

Chapter 2

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Chapter 2: Alternatives

Introduction

This chapter describes the proposed action and alternatives to the proposed action, including a no action alternative. Topics discussed in this chapter include:

- The process used to develop the alternatives
- A description of alternatives considered but dropped from detailed study (including the rationale for elimination)
- A description of alternatives developed which were analyzed in detail
- A description of methods to mitigation or avoid undesired results
- A plan for monitoring implementation and effectiveness of the eventual decision
- A comparison of the alternatives.

Alternative Development

The proposed action was developed using the District Ranger's direction (detailed within the Project Initiation Letter, dated January 20, 1999) and proposals made in the Wall Watershed Analysis (September 1995). Public comments on the Proposed Action were encouraged through a scoping letter, Notice of Intent in the Federal Register (February 25, 1999), and the Forest's Schedule of Proposed Activities. Responses to this scoping were then used to identify significant issues or concerns regarding the Proposed Action.

The interdisciplinary team used these significant issues to identify options to the items listed under the Proposed Action. These options were then coarsely evaluated based on considerations of cost, compliance with other direction documents, and resource concerns. All viable options also had to satisfy the stated purpose and need for action to some degree. As a result, some options were dropped from further consideration.

The interdisciplinary team developed four alternatives to the Proposed Action, including the No Action alternative. The No Action alternative is defined as no change from current management activities. This alternative serves as a baseline to compare the action alternatives. Each of the developed alternatives was designed to satisfy the purpose and need for action stated in Chapter 1 and to address one or more of the key issues.

Alternatives Eliminated From Further Consideration

As explained in the alternatives development section, other options to the Proposed Action were identified. Each option that was eliminated from further consideration is presented here with the rationale for elimination.

Fire as a management tool – Eliminated Options:

- **Eliminate future use of prescribed fire** –This alternative was dropped because fire disturbance is an integral part of this ecosystem for maintaining long-term sustainable conditions and would not meet the purpose and need.
- **Use prescribed burning to reduce stocking densities and eliminate or replace the amount of timber harvest.** Prescribed burning would avoid most soil disturbance or soil compaction and would remove fine flashy fuels; however, it would

not be selective with regard to desired tree species composition, stocking density, or spatial distribution of trees. Given the amount and distribution of fuel, prescribed fire could not be implemented as a thinning tool. The objective is to return fire to these stands. Once stocking densities are reduced to desired ranges prescribed fire would be used to reduce fuel loads, control species composition, and maintain preferred stocking densities. Prescribed fire would be used outside harvest units to reduce fuel loadings. Prescribed fire is not a reliable method of reducing stand densities.

- **Hand treatment of piling and burning of natural fuels** – The area in need of natural fuel reduction is large and covers most of the Rimrock Planning Area. Hand treatment of the entire area would not be cost effective when compared to broadcast prescribed burning.
- **No spring burning to protect nesting birds** – Generally, east side forests have very few burning windows available. Spring provides a larger opportunity for burning than does fall. If these opportunities to burn in the spring were eliminated it would be possible to have no large-scale underburns accomplished on the forest in any given year. Intensity of spring burns are lower than those prescribed in the fall. This is important in control of fire and intensity of heat produced along the forest floor. During spring, large fuels contain higher moisture, thus full consumption of important large wood rarely occurs as it would with fall burns.
- **No Burning during fall hunting seasons** – Very few burning windows are available in this area. If conditions are optimal for prescribed burns the Forest Service must use those opportunities. Timing and relationship to hunting season will be determined on a case by case basis.

Reduce the effects Forest Road 23 and Forest Road 2300100 have on Big Wall Creek – Eliminated Options:

- Relocate FS Road 23 to the top of the ridge – The reroute of the road would be very expensive, increase overall road density, and would not eliminate all uses of the existing road which is required for utility right-of-ways.
- **Constructing bridges to eliminate stream crossings** - The layout of the crossing and the large watershed it drains would create engineering problems for this type of structure.
- **Placing culverts into the stream at crossing locations** - A culvert designed for a 100-year event would be too large for the topography of the area.
- **Closing Forest Service Road 23** – This road is needed for access to private land, access the town of Monument, and to access utility right-of-ways.
- **Helicopter logging of units to eliminate log trucks crossing Big Wall Creek** – Helicopter logging of the units that would use FS Road 23 where it crosses Big Wall Creek would only be a partial solution to the problems of the stream crossings currently in use. The immediate and continued benefits of reducing traffic disturbance to the streambed through crossing improvements would meet the purpose and need of the Rimrock EIS by removing vehicle traffic from the stream beds of Big Wall Creek and Little Wilson Creek. Crossing improvements would be required before hauling could occur.

Logging system types for commercial harvest – Eliminated Options:

- **Helicopter logging systems only** - This alternative was dropped because there is no resource related reason not to use ground-based logging systems on flat ground where roads already exist outside of RHCA's. Helicopter logging is expensive and marking flexibility is reduced with this system. Operability is limited by economics and areas where only light thinning is indicated in the silvicultural prescriptions. This

means that areas that could be treated using ground-based equipment could not be harvested using a helicopter. In addition, mitigation costs would increase, and there would be a higher potential loss of snags.

- **Use of skyline logging systems** - A small portion of the Kingbolt and Rimrock sale areas were capable of using skyline logging systems, but it was determined that the added complexity of including a fourth logging system would increase overall logging cost. The areas that were capable of using skyline systems do not have road access; therefore, to protect other resources it was determined that those areas were better suited for helicopter logging systems.
- **Allow mechanical logging systems within Bull Prairie Recreation Site** – This logging system would be more cost effective than the proposed animal based system. Even though harvest within the recreation site is proposed for the winter season, when snow is on the ground, noise and activity created by mechanical based systems would not leave a positive impact on the forest visitor. The ground disturbance created from skidding and removal of logs using mechanical systems would be increased over that of the proposed animal based skidding systems.

Fish pool habitat construction – Eliminated Options:

- **Remove nonfunctioning in-stream structures** – Soil disturbance would be large. Direct sediment contribution to the stream would be greater as a result of this action versus leaving the structure in place and make the needed repairs.
- **Placing large wood in the stream channels and riparian areas** - Producing new pool habitat in this way was considered and deemed ineffective. The stream channels involved are subject to strong flows, classified as Rosgen Class B channels.
- **Repair all in-stream fish structures (181) on Big Wall Creek and Wilson Creek** – This option was determined to be too extensive. Work on repairing key stones or log weirs, or physically deepening the pools, would be more detrimental, in terms of sediment input to the stream, than beneficial to the pool habitat.
- **Limit the number of in-stream structures repaired each year or until sediment contributions from stream activity is reduced.** The number of structures repaired each year is limited by the in-stream work window. Sediment contribution is dependant upon the action at each individual structure with the reduction of sediment contribution more a result of mitigation than on the number of structures repaired per year.

Bull Prairie Campground – Eliminated Options:

- **Force account felling and leaving down trees in the campground** – Due to overall stand health, the amount of material that would be left in the campground would be excessive, unsightly, and would not be in compliance of the Forest Plans Visual Resource Management Standards and Guides of retention and partial retention.
- **Cut trees as they die for use as firewood within the campground area** – this option was eliminated because the overall forest health of this area has been a reoccurring problem. Heavy insect attacks occur often within these dense stands. Many of the overstory trees have disease, even though the tree is still alive, this creates safety hazards to site users.

Aspen stand treatment – Eliminated Options:

- **Treat the 12 aspen stands with the full range of management treatments** – Through past experience reducing competition of encroaching conifers and protective fencing of the aspen stands creates positive results. Past exclosures have resulted

in increased production of new growth. By progressing through the management strategies as needed for stand health there is less disturbance to the individual stands and the area as a whole.

Alternatives Considered in Detail

The No Action, Proposed Action, and three alternatives to the Proposed Action were analyzed to predict their affect on the environment. The basic design of each of these alternatives is detailed here, while methods to avoid or mitigate possible undesired consequences of these alternatives is described in the mitigation section.

Alternative 1 – No Action

Theme: Allow current biological and ecosystem processes to continue with the associated risks and benefits and to provide a baseline for comparison with other alternatives.

Primary Features:

- Does not harvest any trees
- Allows future fuel loads and continuity to progress through natural cycles of build up and consumption (future fire)
- Recovers wildlife habitat, fish habitat, and soil conditions through natural processes
- Allows effects from past management activities to recover through natural processes
- Allows overstocked stands to progress through natural cycles of disturbance and mortality

Treatment of Key Issues:

Following are the concerns addressed by this alternative:

- Allow the area to progress naturally
- Avoid effects from human intervention on soils, water, and fish

Details: This alternative would allow the area to progress through natural successional processes and recover at its own rate. Current ecosystem processes would continue as they are in the present condition. Current management direction and existing activities such as grazing, fire protection, monitoring, and road maintenance would continue. No other restoration activities, other than those already accomplished prior to this EIS, would be undertaken.

Alternative 2 – Proposed Action

Theme: Begin the process of changing stand composition to tree species and age classes that more closely represent historic conditions to enhance long-term sustainability and ecosystem health. Reduce fuel loads and stocking levels that would support future re-introduction of low intensity fire and reduce stand densities to levels recommended for the Umatilla National Forest.

Primary Features:

- Commercially thin 4,615 acres through the use of tractor, harvester/forwarder, animal, and helicopter logging systems
- Reconstruct 17 miles of roads for log haul
- Construct 11.3 miles of temporary roads for log haul
- Obliterate 10 miles of closed roads
- Decommission 4 miles of closed roads by removing drainage structures
- Close 3 miles of open roads

- Treat 12 aspens stands (24 acres)
- Precommercially thin 874 acres
- Continue treating known noxious weed infestations and any new ones that are identified.
- Prescribe burn 34,615 acres to reduce fuel loads
- Maintain 155 in-channel fish structures on Big Wall Creek and Wilson Creek
- Resurface 27 miles of Forest Roads 23 and 24
- Improve four low water fords on Forest Roads 23 and 2300100.
- Improve 22 existing road closures.

Treatment of Key Issues:

Following are the concerns addressed by this alternative:

- Restore health of forests that are overstocked or diseased
- Reduce fuel loads
- Use sensitive logging systems and mitigation to offset harvest-related increases in erosion or sedimentation
- Reduce erosion and sedimentation through active restoration

Details: This proposed action would commercially thin 4,615 acres of green stands to reduce overstocking. This would improve tree vigor by reducing competition for nutrients, water, and light; maintain stand densities that minimize the potential for destructive crown fires; move species compositions toward historic trends, and promote late/old structure characteristics in the long-term. About 19,300 mbf (37,009 ccf) of wood products would result from this activity. Commercial thinning would consist of harvesting primarily live ponderosa pine and Douglas-fir, with incidental amounts of other conifer species, ranging in diameter from 7-21 inches.

Harvest prescriptions would favor more seral species such as ponderosa pine and healthy Douglas-fir that are more resistant to fire, drought stress, and insect attack. All stands would remain fully stocked upon completion of harvest activities, so no reforestation would be necessary. The residual stand would be composed of vigorous, mature ponderosa pine, and Douglas-fir, western larch and incidental amounts of grand fir. This is primarily an understory thinning, cutting the smaller trees and leaving the largest, most vigorous dominant and co-dominant trees.

Logging systems include tractor (1,424 acres), forwarder (2,230 acres), helicopter (932 acres), and horse or other draft animals (29 acres). The animal logging would occur in Bull Prairie Campground to reduce the impact within the recreational area. The helicopter logging would occur on slopes of 35% or greater or in units where new road construction would have been required. Forwarder logging would occur in areas with a high level of concern due to sensitive soils. No new permanent roads would be constructed. No live trees 21 inches diameter at breast height or greater would be removed and harvest would not occur within Riparian Habitat Conservation Areas, although skidding across Class 4 streams could occur. Eight landings used for helicopter logging would be located in natural openings on the outer edges of RHCA's. They would not be in riparian areas and no reduction of shade would occur. Seven landings are in the RHCA for Wall Creek, which is a Class 1 stream, and one landing is in the RHCA for a Class 3 stream. These landings are necessary in order to avoid long flight distances and construction of new roads. Landings H1, H3, H5, H6, H7, H8, H15, and H16 are in the RHCA's. A description of the landings follows:

Helicopter Landing (H1) is located on an east-facing slope approximately 220 feet from Indian Creek. Within this landing area, the ground is fairly flat with very rocky shallow soils. Road 2400-223 is located in the middle of this landing area. Logs will be dropped on the upper side of the road away from the creek. Logs will be decked below the road. Equipment will not be allowed below the road. A silt fence will be required below the landing perimeter. Grass seeding will be required if felt necessary to prevent soil erosion.

Helicopter Landing (H3) is located on a north-facing slope approximately 140 feet from Wall Creek. Within this landing area, the ground is flat and rocky with shallow clay soils. Road 23 is located in the middle of the landing area. Both sides of the road will be used for dropping and decking of the logs. A silt fence will be required below the landing perimeter. Grass seeding will be required if felt necessary to prevent soil erosion.

Helicopter Landing (H5) is located on flat ground approximately 210 feet from Wall Creek. Within this landing area, the ground is comprised of shallow rocky soils. The 23 road is located between the landing and the creek. No equipment will be allowed below the 23 road. There is an existing ditch line along the 23 road that will be used to divert soil movement instead of a silt fence. Grass seeding will be required if felt necessary to prevent soil erosion. This is an alternate landing with a high probability that it won't be used.

Helicopter Landing (H6) is located on flat ground approximately 160 feet from Wall Creek. This landing area is very rocky with very low soil content. There is an existing ditch line along the 23 road that will be used to divert soil movement instead of a silt fence. No grass seeding is necessary. Very low volume will be flown into this landing.

Helicopter Landing (H7) is located on flat ground approximately 265 feet from Wilson Creek. Within this landing area, the ground is very rocky with little soil content. Logs will be dropped above the 2128 road away from Wilson Creek. There is an existing ditch line along the 2128 road that will be used to divert soil movement instead of a silt fence. No grass seeding is necessary.

Helicopter Landing (H8) is located on flat ground approximately 245 feet from Wilson Creek. This landing area is very rocky with very low soil content. Logs will be dropped on and above the 2128 road away from Wilson Creek. There is an existing ditch line that will be used to divert soil movement instead of a silt fence. No grass seeding is necessary.

Helicopter Landing (H15) is located on flat ground approximately 120 feet from a class III stream. This landing area is very rocky with very low soil content. Logs will be dropped above the 2128-065 road away from the creek. A silt fence will be required around the bottom perimeter of the landing. No grass seeding will be necessary.

Harvest would be divided into three timber sales: Kingbolt timber sale would harvest 520 acres and 2.5 mmbf; Rimrock timber sale would harvest 2,765 acres and 11.6 mmbf; and Wild Horse timber sale would harvest 1,330 acres and 5.2 mmbf (see [Map 2](#) and Table 2.2).

Activities that would occur concurrently or in association with commercial thinning include: construction of approximately 11.3 miles of temporary road to access landings; reconstruction of about 17 miles of road for haul use; prescribed burning of thinning debris on 4,615 acres; subsoiling, waterbaring, and erosion control seeding of temporary roads, skid trails, and landings to restore soil productivity and reduce sediment. During harvest activities, 92 miles of roads would be maintained and 37 miles of closed roads would be reopened for log haul. When log haul is finished the 37 miles would be reclosed. Two low water fords, on Forest Road 23 at mile 10.01 and 11.39, would be improved to reduce sediment in Wall Creek. A suspended grate would be installed that would keep vehicles off the channel bottom. This work is associated with the timber harvest.

Timber stand improvement (TSI) activities would include precommercially thinning 874 acres to improve stand vigor, move species composition towards historic trends, and promote late/old structure characteristics in the long-term. Trees to be thinned range from one to seven inches in diameter and thinning would be done manually using chainsaws. Trees of this size are too small to be merchantable and would be left on site after being cut. Slash would primarily be lopped and scattered. Juniper removal in plant association groups that would not normally support that species would also occur.

Obliterate about 10 miles of closed system roads (the 017, 100, and 105 spurs of Forest Road 2000; the 021, 055, 060, 080, 101, and 112 spurs of Forest Road 23; the 048 spur of Forest Road 2039; the 040 spur of Forest Road 2309; the 050 spur of Forest Roads 2402; and the 060 spur of

Forest Road 2128) to reduce sedimentation. Areas of exposed soil would be revegetated with plants native to the area to reduce the short-term risk of erosion.

Decommission about 4 miles of closed system roads (the 041 and 044 spurs of Forest Road 2309; the 020 and 040 spurs of Forest Road 2402; the 041 spur of Forest Road 2128; and the 351 and 354 spurs of Forest Road 2000) to increase infiltration and reduce sediment contributions. Areas of exposed soil would be revegetated with plants native to the area to reduce the short-term risk of erosion.

Close two currently open roads. Road 2309020 (2.08 miles) has been physically closed for many years and inaccessible to vehicle traffic. The Access and Travel Management Plan would be changed to show the road closed. Road 2300101 (0.50 miles) was originally open to allow access to a dispersed campsite. The campsite has not been used in several years and is very close to Wall Creek. Both roads are within riparian habitat conservation areas. Closing the roads would contribute toward improving water quality and fish habitat.

Road closure improvements would be made on 22 closed roads. Guardrails or earth barricades would be installed to make closures more effective. Closure improvements would reduce unauthorized use of roads, thus contributing to improved water quality and fish habitat.

Approximately 18 miles of Forest Road 24 and 9 miles of Forest Road 23 would be resurfaced. Surface replacement deposits are collected from timber sales based upon the amount of timber hauled over the roads. These funds will be used to pay for resurfacing the roads as the funds become available. Resurfacing may include blading, placement of 4-6" deep aggregate, and/or maintenance of drainage structures such as drainage relief culverts. These road improvements would help to reduce sediment movement, further contributing to improved water quality and fish habitat.

Approximately 30,000 acres would be treated with prescribed fire to reduce ground fuel loadings. This would be accomplished using hand and aerial ignition methods. Implementation would occur over a 3-5 year timeframe. About 18,000 acres would be burned in either the spring or fall, 4,300 acres would be burned in the fall only, and 6,800 acres would be burned in the spring only (see [Map 6](#)).

In 12 identified aspen stands (24 acres), treatment will include: girdling of encroaching conifers or cutting of encroaching conifers less than 21 inches diameter at breast height, construction of ungulate-proof fences, prescribed burning, mechanical root stimulation, and planting. The intensity of the level of treatment will be dependent on response of aspen stands to each management application. Conifers cut within an RHCA would be left on site. Conifers outside of RHCA's would be cut and removed. Continue controlling known noxious weed infestations and any new ones that are identified. Control of new infestations would be accomplished with manual treatments.

Maintain and restore 155 in-channel fish structures on Big Wall Creek (51 structures) and Wilson Creek (104 structures). This work would include pool deepening, boulder placements, rebuilding outside wings, and structure removal. This work would likely be accomplished over several years.

Improve two low-water fords designed for fish passage (large gradation crushed aggregate approaches with a suspended grate). The work on the fords at milepost 9.85 on Forest Road 23 and milepost 0.02 on Forest Road 2300100 would be done as funds become available. Suspended grates would be installed that would keep vehicles off the channel bottom. These fords would replace the current low-water crossings. The intent of these stream-crossing improvements would be to improve water quality and fish habitat.

[See Map 7](#) for the location of aspen stands, fish structures, and noxious weed projects.

[See Map 8](#) for the location of roads to be: closed, obliterated, resurfaced, reconstructed, created for temporary harvest access, seasonal and closed roads to be used for harvest activities, improved road barricades and improved stream crossing locations.

Table 2.1 - Alternative 2 Outputs

Activity	Area	Volume		Length	Number
	(Acres)	mbf	ccf	(Miles)	
Thinning					
Commercial Thinning	4,615	19,300	37,009		
Precommercial Thinning	874				
Logging Systems					
Helicopter	932				
Tractor	1,424				
Forwarder	2,230				
Animal	29				
Roads					
Reconstruction				17	
Resurface				27	
Closed Roads Reopened for Haul				37	
Road Closure Improvements					22
Decommission				4	
Obliteration				10	
Open Roads to be Closed				3	
Low Water Ford Improvements					4
Temporary Road Construction				11.3	
Prescribed Burning					
Slash	4,615				
Under burning	30,000				
Fish Structures					155
Aspen Treatments	24				

Table 2.2 - Alternative 2 Timber Sales

Activity	Rimrock		Wild Horse		Kingbolt	
Commercial Thinning (Acres)	2,765		1,330		522	
Volume mbf/ccf	11,600	22,309	5,200	10,000	2,500	4,700
Logging Systems (Acres)						
Helicopter	578		0		354	
Forwarder	1,507		602		121	
Tractor	680		699		45	
Animal	0		29		0	
Precommercial Thinning (Acres)						
Outside of harvest units	197		177		0	
Within harvest units			500			

Alternative 3

Theme: This alternative emphasizes minimum impacts to water quality, fish habitat, and fish populations, while still addressing all the elements of the purpose and need. The main focus is to minimize sedimentation and degradation of riparian conditions. This alternative addresses issues about water quality and fish habitat, while still achieving some wood fiber production and other ecosystem objectives. Alternative 3 was developed in direct response to Key Issue 2: Water Quality/Fish Habitat/Threatened, Endangered and Sensitive Fish Species.

Primary Features:

- Commercially thins 4570 acres through the use of harvester/forwarder, animal, and helicopter logging systems
- Reconstructs 14 miles of roads for log haul
- Constructs 13.5 miles of temporary roads for log haul
- Obliterates 10 miles of closed roads
- Decommissions 4 miles of closed roads by removing drainage structures
- Closes 3 miles of open roads
- Treats 12 aspens stands (24 acres)
- Precommercially thins 874 acres
- Continue treating known noxious weed infestations and any new ones that are identified.
- Prescribe burn 34,570 acres to reduce fuel loads
- Maintains 155 in-channel fish structures on Big Wall Creek and Wilson Creek
- Resurfaces 27 miles of Forest Roads 23 and 24
- Improves four low water fords on Forest Roads 23 and 2300100.
- Improve 22 existing road closures.

Treatment of Key Issues:

Following are the concerns addressed by this alternative:

- Restore health of forests that are overstocked or diseased
- Reduce fuel loads
- Use low impact logging systems and mitigation to offset harvest-related increases in erosion or sedimentation
- Reduce erosion and sedimentation through active restoration

Details: This alternative would commercially thin 4,570 acres (19,600 mbf, 37,600 ccf). To reduce the potential for soil disturbance and erosion, logging systems would not include the use of tractors. This alternative also increases the use of helicopter logging to avoid reopening old roads, or building new temporary roads near streams.

Harvest would be divided into three timber sales: Kingbolt timber sale would harvest 520 acres and 2.5 mmbf; Rimrock timber sale would harvest 2765 acres and 12.1 mmbf; and Wild Horse timber sale would harvest 1,285 acres and 5.0 mmbf (**see Map 3** and Table 2.4). The units to be logged by horse or other draft animal could be put into a separate small sale.

All other harvest and restoration activities would be identical to Alternative 2.

Table 2.3 - Alternative 3 Outputs

Activity	Area	Volume		Length	Number
	(Acres)	mbf	ccf	(Miles)	
Thinning					
Commercial Thinning	4,570	19,600	37,600		
Precommercial Thinning	874				
Logging Systems					
Helicopter	1,019				
Tractor	0				
Forwarder	3,522				
Animal	29				
Roads					
Reconstruction				14	
Resurface				27	
Closed Roads Reopened for Haul				33	
Road Closure Improvements					22
Decommissioning				4	
Obliteration				10	
Open Roads to be Closed				3	
Low Water Ford Improvements					4
Temporary Road Construction				13.5	
Prescribed Burning					
Slash	4,570				
Underburning	30,000				
Fish Structures					155
Aspen Treatments	24				

Table 2.4 - Alternative 3 Timber Sales

Activity	Rimrock		Wild Horse		Kingbolt	
Commercial Thinning (Acres)	2,765		1,285		520	
Volume mbf/ccf	12,100	23,300	5,000	9,600	2,500	4,700
Logging Systems (Acres)						
Helicopter	630		0		388	
Forwarder	2,135		1,256		132	
Skidder			0		0	
Horse			29		0	
Precommercial Thinning (Acres)						
Outside of harvest units	197		177			
Within harvest units			500			

Alternative 4

Theme: This alternative was designed to improve economic efficiency by eliminating units with very high logging or transportation costs relative to the value of the timber to be harvested. Alternative 4 was developed in direct response to Key Issue 3: Economic Viability of Timber Sales.

Primary Features:

- Commercially thins 4115 acres through the use of tractor, harvester/forwarder, animal, and helicopter logging systems
- Reconstructs 18 miles of roads for log haul
- Constructs 11.3 miles of temporary roads for log haul
- Obliterates 10 miles of closed roads
- Decommissions 4 miles of closed roads by removing drainage structures
- Closes 3 miles of open roads
- Treats 12 aspens stands (24 acres)
- Precommercially thins 874 acres
- Continue treating known noxious weed infestations and any new ones that are identified.
- Prescribe burn 34,115 acres to reduce fuel loads
- Maintains 155 in-channel fish structures on Big Wall Creek and Wilson Creek
- Resurfaces 27 miles of Forest Roads 23 and 24
- Improves four low water fords on Forest Roads 23 and 2300100.
- Improve 22 existing road closures.

Treatment of Key Issues:

Following are the concerns addressed by this alternative:

- Restore health of forests that are overstocked or diseased
- Reduce fuel loads
- Use sensitive logging systems and mitigation to offset harvest-related increases in erosion or sedimentation
- Reduce erosion and sedimentation through active restoration

Details: This alternative would commercially thin 4155 acres (approximately 18,200 mbf or 30,900 ccf). Approximately 18 miles of road reconstruction would occur. Harvest would be divided into three timber sales: Kingbolt timber sale would harvest 307 acres and 1.4 mmbf; Rimrock timber sale would harvest 2496 acres and 11.7 mmbf; and Wild Horse timber sale would harvest 1,312 acres and 5.1 mmbf (see [Map 4](#) and Table 2.6). The units to be logged by horse or other draft animal could be put into a separate small sale.

All other harvest and restoration activities would be identical to Alternative 2.

Table 2.5 - Alternative 4 Outputs

Activity	Area	Volume		Length	Number
	(Acres)	mbf	ccf	(Miles)	
Thinning					
Commercial Thinning	4,115	18,200	30,900		
Precommercial Thinning	874				
Logging Systems					
Helicopter	458				
Tractor	1,426				
Forwarder	2,202				
Animal	29				
Roads					
Reconstruction				18	
Resurface				27	
Closed Roads Reopened for Haul				37	
Road Closure Improvements					22
Decommission				4	
Obliteration				10	
Open Roads to be Closed				3	
Low Water Ford Improvements					4
Temporary Road Construction				11.3	
Prescribed Burning					
Slash	4,115				
Under burning	30,000				
Fish Structures					155
Aspen Treatments	24				

Table 2.6 – Alternative 4 Timber Sales

Activity	Rimrock		Wild Horse		Kingbolt	
Commercial Thinning (Acres)	2,496		1,312		307	
Volume mbf/ccf	11,700	18,300	5,100	9,800	1,400	2,800
Logging Systems (Acres)						
Helicopter	317				141	
Forwarder	1,479		602		121	
Tractor	700		681		45	
Animal			29			
Precommercial Thinning (Acres)						
Outside harvest units	197		177			
Within harvest units			500			

Alternative 5

Alternative 5 is similar to Alternative 3 but was modified to address the stands most heavily defoliated by the Douglas-fir tussock moth outbreak in 2001. The units proposed for timber harvest, and the logging systems are identical to those in Alternative 3. Only the harvest prescriptions change. Because of the high numbers of trees that have died from the defoliation and associated insect attacks, there are not enough live trees remaining in some stands to meet Umatilla National Forest recommended stocking levels. Those areas that do not have enough live trees to meet recommended stocking levels will be regenerated by removing most of the dead trees and by planting conifer seedlings following the timber harvest.

Six stands with a total area of approximately 122 acres will be treated with a shelterwood regeneration prescription. Shelterwood harvest systems typically retain 10 to 15 of the largest, most windfirm trees to serve as a source of shade and seed. However, to meet the requirements of Umatilla Forest Plan Amendment #11 (Timber Sale Screens), at least 18 of the largest trees will be left to ensure an adequate number of green replacement trees for maintaining the snag numbers over time for 100% of the potential population level of primary cavity nesters. The units harvested with a shelterwood prescription would be burned to reduce fuel levels and prepare the site for planting. The units would then be planted with a mixture of conifer species suited to the site to meet recommended stocking levels. The remaining stands will be treated with a commercial thinning prescription as in Alternative 3.

Theme: This alternative emphasizes minimum impacts to water quality, fish habitat, and fish populations, while still addressing all the elements of the purpose and need. The focus is to minimize sedimentation and degradation of riparian conditions. This alternative addresses issues about water quality and fish habitat, while still achieving some wood fiber production and other ecosystem objectives. All other actions are the same as in Alternative 3.

Primary Features:

- Commercially thins 4,448 acres through the use of harvester/forwarder, animal, and helicopter logging systems
- Harvests 122 acres through a shelterwood regeneration harvest in stands severely defoliated by Douglas-fir tussock moth
- Reconstructs 14 miles of roads for log haul
- Constructs 13.5 miles of temporary roads for log haul
- Obliterates 10 miles of closed roads
- Decommissions 4 miles of closed roads by removing drainage structures
- Closes 3 miles of open roads
- Treats 12 aspens stands (24 acres)
- Precommercially thins 874 acres
- Continue treating known noxious weed infestations and any new ones that are identified.
- Prescribe burns 34,570 acres to reduce fuel loads
- Maintains 155 in-channel fish structures on Big Wall Creek and Wilson Creek
- Resurfaces 27 miles of Forest Roads 23 and 24
- Improves four low water fords on Forest Roads 23 and 2300100.
- Improves 22 existing road closures.

Treatment of Key Issues:

Following are the concerns addressed by this alternative:

- Restore health of forests that are overstocked or diseased including 122 acres of forest that has been defoliated by the Douglas-fir Tussock Moth
- Reduce fuel loads
- Use low impact logging systems and mitigation to offset harvest-related increases in

erosion or sedimentation

- Reduce erosion and sedimentation through active restoration

Details: This alternative would commercially thin 4,448 acres (19,100 mbf or 36,700 ccf) and regenerates 122 acres of severely defoliated stands (1,500 mbf, 2,700 ccf). To reduce the potential of soil disturbance and erosion logging systems would not include the use of tractors, and an increase in the use of helicopters

Harvest would be divided into three timber sales: Kingbolt timber sale would harvest 520 acres and 2.5 mmbf; Rimrock timber sale would harvest 2,643 acres and 13.1 mmbf; and Wild Horse timber sale would harvest 1,285 acres and 5.0 mmbf (**see Map 5** and Table 2.8). The units to be logged by horse or other draft animal are shown as part of the Wildhorse sale, but could be put into a separate small sale.

All other harvest and restoration activities would be identical to Alternative 2.

Table 2.7 - Alternative 5 Outputs

Activity	Area	Volume		Length	Number
	(Acres)	mbf	ccf	(Miles)	
Thinning & Timber Harvest					
Commercial Thinning	4,448				
Regeneration Harvest (Shelterwood)	122	20,600	39,400		
Precommercial Thinning	874				
Logging Systems					
Helicopter	1,019				
Tractor	0				
Forwarder	3,522				
Animal	29				
Roads					
Reconstruction				14	
Resurface				27	
Closed Roads Reopened for Haul				33	
Road Closure Improvements					22
Decommission				4	
Obliteration				10	
Open Roads to be Closed				3	
Low Water Ford Improvements					4
Temporary Road Construction				13.5	
Prescribed Burning					
Slash	4,570				
Under burning	30,000				
Fish Structures					155
Aspen Treatments	24				

Table 2.8 - Alternative 5 Timber Sales

Activity	Rimrock		Wild Horse		Kingbolt	
Commercial Thinning (Acres)	2,643		1,285		520	
Regeneration Harvest (Acres)	122					
Volume mbf/ccf	13,100	25,100	5,000	9,600	2,500	4,700
Logging Systems (Acres)						
Helicopter	630		0		388	
Forwarder	2,135		1,256		132	
Skidder	0		0		0	
Horse	0		29		0	
Precommercial Thinning						
Outside of harvest units	197		177		0	
Within harvest units			500			

Table 2.9. Rimrock Alternative Comparison

Activity		Alternative			
		2	3	4	5
Thinning	Commercial harvest acres	4,615	4,570	4,115	4,570
	Precommercial thin acres	874	874	874	874
Logging Systems	Helicopter	932	1,019	458	1,019
	Tractor	1,424	0	1,426	0
	Forwarder	2,230	3,522	2,202	3,522
	Animal	29	29	29	29
Roads	Reconstruction Miles	17	14	18	14
	Resurface Miles	27	27	27	27
	Miles of Roads Reopened	37	33	37	33
	Road Closure Improvements	22	22	22	22
	Decommission Miles	4	4	4	4
	Obliteration Miles	10	10	10	10
	Low Water Ford Improvements	4	4	4	4
	Temporary Road Construction	11.3	13.5	11.3	13.5
	Volume	Thousand board feet (mbf)	19,300	19,600	18,200
	Hundred cubic feet (ccf)	37,009	37,600	30,900	39,400
Rimrock TS	Commercial thin acres	2,765	2,765	2,496	2,643
	Shelterwood acres	0	0	0	122
	Thousand board feet (mbf)	11,600	12,100	11,700	13,100
	Hundred cubic feet (ccf)	22,309	23,300	18,300	25,100
	Helicopter	578	630	317	630
	Forwarder	1,507	2,135	1,479	2,135
	Tractor	680	-	700	-
	PCT	197	197	197	197
Wild Horse TS	Commercial thin acres	1,330	1,285	1,312	1,285
	Thousand board feet (mbf)	5,200	5,000	5,100	5,000
	Hundred cubic feet (ccf)	10,000	9,600	9,800	9,600
	Helicopter	-	-	-	-
	Forwarder	602	1,256	602	1,256
	Tractor	699	-	681	-
	Horse	29	29	29	29
	PCT	177	177	177	177
Kingbolt TS	Commercial thin acres	520	520	307	520
	Thousand board feet (mbf)	2,500	2,500	1,400	2,500
	Hundred cubic feet (ccf)	4,700	4,700	2,800	4,700
	Helicopter	354	388	141	388
	Forwarder	121	132	121	132
	Tractor	45	-	45	-
Prescribed Burning	Slash	4,615	4,570	4,115	4,570
	Natural Fuels	30,000	30,000	30,000	30,000
Fish Structures		155	155	155	155
Aspen Treatments (acres)		24	24	24	24

Potential Knutson-Vandenburg Projects

The following projects and opportunities have been identified as possible candidates to receive funding from the Knutson-Vandenburg Act. These are commonly referred to as K-V funds and are collected from the sale of timber. K-V funds are dependent upon having enough timber sale receipts to pay for the projects. While K-V funding will be sought for these projects, other funding will also be requested if K-V funds are not sufficient for all of the projects.

There are no essential projects proposed.

Timber Stand Improvement

- Precommercially thin 874 acres to improve stand vigor, move species composition towards historic trends, and promote late/old structure characteristics in the long-term. Five hundred acres are within harvest units and 374 are outside harvest units.

Roads

- Improve 22 road closures by installing guardrails or earth barricades. Obliterate 9 miles and decommission 4 miles of closed roads.
- Reinforce the roadbed to the dispersed campsite on Forest Road 2400160.
- Improve two low-water fords designed for fish passage (large gradation crushed aggregate approaches with a suspended grate). The fords are at milepost 9.58 on Forest Road 23 and milepost 0.02 on Forest Road 2300100.

Bull Prairie Campground

- Replace two outhouses to improve water quality and fish habitat. Old concrete vaults will be removed using a backhoe and disposed of at the existing pit on Rd 2039 010 (T7S R25E Sec 4). New vaults will be placed in the existing holes.
- Remove deteriorating and overgrown barbecue pits in the day use area to improve visual quality of recreation area and allow the microsite to be revegetated with native plants.
- Terrace steep, heavily used shoreline slopes with on-site native materials (logs and rock gabions) to reduce erosion and provide areas for fishing and wildlife viewing.

Dispersed Campsites

- Provide interpretive signing to prevent resource damage and install at heavily used dispersed campsites.

Wildlife

- Development /Improvements of water sources for wildlife. These projects would include the development of areas for nesting/foraging waterfowl, upland game birds, and small/large animals. Improvements could include repairing water troughs, replacing dug out water sources (ponds) with spring boxes and troughs.
- Fence construction would take place to exclude livestock and or big game from important habitats, and would include spring source fencing, riparian pastures and meadow/streambank restoration, repair of allotment and pasture fences.

Noxious Weeds

- Seed areas of bare or disturbed soil to prevent or provide deterrence to noxious weed invasion.

- Detection and control of noxious weeds that become established because of ground disturbing activities and introduction by project implementation. Control of new infestations would be done manually. Follow up treatment on 5,000 acres and 55 miles of road for at least 3 years.

Prescribed Fire

- Underburn to control juniper, improve forage for wildlife, or maintain structure and stocking levels would potentially take place with KV funds.

Fish Structures

- Maintain and restore fish structures on Big Wall Creek and Wilson Creek. This work would include pool deepening, boulder placements, rebuilding outside wings, total structure rebuilding, and structure removal.

Aspen Treatment

- Treat 12 aspen stands (24 acres) to protect existing trees and to promote new aspen sprouts.

Mitigation

Mitigation measures define a set of conditions or requirements that an activity must meet to avoid or minimize potential effects of a sensitive resource. Mitigation measures are not optional. Due to the complexity of projects proposed under each alternative, mitigation measures for each type of project are listed here along with identification of those alternatives that would include the mitigation.

Commercial Thinning (Alt. 2, 3, 4, 5)

- A list of the USDA Forest Service Pacific Northwest Region General Water Quality Best Management Practices, 1988, (BMP's) specific to harvest in this area is included in Appendix B. The intent of these BMP's is to meet Clean Water Act requirements and to protect streams and adjacent areas to maintain aquatic resources.
- *Units will be designed to protect all riparian areas (streams, seeps, bogs, and springs) from harvest activities. This will be accomplished delineating timber sale unit boundaries to exclude PACFISH Riparian Habitat Conservation Areas (300 feet on each side of class 1 and 2 streams, 150 feet for class 3 streams, and 100 feet for class 4 streams and springs, seeps, and bogs less than 1 acre).*
- *The source location, quantity, and timing of water use for dust abatement will be approved by the Forest Service before a sale, in order to protect the water and fisheries resources during times of low water.*
- *In alternatives 2, 3, and 4 leave all standing dead trees (with the exception of hazard trees). Where possible, all pre-existing down material will be left and skidding will avoid existing downed logs to minimize breakage. In Alternative 5, some trees recently killed because of the Douglas-fir tussock moth outbreak and associated insect attacks would be cut and removed. At least 3 large snags per acre will be left in those units. Where available, the snags left will be at least 21 inches in diameter.*
- *Only existing or designated skid trails will be used for all heavy equipment operations. Skid trails will not total more than 15% of the stand acres. The Forest Service will approve locations of skid trails. If a skid trail is necessary within a RHCA, it will only be at a designated crossing. Slash will be placed into the crossing to minimize the amount of sediment that could enter streams.*

- *Logging is not planned within PACFISH RHCA's and trees adjacent to RHCA boundaries are required to be directionally felled away from the riparian area. However, in the event that trees are inadvertently damaged within a riparian area, the damaged trees will not be removed unless they are a safety hazard. The intent is to avoid disturbance to the riparian area.*
- *Natural regeneration will be left along open and seasonally open roads to reduce big game vulnerability.*
- *Where safety permits, the following will be protected during felling, skidding, and other timber sale operations: dispersed campsites; residual conifers, research plots (ecology plot center markers and condition and trend transect markers) and improvements (i.e. fences, stock ponds, section corner monuments, etc.).*
- *To reduce the amount of soil disturbance and displacement in units with ash soils, no whole tree yarding will occur on units identified in Appendix E.*
- *Equipment will be confined to designated crossings in ephemeral draws which do not classify as Class IV streambeds, and may not otherwise operate within the draw in order to minimize soil disturbance. Trees within these draws can be cut and dragged or lifted out.*
- *Fences and gates will be maintained during harvest activity to prevent cattle from passing between allotments or pastures.*
- *Logging operations will avoid existing patches of natural regeneration to protect this forest structure and provide hiding cover for big game.*
- *Silt fences will be placed on the lower ends of landings located in RHCA's to prevent sediment from entering creeks. These landings will not be bladed. Restoration of landings will follow harvest activities as quickly as possible. This will include grass seeding with native seed and using straw bale mulch if weed free mulch can be found. If a landing is to be subsoiled, the silt fence will stay in place until after the spring of the year following the subsoiling.*
- *Service landings for fueling and maintaining helicopters will be located away from creeks and outside RHCA's.*
- *Following harvest activities, landings and other heavily compacted areas used during logging operations, where soil conditions are appropriate and where excessive damage to leave trees can be avoided, will be treated with a mechanical winged subsoiler.*
- *Snowplowing will occur in a way that prevents erosion damage to roads and streams.*

Noxious Weeds (Alt. 2, 3, 4, 5)

- *A copy of the "Rimrock Planning Area Noxious Weed Infestations" map will be included in the timber sale contract packages for this project.*
- *Haul routes, skid trails, landings, and all other areas of disturbance will be inspected by Forest Service personnel for noxious weed infestation, annually, for a period of five years.*
- *All equipment to be operated on the project area will be cleaned if needed in a manner sufficient to prevent noxious weeds from being carried on to the project area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning, if needed, will occur off of National Forest System lands. Cleaning will be inspected and approved by the Forest Officer in charge of administering the project.*

- *Noxious weed infestations presently occur within the road system of the analysis area. If road maintenance activities are required on the infested portions of these roads, the equipment may be cleaned prior to moving out of the infested area.*
- *Road rock source pits/quarries will be inspected by Forest Service personnel for noxious weed infestations prior to use. Rock source material infested with high priority noxious weed propagules will not be utilized.*
- *Provide the timber sale operator with weed identification material (UNF Noxious Weed Identification field book) so that they might be better able to recognize the presence of noxious weeds.*
- *Skidding will be minimized on slopes over 35% by designating skid trail locations in advance, and by spacing skid trails to average approximately 60 feet apart and winching to them.*
- *Road construction other than that planned for in the analysis will not be authorized.*
- *As dispersed campsites have higher probability of having existing noxious weed infestations, logging equipment, slash piling and slash burning will be prohibited within 50 feet of those areas.*
- *Areas of bare/disturbed soil (including but not limited to: skid trails, landings, road cuts and fills, etc.) will be seeded using native seed. The seed mix to be used will include at least one grass species which grows readily in the absence of the A soil horizon, and which is moderately to strongly rhizomatous. In addition, the seed mix will include one fast germinating annual grass species to provide immediate (relatively) ground cover. Seed application rates will be high (5-10 lbs/acre) to compensate for the broadcast method of application, and to generate vegetative densities adequate to provide deterrence to noxious weed invasion.*
- *Seed will be certified weed free.*
- *Obliterated roads will be seeded with a seed mix as described above.*
- *Prescribed burning, aspen enhancement and precommercial thinning activities will ensure that all equipment including personal protective equipment is free of noxious weed propagules.*
- *Roads to be closed will be inspected for noxious weed infestation (and inventory/early treatment if infestations exist) prior to road closure.*
- *Prescribed burning operations will avoid known noxious weed infestations.*
- *All hay or straw used for mulching, erosion control, or other rehabilitation purposes will be weed free.*
- *If new noxious weed infestations do occur within the project area, a noxious weed inventory will be completed, and early treatment will be limited to manual treatment methods (as defined in the UNF Noxious Weed Management Plan). If it is determined at some point in the future that manual treatment is no longer effective/efficient, additional analysis will be required to determine the appropriate treatment method.*

Recreation (Alt. 2, 3, 4, 5)

- *Logging activities in the Developed Recreation Management Area will be restricted to animal logging.*
- *Soil disturbance will be restricted to 10% in Developed Recreation Management Area.*

- *Logging activities in the Developed Recreation Management Area will be restricted to dates outside of holidays (Memorial Day, Independence Day, Labor Day) and the big game hunting seasons (September thru November).*
- *Logging activities in the Developed Recreation Management Area will take place while there is a snow pack on the ground.*
- *Slashing of damaged existing saplings will occur along skid trails in units within the Developed Recreation Management Area.*
- *Logging activities that occur within the Viewshed and Developed Recreation Management Areas will be handpiled and burned.*
- *Logging units that are near Dispersed Camping Sites will leave a buffer between the site and the cutting unit.*
- *Burning in the Developed Recreation Management Area will occur in the spring prior to opening Bull Prairie Campground (mid to late May) or in the fall after the 1st Elk Hunting Season (early November).*

Other Restoration Projects (Alt. 2, 3, 4, 5)

- *During prescribed burning projects ignition will not occur in RHCAs.*
- *In-stream work would take place during the in-stream work window of July 15 to August 31, as determined by the Oregon Department of Fish and Wildlife.*

Monitoring Plan

The following are descriptions of monitoring needed to assure the desired outcome of the various projects. Monitoring for both implementation (whether the project was implemented as planned) and effectiveness (whether overall management objectives were met) will occur. Forest Service personnel would conduct monitoring in areas that have the highest probability of showing effects. At a minimum, monitoring will be consistent with the Forest Plan Monitoring Strategy. Additional monitoring defined will be completed as funding permits. An implementation plan will be prepared prior to project implementation that will be used to identify the person(s) responsible for implementation and track project administration and monitoring activities.

Implementation

- *Number, size, and distribution of snags and down logs would be field checked from sale layout through slash disposal activities by Forest Service personnel to determine if habitat capability objectives are being met (particularly for large diameter components).*
- *Riparian protection as delineated by PACFISH and BMP's would be field checked by Forest Service personnel from sale layout through slash disposal to determine that these objectives are being met.*
- *Water quality and stream morphology surveys would be conducted by Forest Service personnel. Water temperature and stream surface shade would be field checked at 11 sites annually for a duration of 10 years. Stream channel morphology would be evaluated at Wall Creek at the forest boundary prior to project implementation, the first year following implementation and at year 5 after implementation and/or after major flood/disturbance (see Appendix D). Sediment would be evaluated as per agreements reached in consultation under the Endangered Species Act.*
- *Presence of noxious weed species surveys would be field checked by Forest Service personnel prior to initiation of logging and other ground disturbing activities within the project area. Sale areas and roadways would also be checked following harvest.*

Noxious weed prevention and treatment methods would be conducted in accordance with the Environmental Assessment for the Management of Noxious Weeds (dated May 24, 1995) and the Noxious Weed Plan developed for the Rimrock project.

Effectiveness

- *Range vegetation within the project area would be monitored to determine whether cumulative effects from project activities result in undesirable trend, or excessive utilization.*
- *Soil disturbance would be monitored to determine if the project results in conditions that comply with Forest-wide Standards and Guidelines for the management of the soil resource.*

Comparison of Alternatives in Response to the Key Issues

Chapter 1 presents in detail the Key Issues that are the focus of this FEIS. This section compares the alternatives in terms of these issues (See Table 2.10).

Key Issue 1: Vegetation Removal

Alternative 1 would provide no direct or indirect improvements to forest health or ecosystem sustainability. Alternative 1 would not manipulate any vegetation, thereby, allowing forest stands to continue to become more dense and stressed from increased density. Trees would be less able to survive insects and disease as a result of the stressed conditions. More shade-tolerant trees such as Douglas-fir and grand fir, which are susceptible to a larger variety of insects and disease, would become established. Activities to reduce fuel accumulations and the risk of stand replacement wildfire would not change with alternative 1.

Alternatives 2, 3, 4, and 5 propose to use commercial harvest to reduce stocking density and begin to change the species composition to a more historical seral species thus resulting in forest stands that would develop and imitate natural stands shaped by long-term disturbances.

Alternative 2 would thin from below a total of 4,615 acres of overstocked stands. Helicopter, tractor, forwarder, and animal based logging systems would be used. Alternative 3 would treat 4,570 acres using helicopter, forwarder and animal systems. No tractor based logging systems would be used. Alternative 3 is in direct response to Key Issue 2 (see Key Issue 2 below). Alternative 4 would thin from below 4,115 acres using all four logging systems. The reduction of acres in alternative 4 is in response to the economic viability of the harvest units (see key issue 3 below). Units with high logging and transportation cost in relation to the value of the timber to be removed would be dropped from the harvest plan. Alternative 5 is the same as Alternative 3 with modifications to address the stands (6 stands/122 acres) that are most heavily defoliated by the Douglas-fir tussock moth outbreak. Under alternative 5, stands that do not meet the recommended stocking levels for the Umatilla National Forest, as a result of Douglas-fir tussock moth mortality, would be treated with a shelterwood harvest and removal of dead trees followed by planting of conifer seedlings.

Alternatives 2, 3, 4, and 5 also include treating 874 acres with future precommercial thinning, treating 24 acres of aspen stands to promote viability and reduce conifer encroachment within those 12 stands, prescribed burning of slash created from commercial thinning, and periodic underburns throughout the Rimrock analysis area.

Key Issue 2: Water Quality/Fish Habitat/Threatened and Sensitive Fish Species

No adverse effects to riparian ecosystem functions, channel conditions, aquatic fish habitat conditions and beneficial uses would likely result from implementing Alternative 1. Channel conditions, water quality and fish habitat would remain unchanged. Channels would still be rated as functioning at risk. No in-channel or riparian restoration/enhancement projects would be implemented. Sediment levels would continue due to existing roads, but total sediment yields would remain constant. Temporary new roads would not be constructed, nor would erosion-prone

roads be reconstructed/resurfaced to reduce sediment flow. No roads would be obliterated or decommissioned. No closed roads would be reopened for haul purposes.

All action alternatives (2, 3, 4, & 5) would obliterate or decommission 14 miles of previously existing road and resurface 27 miles of road. In addition alternative 2 would reconstruct 17 miles of road. Alternatives 3 and 5 would reconstruct 14 miles of road and alternative 4 would reconstruct 18 miles of road. By implementing road obliteration, decommissioning and road reconstruction the available sediment for potential erosion would be reduced over time from current conditions. Over the long-term, stream channel and riparian conditions would improve because of reduced erosion and sedimentation from poorly located and maintained roads.

Additional sedimentation may occur with the reopening of previously closed roads and the construction of temporary roads needed to allow logging equipment into the harvest areas. Alternatives 2 and 4 would reopen 37 miles of previously closed roads and construct 11.3 miles of temporary road for the duration of the harvest period. After the harvest is completed, roads would once again be closed and newly constructed temporary roads would be obliterated. Alternative 3 and 5 would reopen 33 miles of closed road and construct 13.5 miles of temporary road. 4 miles of closed road within RHCA's would not be reopened. This would minimize the hydrologic impacts obtained from road maintenance and stream temperatures would not be affected by vegetation removal. Under alternatives 3 and 5 use of closed roads that enter RHCA's would not be used if mitigation measures could not be met. This results in an additional 1.8 miles of new-temporary road construction required to reach harvest units.

Alternative 2 would commercially thin the largest number of acres of all action alternatives while using 343 acres for landings, skid trails and other soil disturbing activities that could mobilize sediment. Under alternative 2 helicopter logging would occur on slopes of 35% or greater or in units where new road construction would have been required. Forward logging would occur in areas with a high level of concern due to sensitive soils. The least amount of acres being effected by disturbing activities; landings, skid trails, and harvest on steep slopes, would occur in alternatives 3 and 5 for a total of 237 acres. Under these alternatives all ground based logging systems would be carried out using harvester/forwarder equipment with 52 additional acres converting to helicopter logging. In addition, 65 acres would not be commercially thinned as they would in alternative 2. Alternative 4 would affect 346 acres with landings, skid trails, and harvest on steep slopes while reducing total commercial thinning area by 500 acres. The reduction in acres harvested is in response to economic viability of particular stands and only slightly changes the sediment mobilized or the change in stream load from alternative 2. Combined with all other activities proposed alternative 3 would produce the least amount of sediment mobilization.

Improvement and maintenance to 155 in-channel fish structures would occur directly, mobilizing sediment in streams. Mitigation measures would be taken to reduce the amount of sedimentation to the streams. The long-term effect of in-channel structures would be beneficial to fish habitat. This maintenance would occur in all action alternatives.

During the first year all action alternatives are predicted to produce an increase in sediment yield above baseline. Sediment production was modeled for the combined activities of the action alternatives and the no action alternative. Alternative 2 was shown to cause the largest increase in sedimentation. Alternative 4 showed the next largest increase, and alternatives 3 and 5 showed the least.

Key Issue 3: Economic Viability of Timber Sales

Alternative 1 would not harvest any timber, therefore would not produce any revenue or benefits to the wood products industry. Employment within the timber industry as well as employment indirectly effected by the industry would not change.

All action alternatives would produce positive bid rates indicating that the project would provide a viable harvest proposal. Based on analysis, alternative 4 would produce the highest bid rate resulting in the highest potential revenue from the sale of timber. This is the direct result of removing low value units from the thinning plan. Alternative 4 was in direct response to the Key Issue of economic viability. Alternative 2 bid rates are slightly lower than alternative 4 due to the

use of helicopter logging systems on those units with steeper slopes. Alternative 3 and 5 would produce the lowest bid rate and provide the least amount of revenue from other alternatives that harvest timber due to harvesting almost twice as much of the volume with helicopter logging systems. In all action alternatives, units using horse or animal based logging systems would result in a negative bid rate.

The levels of harvest under each action alternative would effect employment in several ways. Direct employment would include those people involved in the harvest of the timber, the transportation of the products, and production of the value added-end product. Indirect employment would include those businesses that supply materials and services to the above businesses. Induced employment is attributed to the moneys spent by the business owners, employees, and other related industries. In addition, other employment opportunities would also be provided by restoration and enhancement activities outlined for the Rimrock Project. Alternative 5 would support the highest level of employment, while alternative 2 and 3 would be slightly lower. Alternative 4 would support the least amount of employment.

Table 2.10 - Comparative Summary of the Alternatives and their Response to the Issues

Measurement Criteria	Alternatives				
	1	2	3	4	5
Issue 1: Vegetation Sustainability					
Number of acres where stand density is reduced and seral species composition is returned.	0	4,615	4,570	4,115	4,570
Issue 2: Water Quality/Fish Habitat/Threatened, Endangered and Sensitive Fish Species					
Number of pools improved and maintained	0	155	155	155	155
Percentage of fish structures functioning properly	31	89	89	89	89
Miles of road improvements where a reduction in sediment contribution occurs:					
Reconstruction	0	17	14	18	14
Resurfacing	0	27	27	27	27
Miles of roads decommissioned or obliterated	0	14	14	14	14
Miles of temporary road constructed	0	11.3	13.5	11.3	13.5
Miles of closed road reopened for haul use (relates to miles of stream where shade may be reduced which correlates to stream temperature)	0	37	33	37	33
Acres of treatment that could mobilize sediment (landings, skid trails, harvest on steep slopes, etc.)	0	343	237	346	237
Modeled change in sediment yield (% baseline)	-	38	33	37	33
Issue 3: Economic Viability of Timber Sales					
Estimated advertised bid rates per hundred cubic feet (\$/ccf)	0	25.52	22.02	30.78	22.25

Agency Preferred Alternative

Alternative 5 is the agency preferred alternative.