		-L	
	Riparian Shade	Riparian Condition & Water Temp.								
	LWD Recruitment	Potential LWD								
Road Improvement and Maintenance	Surface Erosion	Sediment			-L	+L	-L	+L	-L	+L
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process								
	Fish Passage	Habitat Availability								
	Riparian Shade	Riparian Condition & Water Temp.								
	LWD Recruitment	Potential LWD								
New Road Construction and Bridge	Surface Erosion	Sediment					-L	-L	-L	-L
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process					-L	-L	-L	-L
	Riparian Shading	Riparian Condition & Water Temp.						-Negl.		-Negl.

Action	Process Affected	Characteristic Indicator	Alt. A Short Term	Alt. A Long Term	Alt. B Short Term	Alt. B Long Term	Alt. C Short Term	Alt. C Long Term	Alt. D Short Term	Alt. D Long Term
	LWD Recruitment	Potential LWD						-Negl.		-Negl.
Watershed and Fisheries Restoration										
Road Decomm.	Surface Erosion	Sediment		-L	-L	+L	-L	+M	-L	+L
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process		-L	+L	+L	+L	+M	+L	+L
	Riparian Shading	Riparian Condition & Water Temp.				+L		+M		+L
	LWD Recruitment	Potential LWD				+L		+M		+L
American River Vehicle Road Relocation & Road Decomm. in Riparian	Surface Erosion	Sediment			-L	+M	-L	+M		
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process			+L	+M	+L	+M		
	Riparian Shading	Riparian Condition & Water Temp.				+M		+M		
	LWD Recruitment	Potential LWD				+M		+M		
Riparian Restoration	Surface Erosion	Sediment			-M	+M	-M	+M	-M	+M
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process			-L	+L	-L	+L	-L	+L
	Riparian Shading	Riparian Condition & Water Temp.		+L	-L	+M	-L	+M	-L	+M
	LWD Recruitment	Potential LWD		+L		+M		+M		+M
	Fish Disturbance & Aquatic Habitat	Habitat Use and Quality			-Negl.		-Negl.		-Negl.	
Road to ATV Trail Conversion (includes closing fords and ATV	Surface Erosion	Sediment			-L	+L	-L	+L	-L	+M
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process			-L	+L	-L	+L	-L	+L
	Riparian Shading	Riparian Condition & Water Temp.				+L		+L		+M

Action	Process Affected	Characteristic Indicator	Alt. A Short Term	Alt. A Long Term	Alt. B Short Term	Alt. B Long Term	Alt. C Short Term	Alt. C Long Term	Alt. D Short Term	Alt. D Long Term
bridges)	LWD Recruitment	Potential LWD				+L		+L		+L
	Fish Disturbance & Aquatic Habitat	Habitat Use and Quality			+L	+L	+M	+M	+M	+M
Hardening Ford and Meadow Restoration	Surface Erosion	Sediment			+L	+L				
	Infiltration, Runoff, Peaks	Hydrologic Process		.	+Negl.	+Negl.				
	Riparian Shading	Riparian Condition & Water Temp.			+Negl.	+Negl.				
	LWD Recruitment	Potential LWD			+Negl.	+Negl.				
	Fish Disturbance & Aquatic Habitat	Habitat Use and Quality			+L	+L				
Mine Reclamation	Surface Erosion	Sediment			-L	+L	-L	+L	-L	+L
	Mass Failure Risk	Sediment								
	Infiltration, Runoff, Peaks	Hydrologic Process			+Negl.	+Negl.	+Negl.	+Negl.	+Negl.	+Negl.
	Riparian Shading	Riparian Condition & Water Temp.								
	LWD Recruitment	Potential LWD								
Queen Creek Channel Re-connect	Surface Erosion	Sediment			-L		-L		-L	
	Infiltration, Runoff, Peaks	Hydrologic Process								
	Riparian Shading	Riparian Condition & Water Temp.								
	LWD Recruitment	Potential LWD								
	Fish Disturbance & Aquatic Habitat	Habitat Use and Quality								
	Fish Passage	Habitat Availability & Aquatic Integrity[1]			+M	+M	+M	+M	+M	+M
	Non-native competition and/or hybridization	Native Species Viability[1]				-L		-L		-L

The expected short-term consequences of the Eastside project on aquatic condition in American River are fairly balanced between positive and negative influences. The factors contributing to a short-term effects to aquatic condition are primarily related to short term increases in sediment generated from the implementation of the action (timber harvest, temporary road construction, new permanent road construction, new vehicle bridge construction, road decommissioning, road reconstruction and improvement). The temporary road construction and new road construction and bridge are judged to be the largest contributor to this influence, followed by the harvest activities, road decommissioning, and road improvements. The consequences of the Eastside Project on aquatic condition in American River is to generally have short-term negative influences, but positive influences in the long term. Short-term increases in sediment would primarily be attributed to projects such as temporary road construction, new road construction, and riparian restoration actions that would require bank recontouring and would be followed by vegetation treatments. Primary long-term benefits to aquatic conditions would occur from riparian restoration, decommissioning roads within riparian areas, decommissioning of fords, and reconnecting Queen Creek with American River.

Reduction of road densities, particularly in riparian habitats would reduce chronic "press" sources of sediment. Riparian restoration actions would improve streambank and channel conditions, reduce potential for bank erosion, and provide for large woody debris recruitment in the long term. Reduction of chronic sediment sources and improvement of shading would help support achievement of the South Fork Clearwater River TMDL for sediment and water temperature in the long term.

The expected long-term consequences of the Eastside project on aquatic condition in the American River watershed is over-all positive. The road decommissioning, riparian restoration, road relocations out of riparian areas, and Queen Creek channel re-connect and improved habitat accessibility are judged to be the largest contributors to long-term improved aquatic conditions. The reduction in chronic sediment and improved hydrologic process from the road decommissioning, road improvement, and soil restoration are the other contributors to this expected improvement. The amount of the improvement associated with this later group of activities is rated low due to the amount of this work being completed with this project with respect to the remaining amount of degraded mainstem habitat, roads and compacted soils in the American River watershed. These will continue to contribute negatively to these aquatic processes. BLM lands comprise a relatively small percentage of the total ownership in the watershed, and actions identified in the Eastside Project would reduce negative effects attributed to BLM lands and support upward trends. Additional planned Bureau of Land Management work in this drainage will further improve in channel and riparian conditions along the mainstem as well as tributary streams. The Forest Service has also identified watershed restoration measures that will support long term improvements to aquatic conditions.

The above ratings by activity can be summarized by the effect pathways by assigning a value to the Low, Moderate, and High ranking (L=1, M=2, H=3). Table H.4 below summarizes an overall comparison of the alternatives by the effect pathway for short term and long term.

The No Action alternative in American River suggests no change in the short term, but a slight negative trend in the long term related to fire risk associated with untreated stands, and long term slight positive trends for potential LWD and improving riparian conditions with riparian successional advancement towards mid and late seral stages. Alternatives B, C, and D suggest a short term negative effect, followed by long term improving trend.

Table H.4 American River Aquatic Trend Summary

Action	Process Affected	Characteristic Indicator	Alt. A Short Term	Alt. A Long Term	Alt. B Short Term	Alt. B Long Term	Alt. C Short Term	Alt. C Long Term	Alt. D Short Term	Alt. D Long Term
Summary	Surface Erosion	Sediment	0	-2 (-2, +0)	-10 (-11, +1)	+9 (-0, +9)	-10 (-10, +0)	+8 (-1, +9)	-10 (-10, +0)	+6 (-1, +7)
	Mass Failure Risk	Sediment	0	0 (-0, +0)	0 (-0, +0)	0 (-0, +0)	0 (-0, +0)	0 (-0, +0)	0 (-0, +0)	0 (-0, +0)
	Infiltration, Runoff, Peaks	Hydrologic Process	0	-2 (-2, +0)	-2 (-4, +2)	+5 (-0, +5)	-3 (-5, +2)	+5 (-1, +6)	-4 (-5, +1)	+2 (-1, +3)
	Riparian Shading	Riparian Condition & Water Temp.	0	+1 (-0, +1)	-1 (-1, +0)	+7 (-0, +7)	-1 (-1, +0)	+8 (-0, +8)	-1 (-1, +0)	+6 (-0, +6)
	LWD Recruitment	Potential LWD	0	+1 (-0, +1)	0 (-0, +0)	+7 (-0, +7)	0 (-0, +0)	+8 (-0, +8)	0 (-0, +0)	+5 (-0, +5)
	Fish Disturbance & Aquatic Habitat	Habitat Use and Quality	0	0 (-0, +0)	+1 (-0, +1)	+1 (-0, +1)	+2 (-0, +2)	+2 (-0, +2)	+2 (-0, +2)	+2 (-0, +2)
	Fish Passage	Habitat Availability & Aquatic Integrity	0	0 (-0, +0)	+2 (-0, +2)	+2 (-0, +2)	+2 (-0, +2)	+2 (-0, +2)	+2 (-0, +2)	+2 (-0, +2)
	Non-Native Competition and/or Hybridization	Native Species Viability	0	0 (-0, +0)	0 (-0, +0)	-1 (-1, +0)	0 (-0, +0)	-1 (-1, +0)	0 (-0, +0)	-1 (-1, +0)
Total			**0 (-0, +0)**	**-2 (-4, +2)**	**-10 (-16, +6)**	**+31 (-1, +32)**	**-10 (-16, +6)**	**+32 (-3, +35)**	**-11 (-16, +5)**	**+22 (-3, +25)**

Effectiveness Monitoring and Trend

BLM has an active monitoring program as shown in Table H.5. This monitoring is done to: validate models and assumptions; validate the effectiveness of restoration efforts and BMPs; assess existing conditions and trends; apply adaptive management for changes to existing management if warranted; and provide baseline data for decision making and management of resources.

Trend analysis of aquatic habitats, water quality, and riparian conditions in the Eastside Project area is important because it provides documentation in regards baseline conditions, comparison to desired conditions, and long term changes. Trend monitoring data is especially valuable for assessments of ongoing and new management actions occurring on public lands, because streams within the project area provide habitat for federally listed and BLM sensitive species and MFP requirements related to upward trend requirements for below objectives streams.

Trend monitoring is accomplished through three primary methods, which includes: (1) Monitoring of specific aquatic and/or riparian characteristics at permanently established monitoring stations; (2) conducting stream reach specific surveys which characterize and evaluate habitat and resource conditions; and/or (3) watershed evaluations and assessments. Following is a list of primary data which is utilized for trend assessments.

- Deposited Sediment/Substrate Monitoring
- Riparian/Stream Channel Monitoring
- Stream Reach Surveys and Evaluations
- Water Temperature, Water Quality, and Discharge Monitoring
- Fish Population Monitoring and Distribution Surveys
- Watershed Evaluations and Assessments

Table H.5 illustrates trend monitoring in the Eastside Project Area.

Table H.5 BLM Trend Monitoring – Eastside Project Area

Watershed	Substrate Monitoring	Riparian/Stream Channel Monit. (Livestock Grazing Summary)	Subbasin Fish Habitat Survey	Water Temperature & Discharge
Lower American River	Yes	Yes	Yes	Yes
Middle American River	Yes	Yes	Yes	Yes
East Fork American River	Yes	No (Not Leased for Grazing)	Yes	Yes
Whitaker Creek	Yes	No (Not Leased for Grazing)	Yes	Yes
Queen Creek	Yes	No (Not Leased for Grazing)	Yes	Yes
Box Sing Creek	Yes	Yes	Yes	Yes
Kirks Fork	Yes	Yes	Yes	Yes
Elk Creek	Yes	Yes (Elk Creek Fenced to Exclude Grazing)	Yes	Yes
Little Elk Creek	Yes	Yes	Yes	Yes
South Fork American River	Yes	No (Not Grazed by Livestock)	No	Yes

Additionally, the BLM has established fish population snorkeling stations in all prescription watersheds in the Eastside Project. Population monitoring has been sporadic or very limited consequently; limited population trend data is available. However, the monitoring does provide species presence/absence and general population data that provides baseline population

information. Population data may not always be directly correlated with aquatic habitat conditions, particularly with anadromous fish (i.e., chinook salmon, steelhead trout), because returning adult fish numbers fluctuates annually.

Other monitoring information is available. American River is monitored annually (1981 – 2006) by IDFG for chinook redds and 2006 counts totaled 59 redds. During 2006, the BLM started monitoring the South Fork Clearwater River for chinook redds (Crooked River to American/Red Rivers) and counts totaled 2 redds. The BLM is planning to monitor this segment of the South Fork Clearwater River annually.

Deposited Sediment Trend Monitoring

For the substrate monitoring shown in Table H.4, a minimum of two years of data collection has occurred, and has ranged to a high of eleven years (occurring from 1980s – 2006). The primary "reference monitoring station" occurs in lower American River, below the mouth of Buffalo Gulch, and has been monitored eleven times. Substrate monitoring includes cobble embeddedness, surface fines, fines by depth, pebble count, and free matrix. Substrate monitoring protocols and methods are on file at the BLM Cottonwood Field Office.

The period between the earliest and most recent substrate monitoring is generally over ten years. Some stations may have limited trend implications because of limited monitoring data and/or statistical implication. Analysis of all collected deposited sediment data during a given year (e.g., cobble embeddedness, surface fines, core sampling of spawning gravels, pebble counts etc.) may provide some inference of trend conditions when compared to previous monitoring efforts conducted 5 or more than 10 years apart. However, comparison of this various deposited data may not always result in definitive trend direction. Sampling error may have occurred, but long term data collection is continuing to provide for improved trend analysis capability. It is difficult to display a statistically significant change in deposited sediment from the current data however; following is a summary of inference of trend.

Lower American River – Appears to have a stable to slight upward trend for deposited sediment.
Middle American River – Very limited data, but suggested trend at a minimum appears to be at least stable, if not slightly upward.
East Fork American River - Limited data, but trend appears to be stable. Elevated deposited sediment levels noted despite little development in watershed; attributed to natural conditions (i.e., channel type, parent material, land types).
Whitaker Creek – Monitoring station is located immediately upstream from private property (i.e., stream mile 0.4). Limited data, but trend appears to be stable.
Queen Creek – Limited data, but trend appears to be stable.
Box Sing Creek – Limited data, but trend appears to be stable.
Kirks Fork – Limited data, but trend appears to be stable. Elevated deposited sediment levels noted despite little development in watershed; attributed to natural conditions (i.e., channel type, parent material, land types).
South Fork Clearwater River – No definitive trend conclusions made. Various fluctuations between yearly monitoring results and various deposited sediment parameters do not support valid conclusions. Some monitoring inconsistencies noted.

Desired range of cobble embeddedness is 20 – 30 percent or less. Monitoring data for prescription subwatersheds has documented cobble embeddeness levels that range from 30 percent to above 50 percent. Changes to deposited sediment may not be apparent or expected for many years (e.g., decades), even with minimal land uses and active restoration actions. Some channels have been severely altered by dredge mining activity, and expected changes would be

very slow. Some drainages have elevated levels, even with minimal current or historic land uses taking place.

Deposited Sediment Monitoring Limitations: The analysis and comparison of deposited sediment data between watersheds needs to be used with caution and proper professional judgement. Deposited sediment (e.g., cobble embeddedness) exhibits high spatial and temporal variability in both natural and disturbed streams, consequently sampling must be intensive to detect changes (Sylte and Fischenich 2003). Many studies compare sites with different stream power and bed roughness, so they cannot distinguish management effect from effects of local hydraulic conditions unless the management effects are significant. Lisle (1989) identifies that the size of sediment in transport can change with discharge because of size-dependent entrainment thresholds [Jackson and Beschta 1982]. Changes in bed topography can alter transport vectors and local shear stress and thereby cause sediment that is coarser or finer than was present before in a local area to deposit. As a consequence, the spatial distribution of bed material size in natural gravel channels in undisturbed watersheds can vary considerably over time [Adams and Beschta 1980; Scrivener and Brownlee 1981].

Trend Indicators and General Observations

All prescriptions watersheds and fish bearing stream segments have had various surveys conducted, which provide trend data when repeated. One of particular importance is the BLM subbasin fish habitat survey, using a modified Hankin and Reeves (1998) survey methodology, which provides good baseline data in regards to important fish habitat factors, such as pool/riffle ratios and large woody debris, see Table 3.6.6 for summaries of such data. These surveys were conducted during 1991 and 1992. Repeating these surveys provides good data in regards to changes in fish habitat conditions and trends.

Streams surveys (BLM subbasin surveys) were not recently conducted for all fish bearing streams in the project area. However, all fish bearing stream reaches within the project area were recently evaluated by BLM Fisheries Biologist (2004–2006), some general trend observations were noted from such evaluations. Such observations are in regards to changes and trends occurring over past two decades on stream segments occurring on BLM lands, and are summarized as follows:

- LWD is increasing in all fish bearing stream reaches;
- Creation of pools and instream cover conditions are also improving for all fish bearing stream reaches, which is attributed to increases in LWD;
- Natural succession and no new (or minimal) development activity within RHCAs is supporting improving riparian conditions and streambank stability;
- Instream restoration efforts in dredge mined reaches of American River resulted in major improvements to pool habitats and LWD;
- Improved livestock management and reduction of riparian and stream channel impacts ~~effects~~;
- Fish passage improvement effort are providing for improved adult and juvenile access to several streams; and
- East Fork American River and Kirks Fork have low levels of human disturbance, however, elevated levels of deposited sediment occur. Trends probably stable to slightly upward.

A variety of restoration and management activities support upward trend within the project and analysis area, and include BLM Eastside Project restoration actions identified in Appendix I, FS restoration actions (see FEIS American and Crooked River Project), and past and planned BLM

restoration actions. Table H.6 is a brief summary of BLM restoration actions which have recently taken place (within one to three years) or are proposed (foreseeable future) to support upward trend in the American River watershed and the South Fork of the Clearwater River.

Table H.6 Additional Key BLM Actions Supporting Upward Trend Within Project and Analysis Area

Watershed	Action	Key Indicator Affected (BLM Project or Natural Recovery)	Implementation
Lower American River	Create pool habitat in 2.1miles of American R.	Pools (American River Restoration Projects)	2007–2009
	Install LWD and habitat rocks in 2.1 miles of American R.	LWD (American River Restoration Projects)	2007–2009
	Replaced three barrier culverts in Buffalo Gulch	Fish passage – improved distribution (Buffalo Gulch Culvert Replacement Project)	2005
	Construct reconnect channel for Telephone Creek	Fish Passage – improved distribution (American River Restoration Projects)	2007–2008
	Road restoration and obliteration Buffalo Gulch	Sediment (Buffalo Gulch Road Obliteration)	2007
	Convert Telephone Creek road to ATV trail, rehab. fords, improve stream channel conditions.	Sediment (American River Restoration Projects)	2007–2008
	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
Middle American River	Create pool habitat in 1.3 miles of American R.	Pools (American River Restoration Projects)	2007–2009
	Install LWD and habitat rocks in 1.3 miles of American R.	LWD (American River Restoration Projects)	2007–2009
	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
E. Fk. American River	Replaced barrier culvert with 20 foot wide bridge.	Fish Passage – Improved Distribution (American River Restoration Projects)	2006
	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
Whitaker Creek	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
Queen Creek	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
Box Sing Creek	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
Kirks Fork Creek	Natural Recovery	Sediment, Riparian, LWD, Pools	N/A
South Fork Clearwater River	Riparian restoration and reconnect of perennial stream.	Riparian/Water Temperature (South Fork Clearwater	2007–2008

Watershed	Action	Key Indicator Affected (BLM Project or Natural Recovery)	Implementation
		River Restoration Project)	
	Decommisioning of road segments and improved drainage on ATV trail.	Sediment (South Fork Clearwater River Restoration Project)	2007–2008
	Maintenance and improvement of two South Fork Clearwater River side channels.	Fish Habitat – Side Channels (South Fork Clearwater River Restoration Project)	2007–2008
	Natural Recovery	Sediment, Riparian, LWD	N/A

Natural recovery is taking place with the primary benefits to riparian conditions, bank stability, shading, LWD, and pools. Expected trends for these changes are long term improvement in conditions with slightly improving trends. With natural succession, riparian habitat consisting of mixed conifer types are advancing to mid-age to mature overstory trees, subsequently improving riparian shading and conditions. Dead and dying lodgepole pine will contribute to increased levels of LWD and subsequent improvement of instream cover conditions and creation of pool habitat.

Appendix I – Watershed, Riparian, and Fish Habitat Improvements _____

Introduction

Watershed, riparian, and fish habitat improvement projects are part of each alternative. The projects are designed to achieve and support the fisheries upward trend requirements of the addendums and supplements to the BLM Management Framework Plan (USDI-BLM 1981, 1989a, and 1989b), achieve recovery of important habitats to ESA-listed fish and BLM sensitive fish, improve aquatic habitats for BLM sensitive species, and meet Clean Water Act requirements, including TMDLs. The Eastside Project summaries will identify projects specific to alternatives and other ongoing and foreseeable future BLM projects that support upward trend and are planned to take place within Eastside Project subwatersheds during the duration of the Eastside Project. Refer to Table I.1 below for a summary of restoration projects by subwatershed and alternative.

Table I.1 Summary of Restoration Projects by Alternative and Subwatershed

BLM No.	Activity (Project No.)[1]	Project Descrip.	Subwatershed	Alternative		
				B	C	D
T25	Convert road to ATV Trail (#1)–East Side	1.36 miles	Lower American R.	Yes	Yes	Yes
T25	Convert road to ATV Trail (#1)–West Side	0.07 mile	Lower American R.	Yes	Yes	Yes
---	American River ATV Bridge RM 6.3 (#1)	1 Bridge	Lower American R.	Yes	Yes	Yes
---	Decommission/Obliterate American R. Ford (#1)	1 Ford	Lower American R.	Yes	Yes	Yes
---	Kirks Fork ATV Bridge–Mouth (#1)	1 Bridge	Kirks Fork	Yes	Yes	Yes
---	Decommission/Obliterate American R. Ford (#1)	I Ford	Kirks Fork	Yes	Yes	Yes
T25C	Decommission Road Paralleling American River. (New ATV Trail would utilize existing toeslope road #1B -0.34 mile).	0.32 mile	Lower American R.	Yes	Yes	Yes
T25D	New ATV Trail would Utilize Existing Toeslope Road (#1B)	0.34 mile	Lower American R.	Yes	Yes	Yes
T25 A	Decommission Existing Road–South of Ford	0.04 mile	Lower American R.	Yes	Yes	Yes
T25B	Decommission Existing Road - South of Ford	0.04 mile	Lower American R.	Yes	Yes	Yes
2544 G1	Convert road to ATV trail (#2)	0.06 mile	Lower American R.	Yes	Yes	Yes
2544 G2	Convert road to ATV trail (#2)	0.13 mile	Lower American R.	Yes	Yes	Yes
2541 R11	Decommission (abandon) existing road.	0.12 mile	Lower American R.	Yes	Yes	Yes
2541 R4	Decommission existing road (helicopter landing access road).	0.07 mile	Lower American R.	Yes	Yes	Yes
2541 R6	Decommission existing road, tailing road below bridge.	0.21 mile	Lower American R.	Yes	Yes	Yes
2541 R8	Decommission (abandon) existing road.	0.06 mile	Lower American R.	Yes	Yes	Yes
2541 R9	Decommission existing road.	0.03 mile	Lower American R.	Yes	Yes	Yes
2544 G2	Decommission existing road.	0.03 mile	Lower American R.	Yes	Yes	Yes
2544 G3	Decommission existing road.	0.08 mile	Lower American R.	Yes	Yes	Yes
2541 R1	Relocate American River road (south road segment) to toeslope, new road construction (#3).	0.22 mile	Lower American R.	Yes	Yes	No
2541 R5	Decommission American River within riparian area (#3)	0.24 mile	Lower American R.	Yes	Yes	No

BLM No.	Activity (Project No.)[1]	Project Descrip.	Subwatershed	Alternative		
				B	C	D
2541 R2	Relocate American River road (north road segment) to toe slope, new road construction (#4).	0.35 mile	Lower American R.	Yes	Yes	No
2541 R4	Decommission American River within riparian area (#4)	0.29 mile	Lower American R.	Yes	Yes	No
2541 R10	Decommission (abandon) existing road.	0.27 mile	Queen Creek	Yes	Yes	Yes
---	Construct a reconnect channel to Queen Creek to provide for fish passage. Increased fish access 1.4 miles.	Fish access 1.4 miles	Queen Creek	Yes	Yes	Yes
2541 R12	Decommission road.	0.11 mile	Middle American R.	Yes	Yes	Yes
---	Harden and stabilize upper American River ford (RM) (#5).	1 ford	Middle American R.	Yes	No	No
2541 B	Improve and gravel road crossing meadow, rehabilitate off road vehicle use in meadow area (#5).	0.12 mile	Middle American R.	Yes	No	No
---	Decommission and rehabilitate upper American River Ford (#6 and #7)	1 ford	Middle American R.	No	Yes	Yes
2541 B	Decommission road crossing meadow area and rehabilitate off road vehicle use in meadow (#6 and #7).	0.12 mile	Middle American R.	No	Yes	Yes
2541	Decommission road that is adjacent to American River (#6).	0.77 mile	Middle American R.	No	Yes	No
2541	Convert road to ATV trail (#7)	0.77 mile	Middle American R.	No	No	Yes
T2541	Construct new ATV trail so that American River ford and road crossing meadow can be decommissioned (#7).	0.3 mile	Middle American R.	No	No	Yes
2543 G1	Construct new permanent road (west side American River) to provide additional access from the north for the American River subdivision. Road would connect with Ericson Ridge road (#6 and #7).	0.46 mile	Middle American R.	No	Yes	Yes
2543 G2	Construct new permanent road (east side of American River) to provide additional access from the north for the American River subdivision (#6 and #7).	0.1 mile	Middle American R.	No	Yes	Yes
---	Construct a new vehicle bridge across American River to provide additional access from the north for the American River subdivision (#6 and #7).	1 Vehicle Bridge	Middle American R.	No	Yes	Yes
2541 A	Decommission existing road adjacent to American River, new road construction for subdivision access will bi-pass this segment (#6 and #7).	0.12 mile	Middle American R.	No	Yes	Yes

[1] Several restoration projects are directly interrelated with other projects and all would not take place with out several other actions; for example a road to ATV trail project may include other actions such as, decommissioning and restoration of fords, construction of new bridges, and decommissioning of unneeded road/trail segment. Projects that are directly interrelated would have the same project number (#).

A summary of restoration estimated costs are identified in Section 3.13, Socio Economic section. The following Table I.2 summarizes restoration projects by alternative.

Table I.2. Summary and Comparison of Restoration Projects by Alternative.

Proposed Restoration Activity	Alt B	Alt C	Alt D
Miles of decommissioned roads (miles of new permanent road)	1.9 miles (0.6 miles)	3.0 miles (1.1 miles)	1.5 miles (1.2 miles)
Miles of road to ATV trail conversion	1.6 miles	1.6 miles	2.6 miles
Ford armoring and restoration	1 ford	0 ford	0 ford
Ford obliteration and restoration	2 fords	3 fords	3 fords
Miles or riparian plantings.	4.8 miles	4.8 miles	4.8 miles
Miles of streambank recontour and restoration	1.6 miles	1.6 miles	1.6 miles
Queen Creek reconnect and miles of increased fish access	1.4 miles	1.4 miles	1.4 miles
Acres of mine site restoration	0.5 acre	0.5 acre	0.5 acre

Description of Restoration Projects

Road Decommissioning: The objectives of road decommissioning are to reduce negative resource impacts and reduce maintenance costs by removing roads that are not needed for access. The impacts that would be eliminated or reduced include adverse effects from erosion, sediment, and road encroachment in riparian habitats (for roads that occur in riparian areas). Direct and indirect long term benefits would be realized to aquatic resources and improvements to watershed and hydrologic conditions from reduced road densities. Reduced road densities would also have direct and indirect effect beneficial effects to wildlife security and habitat quality, with reduced human related disturbances.

In the context of watershed improvement projects, road decommissioning applies to existing roads and can include treatments ranging from abandonment to re-contouring. The selection of treatment type is based on the condition of the road, existing cut and fill of the road, proximity to streams, cost, and other factors. Most of the roads planned for decommissioning within this project were identified through a roads analysis process. Some roads were added or deleted based on field reconnaissance. These were screened with Field Office personnel to ensure that future access needs were being met.

Decommissioning of roads would include appropriate blockage and restriction of motorized vehicle access, de-compaction of the road surface, seeding, mulching, and placement of woody debris and/or rocks. Restriction of vehicle access may be accomplished by a variety of methods, such as full or partial obliteration of the road, placement of logs, or strategic location of boulders. De-compaction would be accomplished by ripping the road to a minimum depth of 20 inches. As needed, disturbed soil/vegetation sites would be seeded primarily with native species. Mulching would also be used to provide for seed cover and prevention of adverse soil erosion. Seeding and plantings would take place during favorable periods, generally during wet conditions occurring during the fall or spring. Appropriate seed mixes and species are identified in Table I.3 for upland sites and Table I.4 for riparian sites (included in following Riparian Plantings Section), which may be changed based on seed availability or site specific conditions.

Table I.3 Upland Typical Seeding Mixture for Disturbed Soil/Vegetation Sites[1]

Grasses		Forbs	
Species	**Rate Lb./Acre**	**Species**	**Rate Lb./Acre**
Mountain Brome "Bromar" (*Bromus marginatus*)	8	Western Yarrow (*Achillea millefolium*)	2
Hard Fescue "Durar" (*Festuca ovina*)	4	Golden Pea (*Thermopsis Montana*)	2
Annual Rye (*Lolium multiflorum*)	3		
Tufted Hairgrass (*Deschampsia caespitosa*)	2		

[1]Forest seed mix for stabilization of roads, cuts, fills, and primary skid trails.

Placement of woody debris (generally 1 to 12 inches in diameter) would occur on over 50% of the decommissioned road surface.

Temporary roads constructed and decommissioned as part of this project are not considered to be watershed improvements and are not listed in this appendix. However, decommissioning (i.e. obliteration) of temporary roads would be similar as described in this section.

Road Abandonment: Road closure or abandonment would occur on roads which have naturally stabilized and have been determined to be not needed for future long term management. These roads are generally in a stable condition and are not experiencing active erosion/sediment delivery to stabilized. Vegetation cover of the road, fill, and cut bank is adequate to prevent adverse erosion/sediment. No administrative or public vehicle use would be authorized on these roads. An inspection of the road has determined that discountable erosion/sediment is attributed to this road and no additional restoration measures are needed.

Relocating Roads Out of Riparian Areas: The American River road (BLM No. 2541 R1 and R2) provides access to private lands and homes along American River. It is proposed to decommission two segments (see *Road Decommissioning* Section above) of the existing road which are adjacent to American River and construct a new road in the toe slope area. Existing buried utility lines would be moved and located adjacent to the new road. The new road would be all weather surfaced.

Stream Ford Obliteration/Restoration: The project objective is to prevent adverse erosion, sediment, turbidity, and fish disturbance/displacement/mortality from use of fords. As needed, the ford approaches would be obliterated. The road would be ripped to a minimum depth of 20 inches, seeded and planted with suitable riparian species (see Riparian Seeding and Plantings Section below). As needed, mulching would be used to provide for seed cover and prevention of adverse soil erosion. Erosion control measures such as sediment traps or sediment fence would be used to prevent adverse erosion/sediment from reaching stream. Placement of boulder and woody debris would be placed to discourage future unauthorized use of ford.

Hardening or Armoring Ford: The project objective is to prevent adverse erosion, sediment, turbidity, and fish disturbance and mortality from use of an American River ford (river mile 12.8). The approaches to the ford would be reconstructed (re-contoured) and stabilized. The road crossing would be "hardened" with the placement of concrete planks or suitable substrate that would be secured to bottom and streambanks so that vehicle use or high flows would prevent movement or scouring of the instream "hardened" ford crossing. The material used for hardening or armoring of ford crossing would prevent adverse erosion, sediment, and turbidity from vehicle use of the crossing. The size and placement of the material would be designed to discourage use of the ford by spawning fish. Annual monitoring after high flow periods would be conducted to insure that ford is functional and would be maintained as needed. The approaches to the ford would be graveled a minimum 50 feet on each side.

Road to ATV Trail Conversion Projects: The project objective is to reduce existing road related adverse erosion, sediment, and stream channel/riparian encroachment; while still providing for public ATV use of the road/trail. The project would convert and restore segments of existing roads occurring adjacent to American River to an ATV trail. Some segments of road occurring adjacent to American River may be obliterated when an existing toeslope road may be used for the ATV trail. Minor trail reconstruction or construction may occur in localized areas, generally to avoid riparian habitats or stream channel encroachment.

The current road width would be reduced to 60 inches. A 60 inch wide trail would remain within the existing road prism. Road segments with a defined cut and fill would have trail developed after the initial outsloping of the road prism by not ripping the outside (fill-slope side) 60 inches. This would be accomplished by ripping the surface to 16 inches or the depth of compaction to increase water infiltration and percolation and to provide a seedbed. In areas that are relatively level (e.g., cut and fill areas not evident or limited), the maintained trail tread would be located on the upslope side of road and ripping outside of road segment (nearest creek). Placement of rock or slash would be conducted to limit ATV use to the 60 inch wide trail and to provide growing micro-sites for native vegetation. As needed erosion control and restoration measures would be conducted to minimize potential for adverse erosion or sediment.

ATV Bridges: The project objective is to replace two existing ATV bridges so that two existing fords can be obliterated (see *Ford Obliteration/Restoration* Section above), which would reduce adverse erosion, sediment, turbidity and fish disturbance from motorized vehicle use of the fords. One of the ATV bridges is unauthorized (American River ATV bridge–stream mile 6.3) and the other ATV bridge is non-functional (Kirks Fork ATV bridge - mouth).

Replacement bridges would be designed to provide for public hiking, ATV, and horse use. Replacement bridges would designed to reduce adverse erosion, sediment, and channel encroachment, and be sized to handle high flow events (i.e., 100 year). During installation, erosion and sediment control measures would be implemented.

ATV Trail Construction: The project objective is to construct an ATV trail so that an American River ford crossing (river mile 12.8) and road segment crossing a meadow could be decommissioned (and still provide ATV use of road/trail). Implementation of this project would prevent adverse erosion, sediment, turbidity, and instream disturbance to fish utilizing the American River ford crossing. This project would also allow for obliteration and restoration of a road segment crossing a meadow that is adjacent to American River that is severely rutting and eroding.

Riparian Seeding and Plantings: Riparian planting is done to improve streamside shade, restore bank stability, and improve aquatic ecological function. It is done using adapted native species and would include the seeding or planting of grasses, sedges, forbs, shrubs, or trees. Streambank and other disturbed areas would be seeded and planted primarily with native species (see Table F.4 for a list of preferred species). Seedings and plantings would take place during favorable wet conditions during the fall or spring. As needed, mulching would be used to provide for seed cover and prevention of adverse soil erosion. Because of the following variability of site characteristics within the project area: soil, current vegetation, availability of native species, and species suitability, each site would be evaluated prior to seeding or planting. Sedges and rushes planted would use “mats or plugs” with a minimum of six to eight inches of root mass and soils, and would typically be planted in areas below mean high water. Shrubs and trees that are planted would be seedlings or small saplings (typically 2–6 feet in height). Annual rye (*Lolium multiflorum*), a non-native species, would be included in the seed mix to provide for early erosion control ground cover.

Table I.4 Preferred Plant Species for Riparian Areas

Grasses and Grass-Like	Forbs	Shrubs	Trees
Mountain brome *Bromus marginatus*	Arrowleaf groundsel *Senecio triangularis*	Rocky mountain maple *Acer glabrum*	Grand-fir *Abies grandis*
Water sedge *Carex aquatilis*		Mountain alder *Alnus incana*	Subalpine fir *Abies lasiocarpa*
Beaked-sedge *Carex rostrata*		Wavy-leaved alder *Alnus ~~sinuate~~ sinuata*	Engelmann spruce *Picea engelmannii*
Tufted hairgrass *Deschampsia caespitosa*		Red osier dogwood *Cornus stolonifera*	Lodgepole Pine *Pinus contorta*
Dagger-leaf rush *Juncus ensifolius*		Drummond's willow *Salix drummondiana*	Douglas-fir *Pseudotsuga menziesii*
Small-fruited bulrush *Scirpus microcarpus*			
Streambank wheatgrass *Agropyron riparium*			
Red top *Agrostis alba var. alba*			

Streambank Re-contouring: Streambank re-contouring would include the creation of a small terrace or floodplain (approximately 8–10 feet in width), immediately adjacent to or above mean high water level. As needed, over steepened streambanks may be excavated and re-contoured to have a slope of 2:1. Placement of up to 6 inches of top soil may occur on re-contoured gravel/cobble dredge tailings to facilitate seeding and/or placed in holes dug for seedlings and saplings.

Improved Fish Passage: The objective of the Queen Creek channel reconnect project is to improve fish passage for aquatic organisms, particularly for special status fish. The Queen Creek re-connect channel would include constructing approximately 100 feet of new channel and installation of a seven foot diameter culvert (partially buried 35%) at the American River road crossing. The culvert size will be large enough to handle at a minimum 100 year flow events. The new culvert would simulate a natural stream bottom throughout its length. As needed, placement of suitable sized substrate (1 – 6 inches) material would take place throughout the length of the culvert.

During channel construction and culvert installation, the channel would not have flowing water and the new channel would not be connected to the existing channels (i.e., Queen Creek and American River) until work was completed. As needed, excessive subsurface flows would be pumped to an off channel settling basin and filtered through straw and natural vegetation before reaching the stream. The settling basin would consist of straw bales and straw laid out on the ground so water can filter through the straw to prevent sediment from reaching the stream channel

Soil Restoration: No specific soil restoration units are planned for the Eastside Project, and soil restoration actions are primarily associated with road decommissioning efforts, temporary roads, and landings. Soil restoration treats areas that have negative impacts to soil productivity or stability. Objectives of soil restoration include improvement of soil productivity and reduction of adverse effects to hydrologic function. Treatments can include soil de-compaction, recontouring of excavated skid trails and

landings, replacing surface soil and organic material, stabilization of erosion features such as rills and gullies, and revegetation.

Road Improvements: Several roads were identified as having improvement needs due to adverse effects on aquatic resources. The proposed work would improve drainage and reduce erosion from these roads. Techniques could include adding drainage structures, shaping the road, and adding rock surfacing in places. In general, roads being reconstructed primarily for timber haul purposes are not listed as watershed improvements. These exceptions consist of roads that require reconstruction or reconditioning for timber haul purposes, and the treatment activities are deemed to be a benefit to watershed health.

Appendix J – Road and Trail Access Table

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Alt B Upgrade Alt C&D Decommission Existing Rd	BLM	2541			0.12	Rock 6" or Varied	YES	YES	YES	
Alt B&C Decommission Alt D Existing Use	BLM	2541 R 4			0.29	Varied or Maintain	YES	YES	YES	
Alt B&C Decommission Alt D Existing Use	BLM	2541 R 5			0.24	Varied or Maintain	YES	YES	YES	
Alt C Decommission, Alt D Convert to Trail	BLM	2541			0.77	Varied or Reduce Running Surface to 55"	NO	YES	YES	
Convert to Trail Existing Rd	BLM	2544 G 1			0.06	Reduce Running Surface to 55"	YES	YES	YES	
Convert to Trail Existing Rd	BLM	2544 G 2			0.13	Reduce Running Surface to 55"	YES	YES	YES	
Convert to Trail Existing Rd	BLM	T25			1.36	Reduce Running Surface to 55"	YES	YES	YES	
Convert to Trail Existing Rd	BLM	T25			0.07	Reduce Running Surface to 55""	YES	YES	YES	
Decommission Existing Rd	BLM	2541			0.12	Varied	YES	YES	YES	
Decommission Existing Rd	BLM	2541 R 10			0.27	Abandon	YES	YES	YES	
Decommission Existing Rd	BLM	2541 R 11			0.12	Abandon	YES	YES	YES	
Decommission Existing Rd	BLM	2541 R 12			0.11	Varied	YES	YES	YES	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Decommission Existing Rd	BLM	2541 R 3			0.07	Varied	YES	YES	YES	
Decommission Existing Rd	BLM	2541 R 6			0.21	Varied	YES	YES	YES	
Decommission Existing Rd	BLM	2541 R 8			0.06	Abandon	YES	YES	YES	
Decommission Existing Rd	BLM	2541 R 9			0.03	Varied	YES	YES	YES	
Decommission Existing Rd	BLM	2544 G 2			0.03	Varied	YES	YES	YES	
Decommission Existing Rd	BLM	2544 G 3			0.08	Abandon	YES	YES	YES	
Decommission Existing Rd	BLM	T25			0.32	Recontour	YES	YES	YES	
Decommission Existing Rd	BLM	T25 A			0.04	Recontour	YES	YES	YES	
Decommission Existing Rd	BLM	T25 B			0.04	Recontour	YES	YES	YES	
Existing	BLM	2541			0.01	Maintain	YES	YES	YES	
Existing	BLM	2541			0.20	Maintain	YES	YES	YES	
Existing	BLM	2541			0.05	Maintain	YES	YES	YES	
Existing	BLM	2541			0.15	Maintain	YES	YES	YES	
Existing	BLM	2541			0.04	Maintain	YES	YES	YES	
Existing	BLM	2541 R 7			0.12	Maintain	YES	YES	YES	
Existing	BLM	T 25			0.05	Maintain	YES	YES	YES	
Existing Use For Eastside Project	BLM	2541			0.06	Rock 6"	YES	YES	YES	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Existing Use For Eastside Project	BLM	2543	9812	443	1.11	Maintain	YES	YES	YES	Groomed Snowtrails
Existing Use For Eastside Project	BLM	2541 R 12			0.02	Varied	YES	YES	YES	
Existing Use For Eastside Project	BLM	2544 G			0.05	Maintain	YES	YES	YES	
Existing Use For Eastside Project	BLM	2544 G			0.03	Maintain	YES	YES	YES	
Existing Use For Eastside Project	BLM	2544 G			0.07	Maintain	YES	YES	YES	
Open Existing Trail	BLM	T25			0.34	Running Surface to 55"	YES	YES	YES	
Proposed ATV	BLM	T2451			0.30	Running Surface to 55"	NO	NO	YES	
Proposed Permanent	BLM	2541 R 1			0.22	Rock 6"	YES	YES	NO	
Proposed Permanent	BLM	2541 R 2			0.35	Rock 6"	YES	YES	NO	
Proposed Permanent	BLM	2543 G			0.10	Rock 6"	NO	YES	YES	
Proposed Permanent	BLM	2543 G			0.46	Rock 6"	NO	YES	YES	
Proposed Temporary	BLM	2541 C			0.46	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 C			0.41	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 C			0.25	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 C 1			0.08	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 C 2			0.06	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 D			0.41	Varied	YES	NO	YES	
Proposed Temporary	BLM	2541 D			0.38	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 D			0.17	Varied	YES	NO	NO	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Proposed Temporary	BLM	2541 D 1			0.18	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 E			0.46	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 E			0.65	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 E 1			0.09	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 E 1			0.31	Varied	YES	YES	YES	
Proposed Temporary	BLM	2541 E 2			0.19	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 E 2			0.03	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 E 3			0.55	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 E 3			0.02	Varied	YES	NO	NO	
Proposed Temporary	BLM	2541 G			0.55	Varied	NO	NO	YES	
Proposed Temporary	BLM	2543 F			0.27	Varied	YES	NO	YES	
Proposed Temporary	BLM	2543 F			0.71	Varied	YES	YES	YES	
Proposed Temporary	BLM	2543 F			0.15	Varied	YES	YES	NO	
Proposed Temporary	BLM	2543 F			0.77	Varied	YES	NO	YES	
Proposed Temporary	BLM	2543 F			0.24	Varied	YES	NO	NO	
Proposed Temporary	BLM	2543 F			0.14	Varied	YES	NO	NO	
Proposed Temporary	BLM	2543 F 1			0.08	Varied	YES	YES	YES	
Proposed Temporary	BLM	2543 F 1			0.20	Varied	YES	YES	YES	
Proposed Temporary	BLM	2543 H			0.49	Varied	YES	NO	NO	
Proposed Temporary	BLM	2543 H 1			0.24	Varied	YES	NO	NO	
Proposed Temporary	BLM	2544 G			0.06	Varied	YES	YES	YES	
Proposed Temporary	BLM	2544 G			0.10	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A			0.32	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A			0.64	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A			0.44	Varied	YES	YES	YES	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Proposed Temporary	BLM	2548 A			0.52	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 1			0.12	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 2			0.14	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 3			0.40	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 3			0.03	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 4			0.45	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 4			0.12	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 A 4			0.24	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 B			0.33	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 B			0.33	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 B 1			0.10	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 B 2			0.08	Varied	YES	YES	YES	
Proposed Temporary	BLM	2548 B 2			0.56	Varied	YES	YES	YES	
Upgrade Existing Rd	BLM	2541			0.05	Rock 6"	YES	YES	YES	
Upgrade Existing Rd	BLM	2541 R 9			0.01	Rock 6"	YES	YES	YES	
Upgrade Existing Rd	BLM	2541 R 8			0.11	Rock 6"	YES	YES	YES	
Existing Use For Eastside Project	Id County	2543		443	0.94		YES	YES	YES	
Existing Use For Eastside Project	Id County			1818	2.67		YES	YES	YES	Groomed Snowtrail
Existing Use For Eastside Project	Id County			1859	3.17		YES	YES	YES	
Existing Use For Eastside Project	Id County				0.10		YES	YES	YES	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Existing Use For Eastside Project	Id County			443	1.65		YES	YES	YES	
Existing Use For Eastside Project	Id County			443	0.34		YES	YES	YES	
Existing	Private	Coppernoll 2541			0.04	Maintain	YES	YES	YES	
Existing	Private	Coppernoll T 25			0.08	Maintain	YES	YES	YES	
Existing	Private	Greenly 2541			0.05	Maintain	YES	YES	YES	
Existing Use For Eastside Project	Private	2541 Lynn 1			0.29	Minor Reconstruction	YES	YES	YES	
Existing Use For Eastside Project	Private	2548 Bennet 1			0.55	Minor Reconstruction	YES	YES	YES	
Existing Use For Eastside Project	Private	2548 Bennet 1			0.62	Minor Reconstruction	YES	YES	YES	
Existing Use For Eastside Project	Private	2548 Bennet 2			0.25	Minor Reconstruction	YES	YES	YES	
Existing Use For Eastside Project	Private	2548 Bennet 2			0.26	Minor Reconstruction	YES	YES	YES	
Existing Use For Eastside Project	Private	2548 Bennet 3			0.97	Minor Reconstruction	YES	YES	YES	
Existing Use For Eastside Project	Private	MADRE 2541			0.09	Maintain	YES	YES	YES	
Proposed Temporary	Private	2548 Bennet 4			0.08	Varied	YES	YES	YES	
Proposed Temporary	Private	2548 Bennet 5			0.04	Varied	YES	YES	YES	
Proposed Temporary	Private	2548 Bennet 6			0.03	Varied	YES	YES	YES	
Proposed Temporary	Private	2848 Bennet 2			0.04	Varied	YES	YES	YES	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Existing Use For Eastside Project	USFS				0.02	Maintain	YES	YES	YES	Closed yearlong
Existing Use For Eastside Project	USFS				1.30	Maintain	YES	YES	YES	Closed yearlong
Existing Use For Eastside Project	USFS				0.80	Maintain	YES	YES	YES	Closed yearlong
Existing Use For Eastside Project	USFS				0.04	Maintain	YES	YES	YES	
Existing Use For Eastside Project	USFS		1809A		2.22	Maintain	YES	YES	YES	Closed yearlong
Existing Use For Eastside Project	USFS		1809		0.69	Maintain	YES	YES	YES	
Existing Use For Eastside Project	USFS		9812		0.19	Maintain	YES	YES	YES	Groomed Snowtrails
Existing Use For Eastside Project	USFS		9812		1.26	Maintain	YES	YES	YES	Closed yearlong
Existing Use For Eastside Project	USFS		1809		1.58	Maintain	YES	YES	YES	
Existing Use For Eastside Project	USFS		1809		0.72	Maintain	YES	YES	YES	
Existing Use For Eastside Project	USFS		9812F1		0.25	Maintain	YES	YES	YES	Closed yearlong
Existing Use For Eastside Project	USFS		9812F		0.24	Maintain	YES	YES	YES	Closed yearlong
Proposed Temporary	USFS	2541 D			0.26	Varied	YES	NO	YES	
Proposed Temporary[1]	USFS	2543 F			0.56	Varied	YES	YES	NO	
Proposed Temporary[1]	USFS	2543 F			0.17	Varied	YES	YES	NO	
Proposed Temporary[1]	USFS	2543 F			0.10	Varied	YES	YES	NO	

Label	Owner	BLM No	USFS No	IDCO No	Miles	Management Activity/Decommission Method	ALT B	ALT C	ALT D	Other
Proposed Temporary[1]	USFS	2543 H			1.06	Varied	YES	YES	NO	

[1] These roads included in the American and Crooked River Project FEIS, but dropped from the project.

Appendix K – Key Observation Point Photos and FVS-FVS Model Representation

Figure K.1 VRM Mother Lode Road Point, Looking NW Towards Elk City

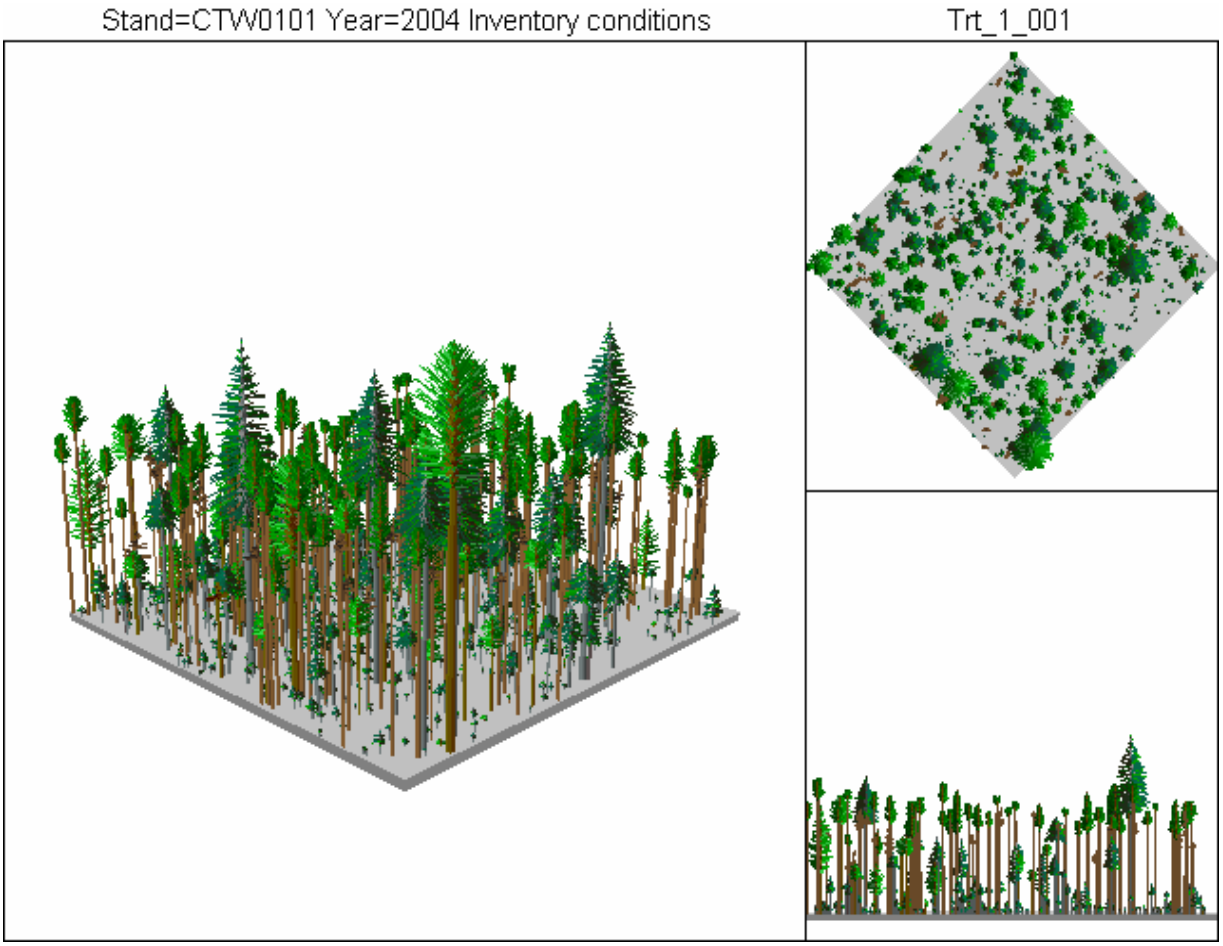

Figure K.2 FVS simulation of Stand in Figure K.1, pre-treatment

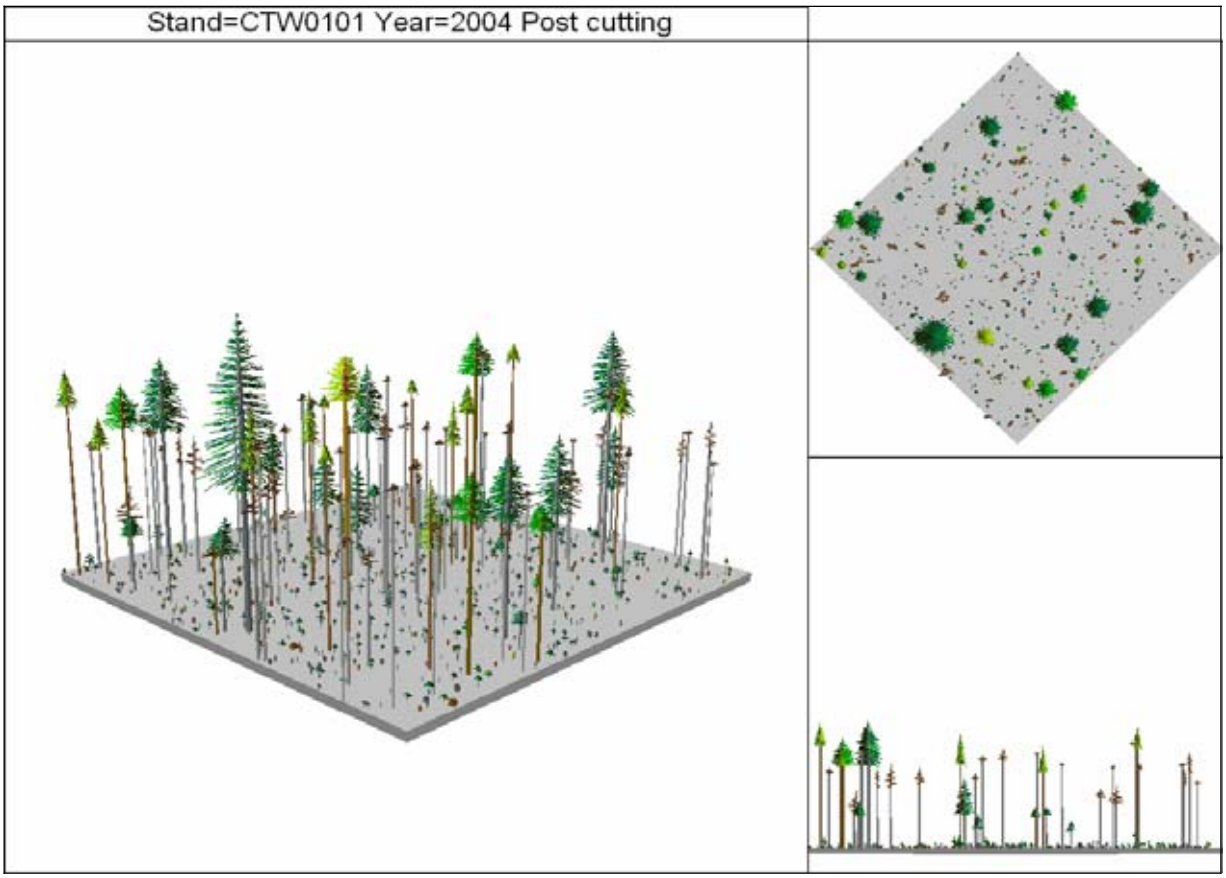

Figure K.3 FVS simulation of Stand in Figure K.1, post-treatment

Figure K.4 VRM Mother Lode Road Point, Looking N Up American River

Figure K.5 VRM Mother Lode Road Point, Looking NE

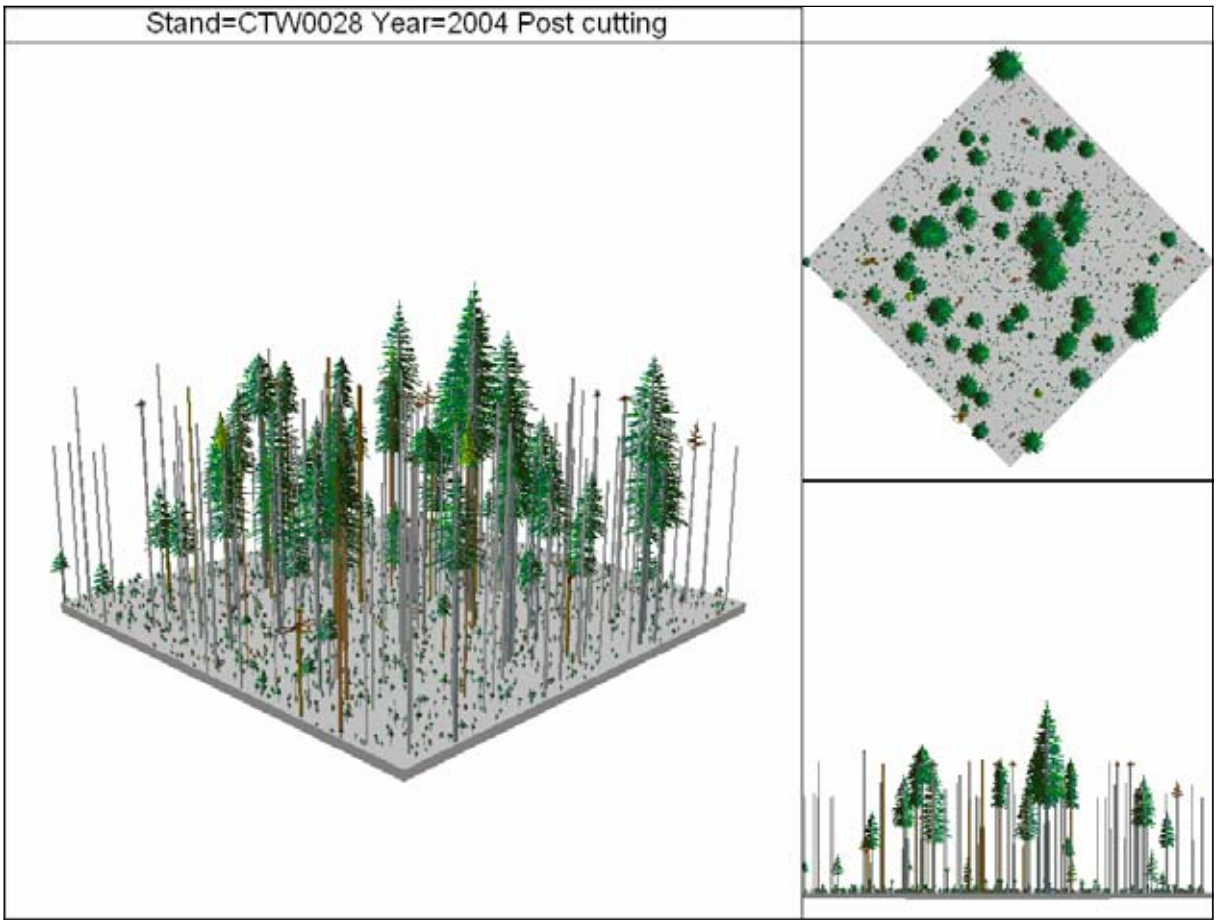

Figure K.14 FVS simulation of Stand in Figure K.12, post-treatment

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