CATEGORICAL EXCLUSION DOCUMENTATION FOR
DNRC FOREST MANAGEMENT ACTIVITY

Project Name: White Line Salvage Timber Permit
Proposed Implementation Date: August 2010
Proponent: Dept. of Natural Resources and Conservation
Type and Purpose of Action: Commercial harvest of an estimated 350 MBF of Douglas-fir sawtimber from approximately 40 acres. The proposed project would primarily address timber that has been affected by insect and disease infestations, focusing on removing dead, dying, susceptible and overstocked trees. The project would incorporate group selection/ selection harvest methods utilizing conventional/tractor harvest systems. Additionally, the proposed project would perform hazard/fuels reductions to address overcrowded sub-merchantable material on selected sites within the proposed harvest units. The project would utilize existing roads and construct approximately 1100 feet of temporary, minimum standard road to access the harvest area. The new road would be physically closed at the end of the project. The purpose of action is to generate revenue for the Common School Trust; remove overstocked and suppressed timber before its value is lost to insect and disease or wildfire; and improve the health, vigor and productivity of the forest in the proposed project area.
Location:SW4SE4 Section 9 and W2 Section 16, Township 5 South, Range 12 West
County: Beaverhead

Category (refer to ARM 36.11.447 for additional detail):

_____1) Temporary Uses of Land with Negligible Effects
_____2) Plans and Policies
_____3) Leases and Licenses
_____4) Acquisition of Land or Interest in Land
_____5) Road Maintenance and Repair
_____6) Bridges and Culverts
_____7) Crossing Class 3 Streams
_____8) Temporary Road Use Permits
_____9) Road Closure
_____10) Material Stockpiles
_____11) Backfilling
_____12) Gathering Forest Products for Personal Use
_____13) Regeneration
_____14) Nursery Operations
_____15) Water Wells
_____16) Herbicides and Pesticides
_____17) Other Hazardous Materials
_____18) Fences
_____19) Waterlines
_____20) Removal of Small Trees
_____21) Removal of Hazardous Trees
_____22) Cone Collection
__X__ 23) Timber Harvest (<100 MBF green or 500 MBF salvage)

By process of the adoption of the Administrative Rules for Forest Management on February 27, 2003, pursuant to ARM 36.2.523(5)(a), the Department of Natural Resources and Conservation, Trust Land Management Division, has adopted the above categorical exclusions for activities conducted on state forest lands. "Categorical Exclusion" refers to a type of action that does not individually, collectively, or cumulatively require an EA or EIS unless extraordinary circumstances occur (ARM 36.2.522(5)).

Extraordinary Circumstances:

Will the proposed action affect one or more of the following resources or situations in the project area? If the resource or situation is present, but project design avoids potential adverse effects on the resource, the answer is "no". One "Yes" answer indicates that Categorical Exclusion is not appropriate for the project, and an EA or EIS must be conducted.

YES	NO	
_____	**X**	1) Sites with high erosion risk.
_____	**X**	2) Federally listed threatened and endangered species or critical habitat for threatened and endangered species as designated by the USFWS.
_____	**X**	3) Municipal watersheds.
_____	**X**	4) The SMZ of fish bearing streams or lakes, except for modification or replacement of bridges, culverts and other crossing structures.
_____	**X**	5) State natural area.
_____	**X**	6) Native American religious and cultural sites.
_____	**X**	7) Archaeological sites.
_____	**X**	8) Historic properties and areas.
_____	**X**	9) Several related projects that individually may be subject to categorical exclusion but that may occur at the same time or in the same geographic area. Such related actions may be subject to environmental review even if they are not individually subject to review.
_____	**X**	10) Violations of any applicable state or federal laws or regulations.

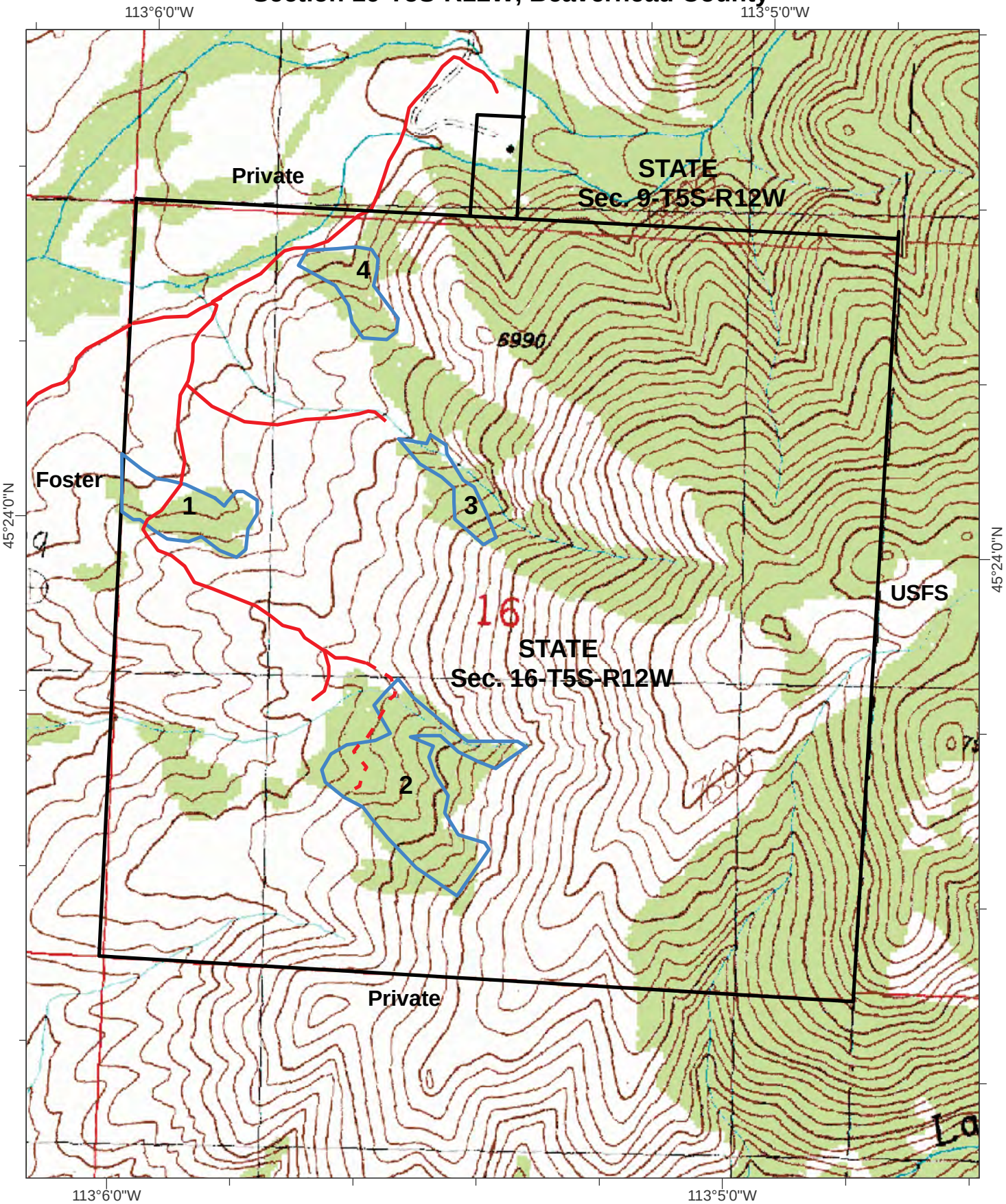
The project listed above meets the definition of the indicated categorical exclusion, including specified conditions and extraordinary circumstances, as provided in the Administrative Rules for Forest Management (ARM 36.11.447).

Prepared by: Chuck Barone (Name) 8/26/10 (Date)

Decision by: Tim Egan (Name) Dillon Unit Manager (Title)

/S/ Tim Egan (Signature) 8/30/2010 (Date)

ATTACHMENT A
Proposed White Line Salvage Timber Permit
Section 16-T5S-R12W, Beaverhead County



0 280 560 1,120 Feet

1:11,000

Access Road

Harvest Area

ATTACHMENT D

February 10, 2004

FROM: JEFF COLLINS, Soil Scientist

SUBJECT: WHITE CREEK TIMBER SALE,
SE Section 9 & NE Section 4, T5S, R12W
Soils, Geology and Noxious Weed report

Soil related concerns and potential issues to be considered

* Long term soil productivity can be reduced depending on area of physical effects, amount and distribution of course woody debris retained for nutrient cycling.

* What design is needed to ensure proper road drainage, reconstruction details and maintenance needs on existing and new roads to control erosion and maintain slope stability.

* Noxious weeds- Do noxious weeds occur on the site and what combination of prevention and control measures would be used for noxious weed management.

EXISTING ENVIRONMENT Geology & Soils
The sale area is located on moderate to steep slopes with high rock content soils derived from residual bedrock, glacial till and alluvium on the mountain sideslopes. Bedrock in the White Creek, Clark Creek and Dingley Creek drainages is mainly metamorphic granitics of the Pioneer Batholith, in state section 4, 9 and the NE corner of section 16. The headwaters of White Creek, Clark Creek, Dingley Creek and Lake Creek are dominated by alpine glacial features of cirques basins, glacial scoured trough-walls and deep glacial till deposits forming a narrow band along the valley bottom. Ridges and southerly slopes have shallow soils and common boulders and talus that limit road access points.

The forest terrain is fairly complex with well developed, small dry draws on mountain sideslopes and narrow alluvial terraces and riparian stingers adjacent to the streams. Segments of Dingley, Clark and White Creeks are deeply incised into the alluvial terraces and have steep sideslopes. State section 16 has mainly argillite bedrock, which is more erosion resistant than the granitics in sections 4 and 9. The toeslopes and open sage/grasslands along the Grasshopper Creek valley are a complex of coarse alluvial soils and tertiary valley fill deposits that have some higher clay content subsoils.

There are no especially unusual or unique geologic features in the proposed harvest area, but there are areas of mineralization. Most moderate slopes and rocky sites are stable. Recent debris flows have occurred in the White Creek drainage as a result of a torrential rainfall event on burned areas, following the 2003 Hidden Lake Fire. The debris flows were confined to narrow strips along two draws. The debris flows originated from concentrated runoff in section 10 that scoured segments of the narrow draws downcuttting to the granitic bedrock, leaving abrupt channel banks in the scoured areas. The flow continued down the stream channel, but most of the material was deposited across the broader stream bottom near the State /FS boundary on White Creek.

The unburned soils with intact duff had some overland flow, but no severe erosion was observed. Areas where all duff was consumed by fire had extensive overland flow and varying levels of sheet and rill erosion. Some hydrophobic effect associated with the short-term high intensity, torrential rainfall event reported in this drainage. The debris flows appear to be within the range of geologic events, (possibly associated with fires), but on a wide recurrence interval, probably in hundreds of years timescale. The recurrent nature of the debris flows can be inferred by the

historic alluvial fans, buried soil surfaces exposed in scoured banks and several old remnant debris flow deposits that have been revegetated.

Soils
DNRC soils assessment is based on field review, and extended mapping of landtype associations from adjacent Beaverhead NF lands. The primary forest landtype association of the proposed harvest area is LTA 53A, well dissected mountain sideslopes/rock outcrop complex on 25-50% slopes with soils developing from granitic bedrock. Soils on upper slopes and ridges and are shallow (<20") cobbly sandy loams with common rock outcrops. Mid to lower slope positions typically have similar, but deeper soils of cobbly sandy loams with clayey subsoils just over the bedrock at depth. Topsoils are thin 2-4 inch gravelly loamy sands that are easily disturbed and bare soils are susceptible to erosion. These soils are excessively drained and droughty due to high sand content and tree growth is most limited by moisture availability.

South slopes are especially droughty and promote Douglas fir, while north aspects promote more Douglas-fir and lodgepole. The high sandy soils are sensitive to rutting if operated on when wet, but typically dry out rapidly, and tend to be droughty in late summer. Included within this map area are short steep slopes of 40-60% with extensive rock outcrops that limit skidding and road construction. These limited steep areas have higher risk of soil displacement and erosion with ground disturbance and slopes over 40% are not suitable for ground skidding.

Narrow alluvial deposits occur adjacent to the creeks and widen into broad alluvial fans on the toeslopes of the valley. These alluvial deposits are somewhat poorly drained and seasonally wet supporting willow and some spruce. Deep alluvial soils form the bed and banks of White Creek, Dingley and Lake Creek. Soils range from sandy loams to stony sandy loams with some localized areas of clay rich soils due to the mixing of creek deposits. These are deeper more productive soils with greater moisture and nutrient retention than the upper slopes of LTA 53A. The complex terrain and narrow nature of some wet areas require site specific review for design of SMZ's and mitigation measures. All SMZ's widths should be located based on a high erosion hazard.

Past Effects
There is very limited previous harvest in the proposed project area. Some historic post and rail type harvest had very little effect. Recent mechanical harvest of about 100 acres occurred in State Section 4 as the 1987 Grasshopper Timber Sale. Skid trails are apparent on some locations indicated by soil berms and disturbance. No erosion or surface drainage problems were noted with the recent timber harvest. Harvest units have established regeneration of lodgepole pine and some spruce. No previous timber harvest occurred in the units proposed for this timber sale, with the exception of a timber salvage operation in the SE1/4 of Section 4 (39 acres) and the NE1/4 of Section 9 (18 acres) that is proposed to be completed in the summer of 2004, prior to this action.

Effects of No Action Alternative on–Geology, Soils
The No-action alternative would have some continued effects on soil resources, mainly from continued erosion on fire areas, segment of eroded fire-line and debris flows in the White Creek drainage. Erosion would decrease as vegetation reestablishes protective ground cover similar to pre-fire conditions and steep debris channel banks stabilize over time. There is potential for recurrent debris flows in the event of high intensity rainfall, but not likely of the same magnitude as the 2003 events due to the expected break-up of temporal soil water repellency (hydrophobic effect) and increased ground cover as plants revegetated in the burned portion of the project area. Stream channel sedimentation is further discussed in the hydrology section.

Effects of the Action Alternative
For the action alternative, specific mitigations and BMP's would be implemented to minimize the area and degree of soil effects associated with proposed harvest and road construction. Direct effects to soils are summarized in table 1. Primary soil concerns associated with timber harvest are maintaining soil depth and avoiding direct effect of excessive displacement and in-direct effect of erosion of the shallow soils during harvest operations. The proposed helicopter harvest

would cause very little disturbance as direct or in-direct effects to soils and would leave tree tops on sites. Within all harvest areas, the addition of twigs and broken coarse woody debris on the ground should provide shade and organic matter to help reduce erosion, retain moisture and enhance survival of seedlings through droughty periods.

The proposed harvest should reduce overstocking and improve growth of remaining trees by reducing competition for limited soil moisture and nutrients. The high density of small trees makes it difficult to economically remove all small trees to restore historic conditions. Implementation of BMP's and the following recommended mitigation measures should reduce the area and degree of soil impacts of harvest areas to control erosion and maintain soil productivity.

DNRC project leader, and resource specialists evaluated the proposed haul route and temporary roads to minimize road construction and design mitigation measures (attached) where needed to provide adequate drainage. No new road is proposed across unstable slopes or creek crossings. Geologic stability should not be affected by the proposed action and effects would be similar to the no-action alternative. With the proposed harvest, DNRC plans to install road drainage to comply with BMP's and reduce erosion for the period of our road use, especially for segments of roads where sedimentation could occur. New temporary roads will be restored to a stable, adequately drained condition following use and grass seeded. We would monitor road drainage conditions as part of on-going project operations and make road repairs as needed. Road drainage repairs will improve existing road conditions compared to the no-action alternative.

Table 1: Summary Comparison of Direct Effects to Soils

Alternative Harvest method	**Harvest Acres / Tree Volume MBF**	**Acres Affected In Roads**	**Harvest Unit Area of Soils Impacted**	**Combined Percent of New Road & Harvest Acres Impacted**
Alt. #1 Helicopter	**322.5 ac.** **1,578 MBF.**	Reconstruct 0.6 mi New Road 0.2 mi	< 5% of Helicopter 16.1 ac.	16.1+0.8 ac.rd. = **less than 6 % of project area impacted**
Alt. #2 Helicopter	**273.5 ac.** **1,333 MBF.**	**Road Option 1** Reconstruct 0.2 mi New Road 1.0 mi **Road Option 2** Reconstruct 0.5 mi New Road 0.1 mi	< 5% of Helicopter 13.7 ac.	14.8+0.8 ac.rd. = **less than 6 % of project area impacted**

Cumulative effects to soil productivity

Cumulative effects could occur from disturbance from repeated entries into the same harvest units. There is some previous harvest (Grasshopper TS logged in 1987-1989) in Section 4 that has revegetated and would not be reentered with this proposal. Timber harvest plans for helicopter harvest presents low risk of cumulative effects to soils. Up to 95% of tree tops and a portion of large woody debris will be retained for nutrient cycling and long term productivity.

MITIGATION MEASURES

* Install and maintain erosion control and adequate drainage on roads during use to comply with BMP's. The granitic soils require above average, relatively close drainage spacing to be effective.

* Road use will be limited to dry or frozen ground conditions to reduce rutting and erosion. New road construction, including drainage features should be completed in the fall prior to freeze-up to be effective.

* Slash Disposal- Maintain 5-10 tons/acre woody debris and retain fine litter as feasible for nutrient cycling and long-term productivity. On rock outcrop sites with lower BA, retain woody debris as feasible since it may not be possible to retain 5 tons/acre.

* When timber hauling is completed, insure road drainage is adequate, and effectively close and stabilize temporary roads to prevent trespass use and traffic that may damage road drainage or carry weed seed onto site. Grass seed newly disturbed temporary roads as directed by the Forest Officer.

Existing Noxious Weeds & Management
Primary noxious weeds noted in the Polaris area are spotted knapweed with spot occurrences of houndstongue. Noxious weeds occurrences are mainly along rangeland adjacent to the County Road. A through reconnaissance of state ownership in the project area found only a spot infestation of a couple of knapweed plants along a two track road at the SE corner of in Section 16 in proposed harvest unit 7H. The dry nature of this area increases the risk of weed establishment associated with disturbance (fire or mechanical).

Effects on Noxious Weeds
With no action, the risk of weed spread is likely to increase on dry sites, trails, fire areas and existing roads. The risk of weed infestation is greater in the fire areas if weed seed is imported by wind, animals or recreation uses. DNRC would eradicate the spot knapweed plants identified in Section 16. DNRC would continue to monitor for weeds as part of periodic range license reviews.

Under the action alternative, weeds could be introduced associated with timber harvest activities. As part of this project proposal, DNRC considered an integrated approach to weed management as required by the County Weed Law with a focus on preventing noxious weeds and controlling any spot infestations. By implementing the following measures, the action alternative effects on weeds should be similar to the no action alternative.

* All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on site.

* All newly disturbed soils on temporary road cuts and fills will be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

* DNRC will monitor the project area for noxious weeds as part of timber sale administration. If new noxious weeds occur following the harvest, a control plan will be developed and implemented that may include spot herbicide treatments. If herbicides are used, application would be done using a licensed applicator in accordance with label directions, State laws, and rules of the Beaverhead County Weed District.

<u>References</u>
Burned Area Emergency Response (BAER) Report , Hidden Lake Fire, August 3, 2003 Beaverhead-Deerlodge National Forest, U.S. Department of Agriculture.

McIver,James D.;Starr, Lynn, tech.eds. 2000 Environmental effects of Postfire Logging: Literature review and annotated bibliography. Gen. Tech. Rep. PNW-GTR-486. Portland,OR: U.S. Department of Agriculture, Pacific Northwest Research Station.

Parrett, Chuck. 1987, Fire-related Debris Flows in the Beaver Creek Drainage, Lewis and Clark County, Montana. USGS Water Supply Paper 2330.

Ruppel, Edward T: O'Neill, Micheal, and Lopez, David 1993, Geologic Map of the Dillon 1x2 degree Quadrangle, Idaho and Montana. USGS Miscellaneous Investigations Map 1-1803-H

Chapter 2 Attachment to insert in Summary effects table			RESOURCE CONCERN SOILS
	Long Term Soil Productivity		
ALTERNATIVE	Soil Impacts - Disturbance, Compaction, and erosion .	Soil Nutrients Tons/acre coarse woody debris	Soil Erosion potential from roads.
NO ACTION ALTERNATIVE	Fire areas continue to erode until revegetated over time consistent with historic conditions.	Slow increase of CWD associated with stand mortality.	Inadequate drainage on mixed ownership roads, only partially meet BMP's.
ACTION ALTERNATIVE 1 Helicopter Harvest	Helicopter harvest would have no discernable long-term effect on soils. Thinning would reduce competition and should improve growth of retained trees.	Mitigation measures will retain a portion of fine litter and coarse woody debris for nutrient cycling. Short-term increase in CWD coarse woody debris on ground.	Drainage improved on access roads to meet BMP 's. New roads built to minimum standard and temp roads closed and revegetated.
ACTION ALTERNATIVE 2 Helicopter Harvest	Alt 2 would harvest about 50 acres less than Alt 1. Harvest effects would be similar on a per acre basis as Alternative 1.	Similar to Alternative 1	Drainage improved on access roads to meet BMP 's. Alt 2 would construct slightly more road up to 1 mile. New roads built to minimum standard and temp roads closed and revegetated.

Attachment Landtype Associations Descriptions				
Map Unit Landtype	Slope/ Aspect/ Elevation	Dominate Soils	Tree Species	Erosion Hazard
21B Weakly glacial till and residual soils on Mod. steep slopes	10-20% slopes E,SE,S 7000-8400	Mod. Deep cobbly sandy loams from granitics, Droughty South slopes	Open fir and sage/range	Common granitic rock outcrops Low on undisturbed Mod on disturbed
21D Weakly glacial till and residual soils on Mod. to steep slopes	20-40% slopes all aspects 7000-8400	Mod. Deep cobbly sandy loams from granitics. Clay loams on footslopes	Mountain grasslands w/ few DF & LPP	Low on undisturbed Mod on disturbed
27A Deep Glacial Moraine, hilly	15-35% slopes all aspects 6600-7600	Shallow to mod deep cobbly sandy loams from granitics. Stones & boulders	LPP-DF-AF	Low on undisturbed Low to Mod disturbed
53A Mountain sideslopes, well dissected	25-50% slopes all aspects 7200-8200	Mod to deep cobbly sandy loams from granitics & some clay loams Stones & boulders	LPP-DF-AF Grass range on SW slopes	Low on undisturbed Mod on disturbed
92A Steep, Glacial scoured Troughwalls & thin till deposits	45-70% slopes North aspects 7800-8800	Shallow gravelly & cobbly sandy loams. Very stoney	LPP & AF	Low on undisturbed Mod on disturbed
92F Steep, Glacial scoured Troughwalls & thin till deposits	35-60% slopes South aspects 7500-8500	Shallow gravelly & cobbly sandy loams. Stone & boulders common	DF & LPP AF & Spruce on wet sites	Mod on undisturbed High on disturbed
95B Steep Stream Breaklands, Frost churned	45-65% North aspects 6500-8500	Shallow to mod. Deep sandy loams. Stone & boulders common	DF & LPP	Mod on undisturbed High on disturbed
96B Steep Stream Breaklands, Frost churned	40-65% South aspects 6500-8500	Shallow to mod. deep channery sandy loams & some clay loams. Stone & boulders common	DF & LPP	Mod on undisturbed High on disturbed

ATTACHMENT E

WATERSHED AND FISHERIES ASSESSMENT FOR WHITE CREEK TIMBER SALE

Jim Bower – Fisheries Program Specialist, DNRC
Gary Frank – Resource Program Manager, DNRC
7 May 2004

INTRODUCTION (*Chapter 1*)

The White Creek Timber Sale project area includes State Trust Lands within T5S R12W Sections 4, 9 and 16 and lies entirely within the Grasshopper Creek drainage (5th code HUC 10020002010). The Grasshopper Creek drainage encompasses a southwestern portion of the Pioneer Mountains.

The project area covers four subbasins of Grasshopper Creek, which will comprise the extent of this watershed/fisheries assessment. From north to south, these four subbasins include Dingley Creek, Clark Creek, White Creek, and Lake Creek. Grasshopper Creek will not be included in this assessment since none of the project alternatives (see below) are expected to have any direct, indirect, or cumulative downstream impacts to water quality, water yield, watershed conditions, or fisheries in Grasshopper Creek.

Grasshopper Creek is listed on the Montana 303(d) list as an impaired stream, and a Total Maximum Daily Load (TMDL) is scheduled for development in 2011. Probable causes of the Grasshopper Creek listing include bank erosion, dewatering, flow alteration, metals, and other habitat alterations, and the probable sources include agriculture, crop-related sources, grazing-related sources, resource extraction, mine tailings, habitat modification (other than hydromodification), and bank or shoreline modification/destabilization. As described, the Grasshopper Creek 303(d) listing is not associated with forest management activities. Dingley, Clark, White, and Lake Creeks are not listed as impaired on the Montana 303(d) list.

The Missouri River drainage including Dingley, Clark, White, and Lake Creeks is classified as B-1 in the Montana Surface Water Quality Standards. The B-1 classification is for multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, and agricultural and industrial uses. Known beneficial uses for water within the project area include use for drinking and culinary purposes after conventional treatment, recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural use. Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentrations of sediment, which will harm or prove detrimental to fish or wildlife. Naturally occurring includes conditions or materials present from runoff on developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities (Thomas et al 1990).

Several cold-water fisheries exist within the project area, and the primary species of interest in this assessment is westslope cutthroat trout (*Oncorhynchus clarki lewisi*) (WCT). WCT are listed as a Class-A Montana Animal Species of Concern. A Class-A designation is defined as a species or subspecies that has limited numbers and/or habitats both in Montana and elsewhere in the North America and elimination from Montana would be a significant loss to the gene pool of the species or subspecies. (Montana Fish, Wildlife and Parks, Montana Natural Heritage Program, and Montana Chapter American Fisheries Society Rankings). The Department of Natural Resources and Conservation (DNRC) has also identified westslope cutthroat trout as a sensitive species (ARM 36.11.436).

ALTERNATIVES (*Chapter 2*)

- No Action Alternative
- Action Alternative #1 (Includes: helicopter harvest, 17 units, 322.5 total acres, 0.6 miles of road reconstruction, 0.2 miles of new road construction)
- Action Alternative #2 (Includes: helicopter harvest, 14 harvest units, 273.5 total acres, 0.2 miles of road reconstruction, 1.0 miles of new road construction)

EXISTING CONDITIONS (*Chapter 3*)

- DINGLEY CREEK

Project Area. T5S R12W Section 4 is the only section within the project area that intersects the Dingley Creek watershed (see MAP 1).

Watershed. The Dingley Creek watershed covers approximately 1,997 acres, of which 1,424 acres (71.3%) are forested ('forested' is defined in this assessment as having 50% or greater canopy cover.) The weighted mean annual precipitation in the Dingley Creek watershed is approximately 29.7", and the annual runoff for the watershed is approximately 9.8".

The perennial reach of Dingley Creek is approximately 5.00 miles in length from the confluence with Grasshopper Creek (river mile (RM) 0.00) to the headwaters (RM 5.00) in Beaverhead-Deerlodge National Forest. Dingley Creek flows through private land from RM 0.00 to 1.17, State Trust Land from RM 1.17 to 2.14, and Beaverhead-Deerlodge National Forest from RM 2.14 to 5.00.

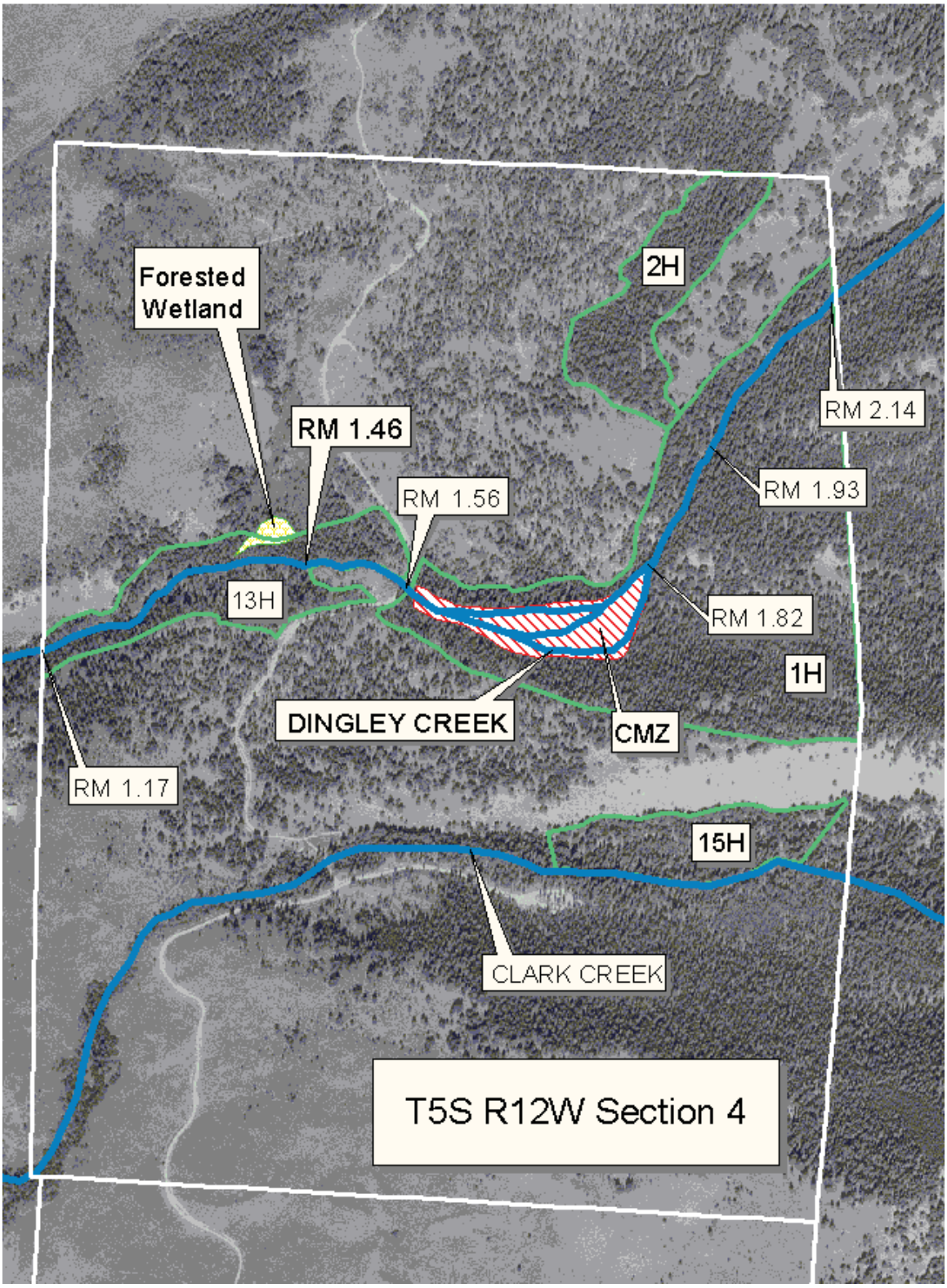
The Dingley Creek watershed is dominated by geologic processes associated with granitic landforms.

Roads and Road/Stream Crossings. Forest Service (FS) Rd #7442 comprises one of two roads within both the project area and Dingley Creek watershed, and the length of this specified road segment is 4,170'. The road is open, high-standard, and unpaved. The road prism within the project area appears to be stable and meet BMPs. No existing impacts due to sedimentation from FS Rd #7442 to WCT in Dingley Creek where observed during a field review (9/15/03-9/16/03.) There is an 800' spur road in the NW1/4NE1/4 of Section 4, and this segment is not a source of sedimentation to Dingley Creek.

At RM 1.56 Dingley Creek intersects FS Rd #7442. The road/stream crossing structure is a pipe-arch culvert with approximate cross-sectional dimensions of 52"x36". The culvert is not embedded in the streambed, has a gradient of 5-6%, and is perched approximately 10" at the outlet with flow falling onto rip-rap. It is highly likely that this culvert is a barrier to migrating WCT and other salmonids under all flow conditions.

Fisheries. According to the Montana Fisheries Information System (MFISH) (January 2004), WCT are present in Dingley Creek from RM 1.2 to 2.2, which is primarily within the project area. 99% genetically pure WCT were found in 2000 between RM 1.2 and 1.3, and 100% genetically pure WCT were found in 1989 between RM 2.0 and 2.1. Juvenile and adult WCT were also visually observed (J. Bower) on 9/16/03 upstream of the FS Rd #7442 culvert at RM 1.56, and juvenile WCT were observed near the downstream/west boundary of the project area at approximate RM 1.2.

MAP 1 – Dingley Creek watershed within the project area.



There are several reasons the reach of Dingley Creek upstream of the FS Rd #7442 culvert is a particularly important segment of WCT habitat: (1) nonnative eastern brook trout (EBT), which can negatively affect WCT populations (McIntyre and Rieman 1995), have not been found during electrofishing surveys in Dingley Creek within the project area (MFISH, Hidden Lake Fire BAER Report 2003), (2) the culvert at FS Rd #7442 is most likely a barrier to cold-water fisheries migration, and this will help isolate WCT upstream of the culvert if EBT become established in Dingley Creek, which can be expected to occur at some point, (3) WCT abundance in the project area is considered rare (MFISH), and (4) WCT populations within this portion of the Grasshopper Creek drainage have been identified as having a "very high" risk of extinction (Shepard et al 1997).

The upper watershed of Dingley Creek, including those reaches within the project area upstream of the FS Rd #7442 culvert, has been designated as a potential restoration area for genetically pure WCT (Oswald 2003).

Stream Morphology. From RM 1.17 to 1.56, Dingley Creek is characterized as a relatively stable B4/B5 channel type using Rosgen (1996). There are high levels of coarse sands (1-2mm) and fine gravels (2-4mm) in this reach, which is broadly characteristic of watersheds dominated by granitic landforms.

From RM 1.56 to 1.82, the main channel is braided into several fairly distinct B3 channels throughout an alluvial fan. The braided channels are relatively stable, and bankfull stream energies are dissipated to a large degree with high levels of large woody debris (LWD). Base flow stream energies are dissipated primarily by cobble substrate. Based on visual estimates, average substrate compositions are 10% boulder (>256mm), 40% cobble (64-256mm) and 50% coarse sands/fine gravels (1-4mm). (Technical hydrologic information for a Clark Creek reference reach is provided in the next section. Refer to this data set for other reference conditions that can be used to describe Dingley Creek.)

From RM 1.82 to 1.93, the stream channel descends a semi-contained cascade generally characterized as a relatively stable A2 process. The gradient through this reach ranges from 14%-22%.

From RM 1.93 to the east edge of the project area at RM 2.14, the Dingley Creek channel gradient ranges from 9%-14% and is characterized as relatively stable B3/A3.

Stream Habitat. The portion of Dingley Creek from RM 1.17 to 1.56 is generally characterized as step-pool (Montgomery and Buffington 1997). This reach of Dingley Creek below FS Rd #7441 has moderate levels of LWD, and low to moderate levels of cover. Those reaches with low levels of cover typically have areas exhibiting aggradation, bank hoof shear, and channel trampling that is at least partially due to disturbances from cattle. There are limited areas of spawning and rearing habitats for WCT. Occasional deep pools with fine substrates (1-4mm) provide limited wintering habitat.

A harvest unit from 1995 is located immediately south of Dingley Creek between RM 1.46 and 1.56. Insufficient numbers of leave trees were left within the SMZ of this harvest unit to effectively manage for background ranges of LWD recruitment and stream shading. However, since the adjacent harvest area is approximately 530' it is unlikely there have been lasting detectable impacts to WCT as a result of the SMZ harvest. An existing moderate indirect impact to WCT related to this SMZ harvest is the now open access for cattle to the Dingley Creek stream channel.

Above FS Rd #7442 Dingley Creek flows through a historic debris flow deposit/alluvial fan (RM 1.56 to 1.82) and exhibits step-pool formation in several separate channels. Throughout this reach there are high levels of cover from LWD and occasional boulders. Although there are high levels of coarse sands and fine gravels (1-4mm) of granitic origin in this reach, most of the substrates are very clean and likely have sufficient porosity/permeability to provide moderately good spawning habitats. Low stream energies and stable banks provide good rearing habitats.

On the other hand, the low stream energies through the alluvial fan in this reach do not facilitate the develop of very many high quality, deep pools for adequate wintering habitat. The lack of wintering habitat may be a limiting factor for WCT in this reach. The relatively high levels of blowdown and LWD within the alluvial fan are largely responsible for keeping cattle away from Dingley Creek within this reach.

From RM 1.82 to 1.93, Dingley Creek exhibits a high gradient cascade formation (Montgomery and Buffington 1997). Field observations have found this reach to have very dynamic formations developed primarily by changing amounts of LWD and varying boulder structure. This reach is an upstream migration barrier to WCT a majority of the time, but it may allow limited upstream migration under some ideal cascade formation and flow conditions.

From RM 1.93 to 2.14, Dingley Creek exhibits a low to moderate gradient cascade formation. Overall, this reach exhibits high quality wintering habitat with deep pools and other boulder formations, and moderately good spawning and rearing habitats. This reach allows for fairly easy upstream/downstream migration of adult WCT.

Detailed, R1/R4 fisheries habitat inventory data (Overton et al 1997) is not available for Dingley Creek.

Riparian Management Zone. With the exception of past SMZ harvest from RM 1.46 to 1.56, the Dingley Creek riparian management zone throughout T5S R12W Section 4 is primarily a reference quality, spruce cover type. Trees were sampled (9/15/03) in the Dingley Creek riparian management zone in T5S R12W Section 4 to determine the site potential tree height at 100 years (see Table 1.) Based on site index curves for Engelmann Spruce from USFS Research Paper INT-42, the mean site index is determined to be 60. The site potential tree height at 100 years is then estimated to be 88'.

TABLE 1 – Dingley Creek RMZ samples for site potential tree height.

	Spp.	**Height (ft)**	**Age(yrs)**
Sample 1	Engelmann Spruce	83	85
Sample 2	Engelmann Spruce	89	107
Sample 3	Engelmann Spruce	90	124

Riparian stand plot data indicates the stand structure of the Dingley Creek riparian management zone within proposed Unit 13H has a quadratic mean diameter (QMD) of 11.6" and 387 trees per acre (TPA) (see Watershed and Fisheries Assessment Appendix A). The stand structure of the Dingley Creek riparian zone within proposed Unit 1H has a QMD of 9.6" and 300 TPA (see Watershed and Fisheries Assessment Appendix B).

Harvest and Grazing History. The Grasshopper Timber Sale, harvested in 1995 in T5S R12W Section 4, totaled 95.5 acres (Williams 1986). 73.5 acres were harvested in the Dingley Creek watershed, 18.5 in the Wellman Creek watershed, and 3.5 in the Clark Creek watershed. Within the Dingley Creek watershed, 68.5 acres of harvest utilized approximately 50% overstory removal. 5.0 acres of harvest utilized clearcut management. Only the 5.0 acre clearcut unit is immediately adjacent to Dingley Creek (RM 1.46 to 1.56). The Grasshopper Timber Sale harvest occurred on 5.2% of the forested acreage in the Dingley Creek watershed, and there are likely no existing impacts to the flow regime in the watershed. There do not appear to be any point sources of sedimentation related to any of the past harvest.

T5S R12W Section 4 is leased for grazing purposes. Impacts to WCT from grazing are evident in the reach of Dingley Creek from RM 1.17 to 1.56 and primarily include localized areas of aggradation, bank hoof shear, and channel trampling. From RM 1.56 to 2.14 there do not appear to be any notable impacts from grazing. Grazing has probably occurred throughout the Dingley Creek watershed since the area was homesteaded at the end of the 19th century resulting in widely varying levels of impact to water quality and native fisheries.

Summary of Existing Impacts. The culvert design at the FS Rd #7442 and Dingley Creek road/stream crossing is essentially a barrier to upstream migration and may or may not be impacting WCT in Dingley Creek. In terms of providing connectivity for WCT with any level of genetic purity, the culvert crossing is having a high direct and indirect impact on WCT. In terms of providing a refugia for 100% pure WCT or providing a barrier to invasion from EBT, the culvert crossing does not have an existing direct or indirect impact.

Past SMZ harvest on the left (south) bank of Dingley Creek between RM 1.46 and 1.56 may be having a very low direct or indirect impact to WCT. The disproportionate modification of the riparian stand structure in this stream reach has altered associated LWD recruitment rates and the ability to provide adequate stream shading, which may have an impact on stream habitat complexity and the stream temperature regime, respectively. Since this modification zone is only 530' in length it is unlikely that this action in and of itself is having any measurable impacts to WCT.

Grazing along Dingley Creek between RM 1.17 and 1.56 is an existing low direct and indirect impact to WCT. The specific impact from grazing that affects WCT in this reach of Dingley Creek is the loss of habitat complexity and quality primarily as a result from aggradation, bank hoof shear, and channel trampling.

There are likely no existing direct or indirect impacts to other beneficial uses of Dingley Creek between RM 1.17 and 2.14.

Overall, existing direct and indirect impacts due to present and past conditions have a low existing cumulative impact to WCT between RM 1.17 and 1.56. The existing cumulative impact in this reach is based on past SMZ harvest between RM 1.46 and 1.56 and the effects of grazing between RM 1.17 and 1.56. There are likely no existing cumulative impacts to other beneficial uses of Dingley Creek between RM 1.17 and 1.56. There are likely no existing cumulative impacts to beneficial uses, including support of WCT, of Dingley Creek between RM 1.56 and 2.14.

- CLARK CREEK

Project Area. T5S R12W Section 4 and a small NW portion of Section 9 are the only sections within the project area that intersects the Clark Creek watershed (see MAP 2).

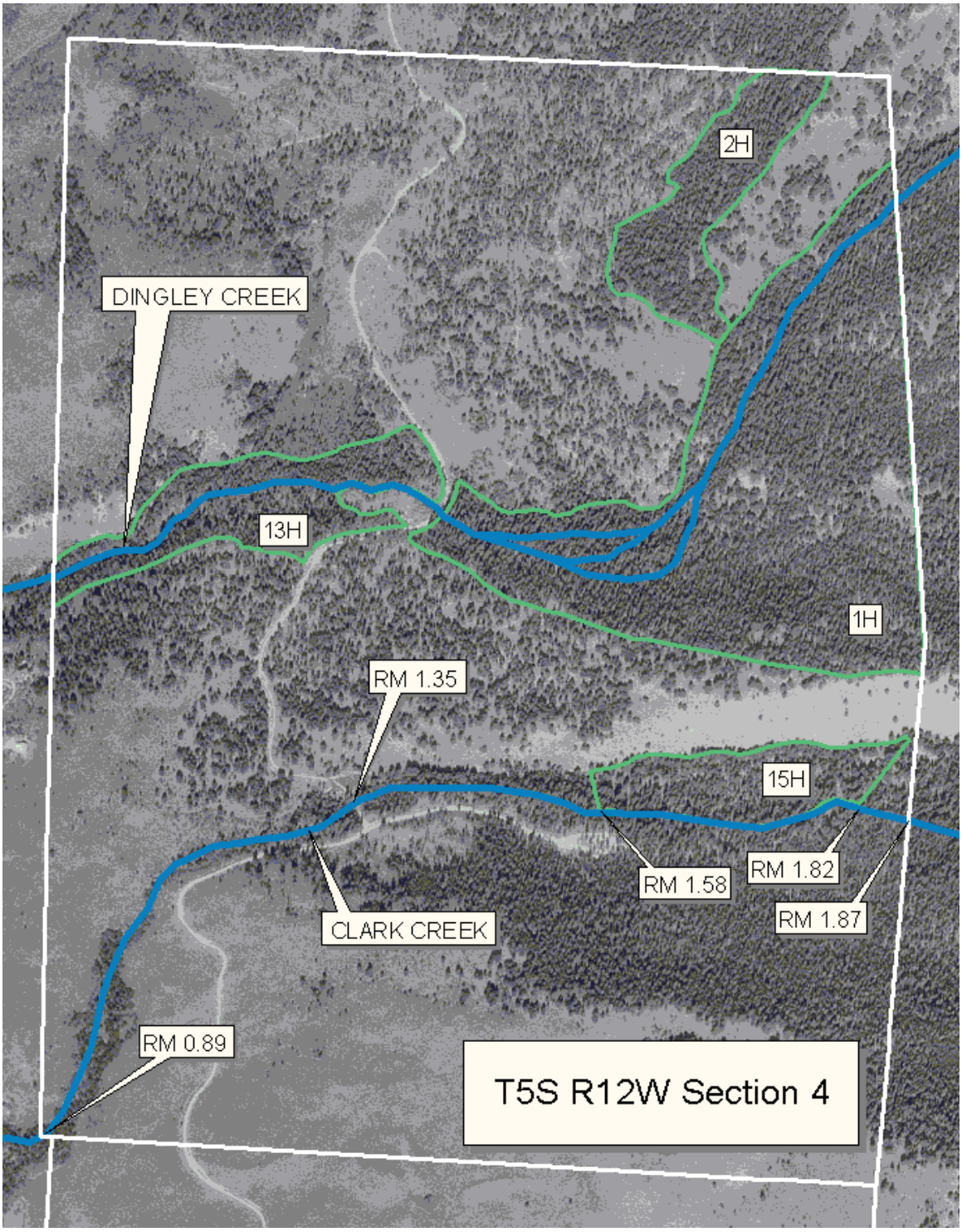
Watershed. The Clark Creek watershed covers approximately 2,948 acres, of which 2,165 acres (73.4%) (baseline/pre-fire, see *Fire* on page 9) are forested ('forested' is defined in this assessment as having 50% or greater canopy cover.) The weighted mean annual precipitation in the Clark Creek watershed is approximately 31.6", and the annual runoff for the watershed is approximately 11.2".

The perennial portion of Clark Creek is approximately 5.00 miles in length from the confluence with Grasshopper Creek (river mile (RM) 0.00) to the headwaters (RM 5.00) in Beaverhead-Deerlodge National Forest. Clark Creek flows through private land from RM 0.00 to 0.89, State Trust Land from RM 0.89 to 1.87, and Beaverhead-Deerlodge National Forest from RM 1.87 to 5.00.

The Clark Creek watershed is dominated by geologic processes associated with granitic landforms.

Roads and Road/Stream Crossings. FS Roads #7441 and #7442 comprise the only roads within both the project area and Clark Creek watershed, and the length of the specified road segments is 4,917'. The roads are open, high-standard, and unpaved. The road prisms within the project area appear to be stable and meet BMPs. There are no existing watershed or fisheries impacts due to sedimentation from FS Roads #7441 and #7442 in Clark Creek.

MAP 2 – Clark Creek watershed within the project area.



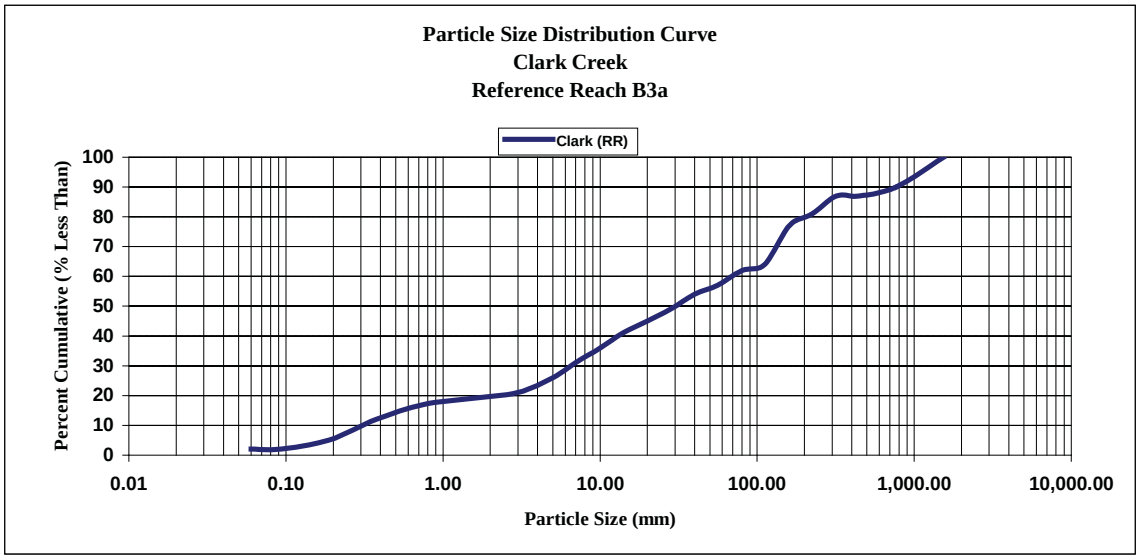
At RM 1.35 Clark Creek intersects FS Rd #7442. The road/stream crossing structure is a 49”x33” bottomless arch which provides passage to all life stages of fisheries in Clark Creek. The arch footings appear stable and the crossing site does not appear to be a point source of sediment.

Fisheries. MFISH data for Clark Creek has not been input into the database or is otherwise unavailable. The following account describes fisheries information on FS land immediately upstream of the project area: “Electrofishing results in Clark Creek, sampled in 1989 300 feet upstream of the second trail crossing (just upstream of Hidden Lake) indicate a very small population of WCT, rainbow trout (RBT), and WCTxRBT hybrids – all based on visual interpretation on site – along with a small number of non-native golden trout (also likely hybridized with RBT). Golden trout evidently were planted in both Hidden and Sawtooth Lakes in the past. No information describing molecular genetic analyses is available” (Riley 2003). R. Oswald notes that MT Fish, Wildlife and Parks has past documentation of the presence of WCT of unknown genetic purity (Oswald 2003). An adult WCT was visually observed (J. Bower) on 9/16/03 in Clark Creek within the project area at approximately RM 1.82.

Stream Morphology. From RM 1.35 to 1.87, Clark Creek is characterized as a relatively stable B3 channel type using Rosgen (1996). There are moderate levels of coarse sands (1-2mm) and fine gravels (2-4mm, 4-8mm) in this reach, which is broadly characteristic of watersheds dominated by granitic landforms.

A reference reach hydraulic survey site was established on Clark Creek by Pete Benjeyfield (Hydrologist, Beaverhead-Deerlodge National Forest) in 1994 at approximate RM 2.46. Data from that survey can be used to describe the stream characteristics within the project area from RM 1.35 to 1.87. Substrate size distribution is described in Table 2, and additional technical data can be found in Watershed and Fisheries Assessment Appendix C.

TABLE 2 – Clark Creek Reference Reach Substrate Distribution Curve (Benjeyfield 1994)



Stream Habitat. Above FS Rd #7442 (RM 1.35 to 1.87) Clark Creek exhibits step-pool channel formation. Throughout this reach there are moderate levels of cover from LWD and occasional boulders. Although there are high levels of coarse sands and fine gravels (1-4mm) of granitic origin in this reach, most of the substrates are very clean and likely have sufficient porosity/permeability to provide moderately good spawning habitats. Moderate stream energies and stable banks provide good rearing habitats. Within the project area occasional deep, clean pools with predominantly fine gravel (2-8mm) and large cobble (128-256mm) substrates provide moderate amounts of wintering habitat.

No fisheries habitat observations were made for Clark Creek from RM 0.89 to 1.35. Detailed, R1/R4 fisheries habitat inventory data (Overton et al 1997) is also not available for Clark Creek.

Riparian Management Zone. Upstream of RM 1.58 (adjacent to the end of FS Rd #7441 and SW corner of proposed Unit 15H) the Clark Creek riparian management zone is primarily a reference quality, Douglas Fir dominated and Lodgepole Pine co-dominated cover type. Trees were not sampled within the proposed Unit 15H riparian management zone to determine site potential tree height. Proposed Unit 1 (see Watershed and Fisheries Assessment for Hidden Lake Salvage) has a riparian management zone on White Creek with a Douglas Fir dominated stand type. The proposed Unit 1 and 15H riparian zones have sufficiently similar characteristics that site potential tree data from the proposed Unit 1 riparian management zone will be used for analysis of the proposed Unit 15H riparian management zone. Samples data taken 9/16/03 from proposed Unit 1 are in Table 6. Based on site index curves for Douglas Fir from USFS Research Paper INT-47, the mean site index is determined to be 50. The site potential tree height at 100 years is then estimated to be 69'.

Riparian stand plot data indicates the stand structure of the Clark Creek riparian management zone within proposed Unit 15H has a quadratic mean diameter (QMD) of 9.7" and 194 trees per acre (TPA) (see Watershed and Fisheries Assessment Appendix D).

Harvest and Grazing History. The Grasshopper Timber Sale, harvested in 1995 in T5S R12W Section 4, totaled 95.5 acres (Williams 1986). 73.5 acres were harvested in the Dingley Creek watershed, 18.5 in the Wellman Creek watershed, and 3.5 in the Clark Creek watershed. Within the Clark Creek watershed, 3.5 acres of harvest utilized approximately 100% overstory removal and approximately 0% removal of understory. The 3.5 acre harvest unit is not located in Clark Creek riparian zone. The Grasshopper Timber Sale harvest occurred on 0.2% of the forested acreage in the Clark Creek watershed, and there are likely no existing impacts to the flow regime in the watershed. There do not appear to be any point sources of sedimentation related to any of the past harvest.

T5S R12W Section 4 is leased for grazing purposes. Watershed or fisheries impacts from grazing are very limited in the reach of Clark Creek from RM 1.35 to 1.87 and primarily include small areas of bank hoof shear. Impacts from grazing were not assessed on Clark Creek from RM 0.89 to 1.35. Grazing has probably occurred throughout the Clark Creek watershed since the area was homesteaded at the end of the 19th century resulting in widely varying levels of impacts to water quality and native fisheries.

Fire. The Hidden Lake Fire occurred within but primarily east of the project area during July and August of 2003. The fire perimeter included the Clark, White and Lake Creek watersheds and totaled 3,289.7 acres. 475.8 acres within the Clark Creek watershed, which is approximately equal to 16.1% of the watershed, were affected by the fire. Soil burn severity levels within the Clark Creek watershed include low (260.5 acres), low to moderate (164.8 acres), and moderate (50.5 acres). Vegetation burn severity levels within the Clark Creek watershed include low (260.5 acres), moderate (197 acres), and high (18.3 acres).

In the Hidden Lake Burned Area Emergency Response Report (2003) impacts to fisheries were only analyzed for Grasshopper Creek, and the report states, "Stormflow analysis and sediment analysis indicate only marginal increases and these do not significantly affect values at risk. Soil erosion is likely to be marginal." Fire suppression activities including fire retardant drops and dozer lines construction may have an impact to WCT within fire perimeter (Riley 2003).

There are likely no detectable existing impacts to the flow regime of the watershed as result of this fire. Consequently, stream stability and water quality are unlikely to be affected by the fire.

Summary of Existing Impacts. Genetic introgression through hybridization with non-native rainbow trout and golden may be impacting WCT in Clark Creek. The degree of introgression that may be occurring is unknown at this time, and therefore the impact to WCT cannot be quantified or qualified.

Very limited grazing along Clark Creek between RM 1.35 and 1.87 is an existing very low direct and indirect impact to WCT (or other cold water fisheries). The specific impact from grazing that affects WCT (or other cold water fisheries) in this reach of Clark Creek is the loss of habitat quality primarily as a result of small areas of bank hoof shear. Grazing along Clark Creek between RM 0.89 and 1.35 has not been assessed, but this reach is lower in elevation with a more open riparian zone than the reach upstream of RM 1.35. At a minimum, a similar very low direct and indirect impact to WCT (or other cold water fisheries) in this reach can also be presumed to occur.

The Hidden Lake Fire burned 475.8 acres in the Clark Creek watershed, which is approximately equal to 16.1% of the watershed. There may be low existing direct or indirect impacts to WCT (or other cold water fisheries) in Clark Creek as a result of fire suppression activities (fire retardant drops and dozer lines construction), however these impacts cannot be specifically quantified or qualified since the locations and frequency of those activities are unknown.

There are likely no existing direct or indirect impacts to other beneficial uses of Clark Creek between RM 0.89 and 1.87.

There may be a low existing cumulative impact to WCT in Clark Creek within the project area as a result of genetic introgression, very low levels of grazing impacts, and potential impacts from fire suppression activities. There may also be a low existing cumulative impact to other cold water fisheries in Clark Creek within the project area as a result of very low levels of grazing impacts and potential impacts from fire suppression activities. The potential low existing cumulative impacts can neither be quantified nor reliably qualified, as the levels of genetic introgression and fire suppression are unknown. There are likely no existing cumulative impacts to other beneficial uses of Clark Creek within the project area.

- WHITE CREEK

Project Area. T5S R12W Sections 9 and 16 are the only sections within the project area that intersect the White Creek watershed (see Map 3).

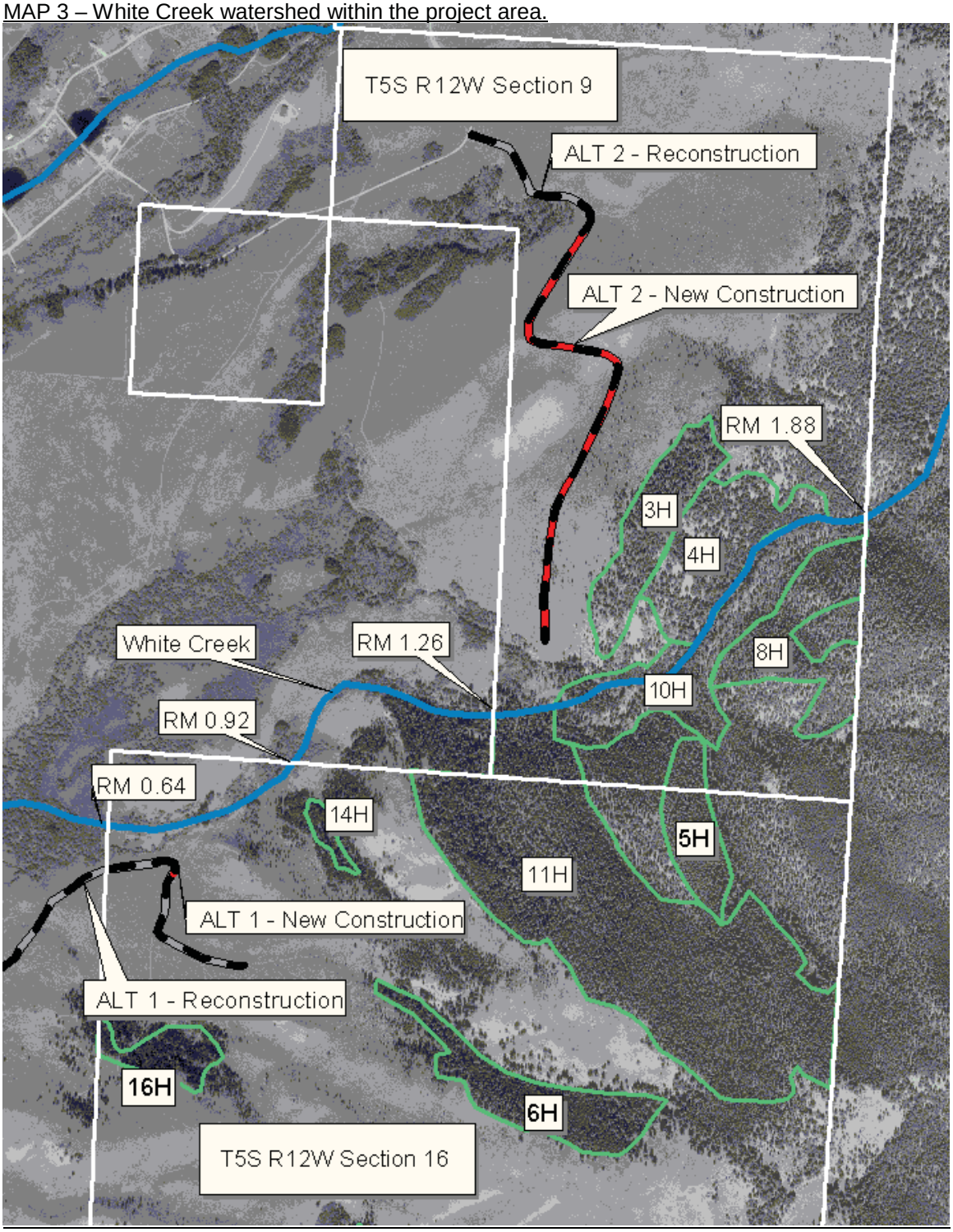
Watershed. The White Creek watershed covers approximately 3,736 acres, of which 2,815 acres (75.4%) (baseline/pre-fire, see *Fire* on page 14) are forested ('forested' is defined in this assessment as having 50% or greater canopy cover.) The weighted mean annual precipitation in the White Creek watershed is approximately 26.3", and the annual runoff for the watershed is approximately 7.9".

The perennial portion of White Creek is approximately 5.26 miles in length from the confluence with Grasshopper Creek (RM 0.00) to the headwaters (RM 5.26) in Beaverhead-Deerlodge National Forest. White Creek flows through private land from RM 0.00 to 0.64, State Trust Land from RM 0.64 to 0.92, private land from RM 0.92 to 1.26, State Trust Land from RM 1.26 to 1.88, and Beaverhead-Deerlodge National Forest from RM 1.88 to 5.26.

The White Creek watershed is dominated by geologic processes associated with granitic landforms.

Roads and Road/Stream Crossings. One closed, unimproved spur road from FS Rd #7441 in T5S R12W Section 9 and two closed, unimproved spur roads in NW T5S R12W Section 16 comprise the only roads within both the project area and White Creek watershed. The lengths of these specified road segments are 1,110' and 3,561', respectively. On the most part, the road prisms within the project area appear to be stable and meet BMPs. The closed, unimproved spur road in NW T5S R12W Section 16 that parallels White Creek has poor drainage in one section approximately 200' in length, but this area is approximately 100' from White Creek and does not appear to be a source of sediment to the creek. There do not appear to be any existing watershed or fisheries impacts due to sedimentation from the three closed roads described above.

MAP 3 – White Creek watershed within the project area.



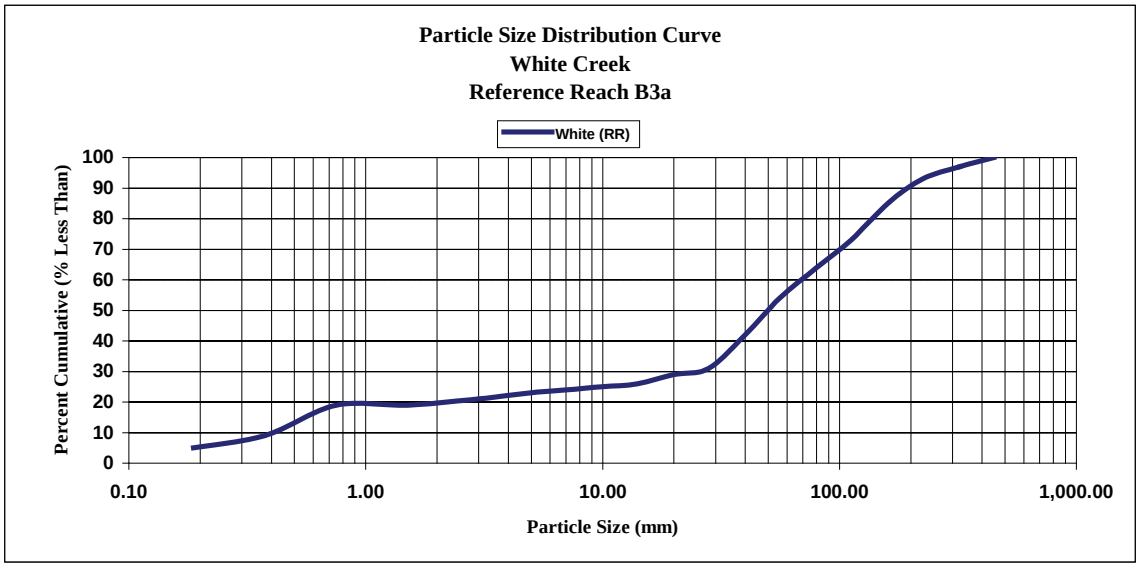
Fisheries. MFISH data for White Creek has not been input into the database or is otherwise unavailable. The following account describes fisheries information on FS land immediately upstream of the project area: "Electrofishing results in White Creek, sampled in 1989 in [T5S R12W] Section 10 indicate a small brook trout population in the NW quarter. WCT individuals were observed visually upstream of the electrofishing reach. Subsequent surveys by the [Beaverhead-Deerlodge NF] fisheries crew detected only brook trout downstream." (Riley 2003) One-pass electrofishing surveys conducted in Section 9 by a DNRC and Beaverhead-Deerlodge National Forest field crew 8/5/02 and 8/6/02 revealed 12.2 EBT/1000'. No visual observations were made in White Creek within the project area on 9/16/03 (J. Bower), but that is not unanticipated since a major debris torrent (7/25/03) associated with the Hidden Lake Fire completely eliminated all fisheries and essentially all fisheries habitat in White Creek from approximately RM 0.92 to 2.01. It is unlikely that fisheries will be occupying White Creek to any appreciable degree from approximately RM 0.92 to 2.01 for at least several years, until LWD and hydrologic processes have the opportunity to reestablish step-pool formation.

Stream Morphology. From RM 0.64 to 1.26 White Creek is characterized as a moderately unstable D5 channel type using Rosgen (1996). There are high levels of coarse sands (1-2mm) and fine gravels (2-4mm, 4-8mm) in this reach, which is broadly characteristic of watersheds dominated by granitic landforms. This reach is currently flowing through the southern edge of historic, large alluvial fan.

From RM 1.26 to 1.88 White Creek is characterized as a moderately unstable B4 channel type using Rosgen (1996). Substrate composition is approximately 50% fine gravels (2-4mm, 4-8mm), 40% medium to coarse gravels (8-12mm, 16-32mm) and 10% very coarse gravel (32-64mm). The portion of this reach from RM 1.26 to 1.56 is currently flowing through a recent large debris torrent deposit with relatively frequent channel migration.

A reference reach hydraulic survey site was established on White Creek by Pete Benjeyfield (Hydrologist, Beaverhead-Deerlodge National Forest) in 1994 at approximate RM 1.92. Data from that survey can be used to describe a baseline for stream characteristics within the project area from RM 1.56 to 1.88. Substrate size distribution is described in Table 3, and additional technical data can be found in Watershed and Fisheries Assessment Appendix E.

TABLE 3 – White Creek Reference Reach Substrate Distribution Curve (Benjeyfield 1994)



Stream Habitat. R1/R4 fisheries habitat inventory data (Overton et al 1997) for White Creek in T5S R12W Section 9 was collected by a DNRC and Beaverhead-Deerlodge National Forest field crew 8/5/02 and 8/6/02, but this data set is no longer representative of existing conditions. Since

then stream habitats have been completely altered by a major debris torrent (7/25/03) associated with the Hidden Lake Fire.

Currently the portion of White Creek from RM 0.64 to 1.26 is generally characterized as high gradient pool-riffle (Montgomery and Buffington 1997). The stream gradient ranges from 3-5%. There is no cover or wintering habitat. There are very limited sections with low quality rearing and spawning habitat. Substrate composition is approximately 100% coarse sands (1-2mm) and fine gravels (2-4mm, 4-8mm).

From RM 1.26 to 1.88 the White Creek channel is now generally characterized as plane bed (Montgomery and Buffington 1997). The stream gradient ranges from 5-7%. There is no cover, wintering, rearing or spawning habitat. Substrate composition is approximately 50% fine gravels (2-4mm, 4-8mm) and 50% medium to coarse gravels (8-12mm, 16-32mm). This reach is most likely acting as a temporary barrier to upstream migration of EBT, and may ultimately serve to benefit WCT upstream of the project area in the short term.

Riparian Management Zone. The White Creek riparian management zone from RM 1.26 to 1.34 (defining the north boundary of proposed Unit 11H) is primarily a reference quality, Douglas Fir dominated and Engelmann Spruce co-dominated cover type. Trees were sampled (9/16/03) in the White Creek riparian management zone within proposed Unit 11H to determine the site potential tree height at 100 years (see Table 4.) Based on site index curves for Engelmann Spruce from USFS Research Paper INT-42 and Douglas Fir from USFS Research Paper INT-47, the mean site index is determined to be 50. The site potential tree height at 100 years is then estimated to be 75'.

TABLE 4 – White Creek RMZ samples for site potential tree height (proposed Unit 11H).

	Spp.	**Height (ft)**	**Age(yrs)**
Sample 1	Douglas Fir	69	89
Sample 2	Engelmann Spruce	27	18
Sample 3	Engelmann Spruce	54	70

Riparian stand plot data indicates the stand structure of the White Creek riparian management zone within proposed Unit 11H has a quadratic mean diameter (QMD) of 15.6" and 181 trees per acre (TPA) (see Watershed and Fisheries Assessment Appendix F).

The White Creek riparian management zone from RM 1.34 to 1.83 (defining the north boundary of proposed Unit 10H) is primarily a reference quality, Douglas Fir dominated and Lodgepole Pine co-dominated cover type. Trees were sampled (9/16/03) in the White Creek riparian management zone within proposed Unit 10H to determine the site potential tree height at 100 years (see Table 5.) Based on site index curves for Douglas Fir from USFS Research Paper INT-47, the mean site index is determined to be 40. The site potential tree height at 100 years is then estimated to be 57'.

TABLE 5 – White Creek RMZ samples for site potential tree height (proposed Unit 10H).

	Spp.	**Height (ft)**	**Age(yrs)**
Sample 1	Douglas Fir	58	119
Sample 2	Douglas Fir	62	115

Riparian stand plot data indicates the stand structure of the White Creek riparian management zone within proposed Unit 10H has a quadratic mean diameter (QMD) of 11.0" and 131 trees per acre (TPA) (see Watershed and Fisheries Assessment Appendix G).

Upstream of RM 1.56 (SW corner of proposed Unit 4H, also defining the south boundary of proposed Unit 4H) the White Creek riparian management zone is primarily a reference quality, Douglas Fir dominated cover type. Trees were not sampled within the proposed Unit 4H riparian management zone to determine site potential tree height. Proposed Unit 1 (see Fisheries Supplemental for Hidden Lake Salvage) has a riparian management zone on White Creek with a

Douglas Fir dominated cover type. The proposed Unit 1 and 4H riparian management zones have sufficiently similar characteristics that site potential tree data from the proposed Unit 1 riparian management zone will be used for analysis of the proposed Unit 4H riparian management zone. Samples data taken 9/16/03 from proposed Unit 1 are in Table 6. Based on site index curves for Douglas Fir from USFS Research Paper INT-47, the mean site index is determined to be 50. The site potential tree height at 100 years is then estimated to 69'.

The slopes within the riparian management zone of proposed Unit 4H average over 35%.

TABLE 6 – White Creek RMZ samples for site potential tree height (proposed Unit 1 from Hidden Lake Salvage).

	Spp.	**Height (ft)**	**Age(yrs)**
Sample 1	Douglas Fir	88	102
Sample 2	Douglas Fir	76	120
Sample 3	Douglas Fir	40	77

Riparian stand plot data indicates the stand structure of the White Creek riparian management zone within proposed Unit 4H has a quadratic mean diameter (QMD) of 11.1" and 321 trees per acre (TPA) (see Watershed and Fisheries Assessment Appendix H).

Harvest and Grazing History. There is no indication that there has been past commercial timber harvest in the White Creek watershed. There is evidence of past low-level selective harvest within proposed Unit 10H, which can most likely be traced back to homesteading activities in the area many years ago. This historic low-level selective harvest within proposed Unit 10H most likely is not having direct or indirect impacts to water quality or native fisheries.

T5S R12W Sections 9 and 16 are leased for grazing purposes. Evidence of grazing impacts are evident in the reach of White Creek from RM 0.64 to 1.26, but there likely are no existing impacts to potential WCT or other salmonids since these fisheries have not been able to utilize this environment since the major debris torrent following the recent fire. Impacts in this reach primarily included bank hoof shear and channel trampling. No impacts from grazing were identified from RM 1.26 to 1.88. Grazing has probably occurred throughout the lower White Creek watershed since the area was homesteaded at the end of the 19th century resulting in widely varying levels of impact to water quality and native fisheries.

Fire. The Hidden Lake Fire occurred within but primarily east of the project area during July and August of 2003. The fire perimeter included the Clark, White and Lake Creek watersheds and totaled 3,289.7 acres. 2,244.9 acres within the White Creek watershed, which is approximately equal to 60.0% of the watershed, were affected by the fire. Soil burn severity levels within the White Creek watershed include low (1,658.9 acres), low to moderate (23.5 acres), and moderate (562.5 acres). Vegetation burn severity levels within the White Creek watershed include low (1,636.1 acres), moderate (46.3 acres), and high (562.5 acres).

In the Hidden Lake Burned Area Emergency Response Report (2003) impacts to fisheries were only analyzed for Grasshopper Creek, and the report states, "Stormflow analysis and sediment analysis indicate only marginal increases and these do not significantly affect values at risk. Soil erosion is likely to be marginal." Fire suppression activities including fire retardant drops and dozer lines construction may have an impact to WCT within fire perimeter (Riley 2003).

A moderate to high existing impact to the flow regime of the watershed is expected as a result of this fire. Stream stability and, consequently, water quality are also likely to be moderately impacted from higher water yields resulting from the fire.

Evenly distributed portions of proposed Units 3H, 4H, 8H and 10H have areas of low severity soil and vegetation burn as a result of the Hidden Lake Fire.

Summary of Existing Impacts. The Hidden Lake Fire burned 2,244.9 acres in the White Creek watershed, which is approximately equal to 60.0% of the watershed. There may be low existing

direct or indirect impacts to isolated WCT (or other cold water fisheries) in White Creek as a result of fire suppression activities (fire retardant drops and dozer lines construction), however these impacts cannot be specifically quantified or qualified since the locations and frequency of those activities are unknown.

Also related to the fire, there are likely moderate direct and indirect impacts to water quality in White Creek, primarily as a result of channel instability from increased water yield. Soil disturbance and a subsequent major debris torrent has had a short-term high direct and indirect impact to cold water fisheries, primarily through the elimination of spawning, rearing, and wintering habitats within the project area.

There are likely no existing direct or indirect impacts to other beneficial uses of White Creek between RM 0.64 and 1.88.

There is a high existing cumulative impact to potential WCT (and other cold water fisheries) in White Creek between RM 0.64 and 1.26 as a result of low levels of grazing impacts, potential impacts from fire suppression activities, a high short-term impact due to a major debris torrent, and channel instability resulting from increased water yields. There is a high existing cumulative impact to potential WCT (and other cold water fisheries) in White Creek between RM 1.26 and 1.88 as a result of potential impacts from fire suppression activities, a high short-term impact due to a major debris torrent, and channel instability resulting from increased water yields. There are likely no existing cumulative impacts to other beneficial uses of White Creek within the project area.

- LAKE CREEK

Project Area. T5S R12W Section 16 is the only section within the project area that intersects the Lake Creek watershed.

Watershed. The Lake Creek watershed covers approximately 4,551 acres, of which 3,749 acres (82.4%) (baseline/pre-fire, see *Fire* on page 16) are forested ('forested' is defined in this assessment as having 50% or greater canopy cover.) The weighted mean annual precipitation in the Lake Creek watershed is approximately 28.0", and the annual runoff for the watershed is approximately 8.9".

The perennial portion of Lake Creek is approximately 5.39 miles in length from the confluence with Grasshopper Creek (RM 0.00) to the headwaters (RM 5.39) in Beaverhead-Deerlodge National Forest. Lake Creek flows through private land from RM 0.00 to 1.58 and Beaverhead-Deerlodge National Forest from RM 1.58 to 5.39.

The Lake Creek watershed is dominated by geologic processes associated with granitic landforms.

Roads and Road/Stream Crossings. There do not appear to be any existing impacts due to sedimentation from roads to fisheries in Lake Creek.

Fisheries. MFISH data for Lake Creek has not been input into the database or is otherwise unavailable. The following account describes fisheries information on FS land immediately upstream of the project area: "Electrofishing results in Lake Creek, sampled in 1989 in [T5S R12W] Sections 22 and 15 of the southern braid indicate a small brook trout population. WCT individuals were observed visually upstream of the electrofishing reach. Subsequent surveys by the [Beaverhead-Deerlodge NF] fisheries crew detected only brook trout downstream." (Riley 2003)

Harvest and Grazing History. There is no indication that there has been past commercial timber harvest in the Lake Creek watershed.

T5S R12W Section 16 is leased for grazing purposes, and this section only covers a small, upland portion of the Lake Creek watershed. It is likely there is some level of existing impact to potential WCT or other salmonids from grazing on private lands, but this condition has not been assessed and therefore cannot be quantified or qualified. Grazing has probably occurred throughout the lower Lake Creek watershed since the area was homesteaded at the end of the 19th century resulting in widely varying levels of impact to water quality and native fisheries.

Fire. The Hidden Lake Fire occurred within but primarily east of the project area during July and August of 2003. The fire perimeter included the Clark, White and Lake Creek watersheds and totaled 3,289.7 acres. 569 acres within the Lake Creek watershed, which is approximately equal to 12.5% of the watershed, were affected by the fire. Soil burn severity levels within the Lake Creek watershed include low (566.4 acres) and moderate (2.6 acres). Vegetation burn severity levels within the Lake Creek watershed include low (566.4 acres) and high (2.6 acres).

In the Hidden Lake Burned Area Emergency Response Report (2003) impacts to fisheries were only analyzed for Grasshopper Creek, and the report states, "Stormflow analysis and sediment analysis indicate only marginal increases and these do not significantly affect values at risk. Soil erosion is likely to be marginal." Fire suppression activities including fire retardant drops and dozer lines construction may have an impact to WCT within fire perimeter (Riley 2003).

There are likely no detectable existing impacts to the flow regime of the watershed as result of this fire. Consequently, stream stability and water quality are unlikely to be affected by the fire.

Summary of Existing Impacts. There may be an existing impact to WCT or other salmonids in Lake Creek from grazing on private lands, but this condition has not been assessed and therefore cannot be quantified or qualified.

The Hidden Lake Fire burned 569 acres in the Lake Creek watershed, which is approximately equal to 12.5% of the watershed. There may be low existing direct or indirect impacts to WCT in Lake Creek as a result of fire suppression activities (fire retardant drops and dozer lines construction), however these impacts cannot be specifically quantified or qualified since the locations and frequency of those activities are unknown.

There are likely no detectable existing impacts to the flow regime of the watershed as result of this fire. Consequently, stream stability and water quality are unlikely to be affected by the fire.

There may be a low existing cumulative impact to WCT in Lake Creek within the project area as a result of some level of grazing impacts and potential impacts from fire suppression activities. This potentially low existing cumulative impact can neither be quantified nor reliably qualified, as the levels of grazing impacts and fire suppression are unknown. There are likely no existing cumulative impacts to other beneficial uses of Lake Creek within the project area.

SPECIALIST RECOMMENDATIONS

For the purpose of developing project recommendations in respect to watershed and fisheries resources, the draft methodology (draft unpublished) used to model SMZ and RMZ buffer harvest constraints in the 2004 DNRC Sustained Yield Study will be used as a coarse filter, and then a project level field assessment will be used as a fine filter.

The following recommendations are in addition to SMZ rules for any Class 1, 2 or 3 streams identified during project layout or harvest.

Unit 13H. Establish RMZ boundary on both sides of Dingley Creek at a minimum of 88' from the bankfull slope break. Include small forested wetland on north side of creek at approximate RM 1.3 into RMZ (see MAP 1). [Existing RMZ condition: QMD = 11.6", 387 TPA.] Existing RMZ stand conditions are not expected to provide regional target levels of LWD, but recommendation

based on field observations and existing fisheries data is no harvest in SMZ (0-25'), up to 50% harvest of trees >/= 8" DBH in SMZ (25-50'), and up to 50% harvest of trees >/= 8" DBH in remaining RMZ (50-88'). Maintain a harvest to residual DBH ratio of approximately 1:1 throughout remaining RMZ (50-88').

Unit 1H. No harvest within CMZ between RM 1.56 and 1.82. Establish RMZ boundary on both sides of Dingley Creek at a minimum of 88' from the CMZ slope break between RM 1.56 and 1.82 and at a minimum of 88' from the bankfull slope break between RM 1.82 and 2.14. [Existing RMZ condition: QMD = 9.6", 300 TPA.] Existing RMZ stand conditions are not expected to provide regional target levels of LWD, and recommendation based on field observations and existing fisheries data is no harvest in RMZ.

Unit 2H. No recommendations.

Unit 15H. Establish RMZ boundary on both sides of Clark Creek at a minimum of 69' from the bankfull slope break. [Existing RMZ condition: QMD = 9.7", 194 TPA.] Existing RMZ conditions are not expected to provide regional target levels of LWD, and recommendation based on field observations and existing fisheries data is no harvest in RMZ.

Unit 11H. Establish RMZ boundary on both sides of White Creek from RM 1.26 to 1.34 at a minimum of 75' from the bankfull slope break. [Existing RMZ condition: QMD = 15.6", 181 TPA.] Existing RMZ conditions are not expected to provide regional target levels of LWD, but recommendation based on field observations and existing fisheries data is up to 25% harvest of trees >/= 6" DBH throughout RMZ (0-75'). Maintain a harvest to residual DBH ratio of approximately 1 throughout RMZ (0-75').

Unit 10H. Establish RMZ boundary on both sides of White Creek from RM 1.34 to 1.56 at a minimum of 57' from the bankfull slope break and on the south side of White Creek from RM 1.56 to 1.88 at a minimum of 57' from the bankfull slope break. [Existing RMZ condition: QMD = 11.0", 131 TPA.] Existing RMZ conditions are not expected to provide regional target levels of LWD, but recommendation based on field observations and existing fisheries data is up to 25% harvest of trees >/= 6" DBH throughout RMZ (0-57'). Maintain a harvest to residual DBH ratio of approximately 1 throughout RMZ (0-57').

Unit 8H. No recommendations.

Unit 5H. No recommendations.

Unit 4H. Establish SMZ boundary on the north side of White Creek from RM 1.56 to 1.83 at a minimum of 100' from the bankfull slope break and an RMZ boundary on the north side of White Creek from RM 1.56 to 1.83 at a minimum of 69' from the bankfull slope break. [Existing RMZ condition: QMD = 11.1", 321 TPA.] Existing RMZ conditions are not expected to provide regional target levels of LWD, but recommendation based on field observations and existing fisheries data is 25% harvest of trees >/= 6" DBH throughout RMZ (0-69'). Maintain a harvest to residual DBH ratio of approximately 1 throughout RMZ (0-69'). Leave all non-merchantable trees in remaining SMZ (69-100').

Unit 3H. No recommendations.

Unit 16H. No recommendations.

Unit 14H. No recommendations.

Unit 12H. No recommendations.

Unit 7H. No recommendations.

Unit 6H. No recommendations.

ENVIRONMENTAL IMPACTS (*Chapter 4*)

The following statements of environmental impacts in Alternatives 1 and 2 are based on the understanding that the 'Specialist Recommendations' described above will be implemented as maximum SMZ and RMZ treatments.

- NO ACTION ALTERNATIVE

Dingley Creek, Clark Creek, White Creek, and Lake Creek. No foreseeable **direct, indirect, or cumulative impacts** are anticipated to WCT or any other beneficial uses associated with the Dingley Creek, Clark Creek, White Creek, and Lake Creek watersheds beyond those described in Existing Conditions.

- ALTERNATIVE 1

Dingley Creek. Proposed Units 1H, 2H and 13H comprise a combined total of ~85.0 acres, which is roughly equivalent to 4.3% of the Dingley Creek watershed. All three proposed units are categorized as Douglas Fir/Spruce (DF/S) stand type, which has been selected for 50-55% harvest of merchantable sawlog volume using group selection, selection, and modified seed tree groupings. Helicopter yarding would be used exclusively in all three proposed units. 800' of light road reconstruction is proposed for an existing spur road in NW1/4NE1/4 of Section 4, and this comprises the only road construction or reconstruction proposed in the watershed. Existing roads will be required to meet BMPs.

The implementation of specialist recommendations is expected to (1) provide adequate rates of LWD recruitment that are within background ranges for the physiographic region, (2) provide adequate levels of stream shading, and (3) the highest level of tree density possible within the SMZ to help prevent future stream access to cattle.

Given the low relative harvest area (4.3% of watershed), a 45-50% tree retention prescription, minimal ground disturbance from helicopter yarding, no road construction or reconstruction, and specialist recommendations, no foreseeable **direct, indirect, or cumulative impacts** are anticipated to WCT or any other beneficial uses associated with the Dingley Creek watershed beyond those described in Existing Conditions.

Clark Creek. Proposed Unit 15H comprises a total of ~8.0 acres, which is roughly equivalent to 0.3% of the Clark Creek watershed. The proposed unit is categorized as DF stand type, which has been selected for 50-55% harvest of merchantable sawlog volume using group selection, selection, and modified seed tree groupings. Helicopter yarding would be used exclusively in the proposed unit. No road construction or reconstruction is proposed in the watershed, and existing roads will be required to meet BMPs.

The implementation of specialist recommendations is expected to (1) provide adequate rates of LWD recruitment that are within background ranges for the physiographic region, (2) provide adequate levels of stream shading, and (3) the highest level of tree density possible within the SMZ to help prevent future stream access to cattle.

Given the low relative harvest area (0.3% of watershed), a 45-50% tree retention prescription, minimal ground disturbance from helicopter yarding, no road construction or reconstruction, and specialist recommendation, no foreseeable **direct or indirect impacts** are anticipated to WCT or any other beneficial uses associated with the Clark Creek watershed beyond those described in Existing Conditions.

Proposed Unit 2 of the Hidden Lake Salvage is planned for harvest during summer 2004. This unit comprises a total of ~39.0 acres, which is roughly equivalent to 1.3% of the Clark Creek watershed. The proposed unit is categorized as DF and Lodgepole Pine (LP) stand types, which

have been selected for removal of all merchantable fire damaged (dead/dying) sawlog volume and 50-60% harvest of remaining merchantable green sawlog volume. (It is estimated that 30-37% of living trees would be retained in the unit.) Based on the proposed boundary drawings for the Hidden Lake Salvage, proposed Unit 2 does not come within 100' of Clark Creek, and this substantial buffer will provide adequate filtration against any downhill sedimentation related to harvest activities. Tractor yarding would be used exclusively in the proposed unit. 2,200' of road construction is planned in and adjacent to the proposed unit, and all construction will be required to meet BMPs. New construction would be closed with slash/debris at the end of the sale.

Considering the proposed actions of both proposed Unit 15 and proposed Unit 2 of the Hidden Lake Salvage, there are not expected to be any **cumulative impacts** to WCT or any other beneficial uses associated with the Clark Creek watershed beyond those described in Existing Conditions.

White Creek. Proposed Units 3H, 4H, 5H, 8H, 10H, 11H, 6H, 14H and 16H comprise a combined total of ~174.0 acres, which is roughly equivalent to 4.7% of the White Creek watershed. All of the proposed units are categorized as having a DF stand type, which has been selected for 50-55% harvest of merchantable sawlog volume using group selection, selection, and modified seed tree groupings. A portion of proposed Units 10H and 11H are also categorized as having a LP stand type, which has been selected for clearcut harvest of merchantable sawlog volume with individual or small group retention of Douglas Fir seed trees. Helicopter yarding would be used exclusively in the proposed unit. ~880' of new road construction and ~3,200' of existing road reconstruction is proposed in the watershed, and existing roads will be required to meet BMPs. The proposed road construction and reconstruction does not cross any perennial streams, and the proposed routes are sufficiently buffered from any perennial streams that they are not expected to have any impacts to WCT or any other beneficial uses related to the White Creek watershed.

The implementation of specialist recommendations is expected to (1) provide adequate rates of LWD recruitment that are within background ranges for the physiographic region, (2) provide adequate levels of stream shading, and (3) up to ~25% canopy opening in the RMZ to facilitate a faster regrowth of understory shrubs and other sources of cover, detritus and small organic debris to the channel. Since White Creek has been completely scoured of organic debris and fisheries habitat by the recent debris torrent, the (up to) ~25% canopy openings are expected to provide a medium for faster riparian rehabilitation and a net positive impact to cold water fisheries and associated aquatic life in the stream.

Given the low relative harvest area (4.7% of watershed), a 45-50% tree retention prescription for the bulk of the harvest area, minimal ground disturbance from helicopter yarding, distant road construction or reconstruction, and specialist recommendations, no foreseeable **direct or indirect impacts** are anticipated to WCT or any other beneficial uses associated with the White Creek watershed beyond those described in Existing Conditions.

Proposed Unit 1 of the Hidden Lake Salvage is planned for harvest during summer 2004. This unit comprises a total of ~18.0 acres, which is roughly equivalent to 0.5% of the White Creek watershed. The proposed unit is categorized as Douglas Fir (DF) stand type, which has been selected for removal of all merchantable fire damaged (dead/dying) sawlog volume and 40-50% harvest of remaining merchantable green sawlog volume. Based on the proposed boundary drawings for the Hidden Lake Salvage, approximately 250' of proposed Unit 1 borders the riparian management zone north of White Creek. The soils on the north side of the stream adjacent to this 250' reach are high risk for erosion and RMZ should be a minimum of 100' from White Creek, as recommended in the Soils and Geology Assessment for the Hidden Lake Salvage (J. Collins). The high erosion risk RMZ buffer should provide adequate filtration against any downhill sedimentation related to harvest activities. Tractor yarding would be used exclusively in the proposed unit. 1,410' of road reconstruction and 1,050' of skid trail construction is planned in and adjacent to the proposed unit, and all construction/reconstruction will be required to meet BMPs. The total skidding distance to the landing area will be ~2,900', and the constructed skid trail would be rehabilitated at the end of the sale.

Considering the proposed actions of Units 3H, 4H, 5H, 8H, 10H, 11H, 6H, 14H and 16H and proposed Unit 1 of the Hidden Lake Salvage, there are not expected to be any **cumulative impacts** to WCT or any other beneficial uses associated with the White Creek watershed beyond those described in Existing Conditions.

Lake Creek. Proposed Unit 12H comprises a total of ~42.0 acres, which is roughly equivalent to 0.9% of the Lake Creek watershed. The proposed unit is categorized as DF stand type, which has been selected for 50-55% harvest of merchantable sawlog volume using group selection, selection, and modified seed tree groupings. Helicopter yarding would be used exclusively in the proposed unit.

Given the low relative harvest area (0.9% of watershed), a 45-50% tree retention prescription, and minimal ground disturbance from helicopter yarding, no foreseeable **direct, indirect, or cumulative impacts** are anticipated to WCT or any other beneficial uses associated with the Lake Creek watershed beyond those described in Existing Conditions.

- ALTERNATIVE 2

Dingley Creek. Same **direct, indirect, or cumulative impacts** as Alternative 1.

Clark Creek. Same **direct, indirect, or cumulative impacts** as Alternative 1.

White Creek. Proposed Units 3H, 4H, 5H, 8H, 10H, 11H, and 6H comprise a combined total of ~167.0 acres, which is roughly equivalent to 4.5% of the White Creek watershed. All of the proposed units are categorized as having a DF stand type, which has been selected for 50-55% harvest of merchantable sawlog volume using group selection, selection, and modified seed tree groupings. A portion of proposed Units 10H and 11H are also categorized as having a LP stand type, which has been selected for clearcut harvest of merchantable sawlog volume with individual or small group retention of Douglas Fir seed trees. Helicopter yarding would be used exclusively in the proposed unit. ~5,210' of new road construction and ~1,305' of existing road reconstruction is proposed in the watershed, and existing roads will be required to meet BMPs. The proposed road construction and reconstruction does not cross any perennial streams, and the proposed routes are sufficiently buffered from any perennial streams that they are not expected to have any impacts to WCT or any other beneficial uses related to the White Creek watershed.

The implementation of specialist recommendations is expected to (1) provide adequate rates of LWD recruitment that are within background ranges for the physiographic region, (2) provide adequate levels of stream shading, and (3) up to ~25% canopy opening in the RMZ to facilitate a faster regrowth of understory shrubs and other sources of cover, detritus and small organic debris to the channel. Since White Creek has been completely scoured of organic debris and fisheries habitat by the recent debris torrent, the (up to) ~25% canopy openings are expected to provide a medium for faster riparian rehabilitation and a net positive impact to cold water fisheries and associated aquatic life in the stream.

Given the low relative harvest area (4.5% of watershed), a 45-50% tree retention prescription for the bulk of the harvest area, minimal ground disturbance from helicopter yarding, distant road construction or reconstruction, and specialist recommendations, no foreseeable **direct or indirect impacts** are anticipated to WCT or any other beneficial uses associated with the White Creek watershed beyond those described in Existing Conditions.

Same **cumulative impacts** as Alternative 1.

Lake Creek. This watershed is not within the scope of Alternative 2 and therefore is not evaluated for **direct, indirect or cumulative impacts** with respect to Alternative 2.

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Riparian Management Zone Cruise Data (9/15/03) - **UNIT 1H**
1/20 acre fixed plots, evenly spaced

PLOT 1		
SPP	Live/Dead	DBH
Spruce	L	7
Spruce	L	15
Spruce	L	9
Spruce	L	7
Spruce	L	8
Spruce	L	8
Spruce	L	8
Spruce	L	16
Spruce	L	14
Spruce	L	13
Spruce	L	12
Spruce	L	14
Spruce	L	13
Spruce	L	7
Spruce	L	5
Spruce	L	6
Spruce	L	5
Spruce	L	10
Spruce	L	15

PLOT 2		
SPP	Live/Dead	DBH
Spruce	L	17
Aspen	D	8
Spruce	L	21
Spruce	L	18
Spruce	L	11
Spruce	L	5
Spruce	L	14
Douglas Fir	L	18
Spruce	L	11
Spruce	L	14
Spruce	L	8
Spruce	L	15
Spruce	L	13
Spruce	L	5
Spruce	L	9
Spruce	L	14
Spruce	L	7
Spruce	L	14

PLOT 3		
SPP	Live/Dead	DBH
Spruce	L	10
Spruce	L	8
Spruce	L	9
Spruce	L	5
Spruce	L	5
Spruce	L	17
Spruce	L	5
Spruce	L	10
Spruce	L	6
Lodgepole	L	14
Spruce	L	12
Spruce	L	16
Lodgepole	L	12
Spruce	L	17
Spruce	L	15
Spruce	L	10
Spruce	D	5
Spruce	D	5
Spruce	L	8
Spruce	L	14
Spruce	L	12

Stand Table		
SPP	DBH	TPA
All spp.	5	60
All spp.	6	13
All spp.	7	27
All spp.	8	47
All spp.	9	20
All spp.	10	27
All spp.	11	13
All spp.	12	27
All spp.	13	20
All spp.	14	53
All spp.	15	27
All spp.	16	13
All spp.	17	20
All spp.	18	13
All spp.	21	7
QMD =	11.6	387

Riparian Management Zone Cruise Data (9/15/03) - **UNIT 13H**
1/20 acre fixed plots, evenly spaced

PLOT 1		
SPP	Live/Dead	DBH
Lodgepole	D	9
Lodgepole	L	5
Lodgepole	L	8
Douglas Fir	L	26
Lodgepole	D	8
Lodgepole	D	7
Lodgepole	D	12
Lodgepole	L	6
Lodgepole	D	7

PLOT 2		
SPP	Live/Dead	DBH
Lodgepole	D	5
Lodgepole	L	10
Lodgepole	L	8
Lodgepole	L	12
Lodgepole	D	5
Lodgepole	L	8
Lodgepole	L	8
Lodgepole	L	8
Lodgepole	D	8
Spruce	L	5
Lodgepole	D	6
Lodgepole	D	6

PLOT 3		
SPP	Live/Dead	DBH
Spruce	D	6
Spruce	L	12
Spruce	L	13
Lodgepole	D	12
Spruce	L	7
Spruce	D	9
Spruce	L	12
Spruce	L	7
Spruce	L	6
Spruce	D	9
Spruce	L	9
Spruce	L	13
Spruce	L	6
Spruce	L	9
Aspen	D	9
Spruce	D	13
Spruce	L	7
Aspen	D	9
Spruce	L	11
Spruce	L	9
Spruce	L	10
Spruce	D	5
Spruce	L	12
Spruce	L	5

Stand Table		
SPP	DBH	TPA
All spp.	5	40
All spp.	6	40
All spp.	7	33
All spp.	8	47
All spp.	9	53
All spp.	10	13
All spp.	11	7
All spp.	12	40
All spp.	13	20
All spp.	26	7
QMD =	9.6	300

Clark Creek Reference Reach Hydraulic Data (Benjeyfield 1994)

Dimension		typical	min	max
Size:	x-area bankfull	11.9	---	---
	width bankfull	6.9	---	---
	mean depth	1.7	---	---
Ratios:	Width/Depth Ratio	4.0	---	---
	Entrenchment Ratio	3.0	---	---
	Riffle Max Depth Ratio	1.3	---	---
	Pool Area Ratio	---	---	---
	Pool Width Ratio	---	---	---
	Pool Max Depth Ratio	---	---	---
	Bank Height Ratio	1.1		
	Run Area Ratio	---	---	---
	Run Width Ratio	---	---	---
	Run Max Depth Ratio	---	---	---
	Glide Area Ratio	---	---	---
	Glide Width Ratio	---	---	---
	Glide Max Depth Ratio	---	---	---
Hydraulics:		riffle	pool	run
	discharge rate, Q (cfs)	91.8	91.8	91.8
	velocity (ft/sec)	7.7	---	---
	shear stress @ max depth (lbs/ft sq)	12.83	---	---
	shear stress (lbs/ft sq)	6.69	---	---
	shear velocity (ft/sec)	1.86	---	---
	unit stream power (lbs/ft/sec)	74.219	74.219	74.22
	relative roughness	1.7	---	---
	friction factor u/u*	4.2	---	---
	threshold grain size @ max depth (mm)	10505.7	---	---
	threshold grain size (mm)	2954	---	---

Channel Materials	total	riffle	pool	run	glide	bar sample
D16	0.871	0.871	0.000	0.0	0.0	---
D35	10.83	10.83	0.00	0	0	---
D50	36.9	36.9	0.0	0	0	---
D84	308.0	308	0	0	0	---
D95	1471.1	1471	0	0	0	---
Largest Bar						0
% Silt/Clay	2%	2%	---	---	---	---
% Sand	17%	17%	---	---	---	---
% Gravel	37%	37%	---	---	---	---
% Cobble	25%	25%	---	---	---	---
% Boulder	19%	19%	---	---	---	---
% Bedrock	0%	0%	---	---	---	

Riparian Management Zone Cruise Data (9/15/03) - **UNIT 15H**
1/20 acre fixed plots, evenly spaced

PLOT 1		
SPP	Live/Dead	DBH
Douglas Fir	L	24
Spruce	L	13
Spruce	L	15
Lodgepole	L	8
Aspen	L	9
Lodgepole	L	12
Douglas Fir	L	6

PLOT 2		
SPP	Live/Dead	DBH
Douglas Fir	L	11
Douglas Fir	L	8
Spruce	L	15
Douglas Fir	L	10
Lodgepole	D	9
Lodgepole	L	12
Douglas Fir	L	5
Lodgepole	D	8
Lodgepole	D	6
Douglas Fir	L	14

PLOT 3		
SPP	Live/Dead	DBH
Lodgepole	L	7
Lodgepole	L	11
Lodgepole	L	12
Lodgepole	D	6
Lodgepole	L	6
Lodgepole	L	9
Lodgepole	L	5
Lodgepole	D	8
Douglas Fir	L	8
Lodgepole	L	10
Lodgepole	D	9
Lodgepole	L	9
Lodgepole	D	5

Stand Table		
SPP	DBH	TPA
All spp.	5	20
All spp.	6	27
All spp.	7	7
All spp.	8	33
All spp.	9	33
All spp.	10	13
All spp.	11	13
All spp.	12	20
All spp.	13	7
All spp.	14	7
All spp.	15	13
All spp.	24	1
QMD =	9.7	194

White Creek Reference Reach Hydraulic Data (Benjeyfield 1994)

Dimension		typical	min	max
Size:	x-area bankfull	4.1	---	---
	width bankfull	6.8	---	---
	mean depth	0.6	---	---
Ratios:	Width/Depth Ratio	11.3	---	---
	Entrenchment Ratio	1.8	---	---
	Riffle Max Depth Ratio	1.3	---	---
	Pool Area Ratio	---	---	---
	Pool Width Ratio	---	---	---
	Pool Max Depth Ratio	---	---	---
	Bank Height Ratio	1.6		
	Run Area Ratio	---	---	---
	Run Width Ratio	---	---	---
	Run Max Depth Ratio	---	---	---
	Glide Area Ratio	---	---	---
	Glide Width Ratio	---	---	---
	Glide Max Depth Ratio	---	---	---
Hydraulics:		riffle	pool	run
	discharge rate, Q (cfs)	12.5	12.5	12.5
	velocity (ft/sec)	3.0	---	---
	shear stress @ max depth (lbs/ft sq)	2.80	---	---
	shear stress (lbs/ft sq)	2.10	---	---
	shear velocity (ft/sec)	1.04	---	---
	unit stream power (lbs/ft/sec)	6.424	6.424	6.42
	relative roughness	1.1	---	---
	friction factor u/u*	2.9	---	---
	threshold grain size @ max depth (mm)	538.2	---	---
	threshold grain size (mm)	307	---	---

Channel Materials	total	riffle	pool	run	glide	bar sample
D16	0.758	0.758	0.000	0.0	0.0	---
D35	36.36	36.36	0.00	0	0	---
D50	56.4	56.4	0.0	0	0	---
D84	172.6	173	0	0	0	---
D95	291.5	292	0	0	0	---
Largest Bar						0
% Silt/Clay	0%	0%	---	---	---	---
% Sand	20%	20%	---	---	---	---
% Gravel	35%	35%	---	---	---	---
% Cobble	39%	39%	---	---	---	---
% Boulder	6%	6%	---	---	---	---
% Bedrock	0%	0%	---	---	---	

Riparian Management Zone Cruise Data (9/15/03) - **UNIT 11H**
1/20 acre fixed plots, evenly spaced

PLOT 1			**PLOT 2**			**PLOT 3**		
SPP	Live/Dead	DBH	SPP	Live/Dead	DBH	SPP	Live/Dead	DBH
Douglas Fir	L	18	Spruce	L	5	Douglas Fir	L	10
Douglas Fir	L	22	Douglas Fir	L	13	Douglas Fir	L	8
Douglas Fir	L	27	Douglas Fir	L	7	Douglas Fir	L	6
Spruce	L	5	Douglas Fir	L	10	Douglas Fir	L	8
Douglas Fir	L	10	Douglas Fir	D	32	Douglas Fir	L	14
Douglas Fir	L	20	Douglas Fir	L	12	Douglas Fir	L	13
Douglas Fir	L	26	Douglas Fir	L	8	Douglas Fir	L	19
Douglas Fir	L	6	Douglas Fir	L	20	Douglas Fir	L	14
			Douglas Fir	L	10	Douglas Fir	L	8
						Douglas Fir	L	19

Stand Table		
SPP	DBH	TPA
All spp.	5	13
All spp.	6	13
All spp.	7	7
All spp.	8	27
All spp.	10	27
All spp.	12	7
All spp.	13	13
All spp.	14	13
All spp.	18	7
All spp.	19	13
All spp.	20	13
All spp.	22	7
All spp.	26	7
All spp.	27	7
All spp.	32	7
QMD =	15.6	181

Riparian Management Zone Cruise Data (9/16/03) - **UNIT 10H**
1/20 acre fixed plots, evenly spaced

PLOT 1

SPP	Live/Dead	DBH
Lodgepole	L	8
Lodgepole	D	5
Douglas Fir	L	6
Douglas Fir	L	5
Lodgepole	L	8
Lodgepole	L	10
Lodgepole	L	9
Lodgepole	L	7
Lodgepole	L	5
Lodgepole	L	6

PLOT 2

SPP	Live/Dead	DBH
Lodgepole	L	7
Lodgepole	L	7
Lodgepole	L	14
Douglas Fir	L	7
Douglas Fir	L	7

PLOT 3

SPP	Live/Dead	DBH
Douglas Fir	L	7
Douglas Fir	L	14
Douglas Fir	L	8
Douglas Fir	L	17
Douglas Fir	L	13

PLOT 4

SPP	Live/Dead	DBH
Douglas Fir	L	22
Douglas Fir	L	26
Lodgepole	L	7
Douglas Fir	L	7
Douglas Fir	L	5

PLOT 5

SPP	Live/Dead	DBH
Douglas Fir	L	19
Lodgepole	D	19
Lodgepole	D	14
Douglas Fir	L	11
Lodgepole	L	6
Lodgepole	L	7
Douglas Fir	L	7

PLOT 6

SPP	Live/Dead	DBH
Douglas Fir	L	14
Lodgepole	L	5
Douglas Fir	L	5
Douglas Fir	L	6
Douglas Fir	L	10
Douglas Fir	L	12
Douglas Fir	L	14
Lodgepole	L	8

Stand Table

SPP	DBH	TPA
All spp.	5	20
All spp.	6	13
All spp.	7	33
All spp.	8	13
All spp.	9	3
All spp.	10	7
All spp.	11	3
All spp.	12	3
All spp.	13	3
All spp.	14	17
All spp.	17	3
All spp.	19	7
All spp.	22	3
All spp.	26	3
QMD =	11.0	131

Riparian Management Zone Cruise Data (9/16/03) - **UNIT 4H**
1/20 acre fixed plots, evenly spaced

PLOT 1		
SPP	Live/Dead	DBH
Douglas Fir	L	6
Douglas Fir	L	15
Douglas Fir	L	7
Douglas Fir	L	20
Douglas Fir	L	13
Douglas Fir	L	8
Douglas Fir	L	11
Douglas Fir	L	8
Douglas Fir	L	8
Douglas Fir	L	7
Douglas Fir	L	18
Douglas Fir	L	8

PLOT 2		
SPP	Live/Dead	DBH
Douglas Fir	L	5
Douglas Fir	L	6
Douglas Fir	L	7
Douglas Fir	L	16
Douglas Fir	L	16
Douglas Fir	L	15
Douglas Fir	L	15
Douglas Fir	L	12
Douglas Fir	L	5
Douglas Fir	L	11
Douglas Fir	L	16
Douglas Fir	L	5

PLOT 3		
SPP	Live/Dead	DBH
Douglas Fir	L	9
Douglas Fir	L	10
Douglas Fir	L	5
Douglas Fir	L	6
Douglas Fir	L	15
Douglas Fir	L	7
Douglas Fir	L	16
Douglas Fir	L	6
Douglas Fir	L	9
Douglas Fir	L	13
Douglas Fir	L	10
Douglas Fir	L	11
Douglas Fir	L	6
Douglas Fir	L	16
Douglas Fir	L	14
Douglas Fir	L	10
Douglas Fir	D	10
Douglas Fir	L	5
Douglas Fir	L	5
Douglas Fir	L	5
Douglas Fir	L	10
Douglas Fir	L	9
Douglas Fir	L	13
Douglas Fir	L	15

Stand Table		
SPP	DBH	TPA
All spp.	5	47
All spp.	6	33
All spp.	7	27
All spp.	8	27
All spp.	9	20
All spp.	10	33
All spp.	11	20
All spp.	12	7
All spp.	13	20
All spp.	14	7
All spp.	15	33
All spp.	16	33
All spp.	18	7
All spp.	20	7
QMD =	11.1	321

ATTACHMENT F

Vegetative Analysis/Stand Prescription
White Line Salvage Timber Permit

The State parcel is located along the lower reach of White Creek on the southern edge of the Pioneer Mountains. Slopes range from 10-65% with an elevation range of 6600-7800 feet. No previous harvesting has occurred within the State parcels. Harvesting has occurred on the private lands to the south of the Section 16 over the past 20 years. The State parcels have ~512 forested acres which are dominated by Douglas-fir. The cover type is Douglas-fir and the habitat type is Douglas-fir/Idaho Fescue (Psme/Feid). Forested stands are included in fire group five with Douglas-fir the indicated climax species. The fire disturbance regime was likely low to moderate severity fires maintaining many mature stands in an open, park-like condition. The absence of fire, in combination with encroachment, has resulted in mature/over mature, overstocked and suppressed stands which along with extended drought, have provided conditions for the current heavy infestations of Douglas fir beetle and Spruce Budworm and a higher susceptibility to fire. Soils in Section 9 are derived from granitic parent material while soils in Section 16 are derived from argillite parent material which is more resistant than the granitics. The toe slopes and open sage/grasslands are a complex of coarse alluvial soils and tertiary valley fill deposits with higher clay content.

<u>Unit 1 (7.8 ac/25 MBF), Unit 2 (18.0 ac/79 MBF), Unit 3 (3 ac/10 MBF), Unit 4 (5 ac/25 MBF), Unit 5 (6.0 ac/20 MBF)</u> - Stands are composed of Douglas fir sawtimber and submerchantable material. Scattered individuals and small clumps (<5 acres) of old relic Douglas-fir trees do occur within these stands. Unit 2 has a core area of ~7 acres that would meet the “old growth” definition. This core area has been infested with bark beetle and the scattered old relic trees in the other stands have been infested or are “at-risk” of being infested. Overall health and growth of the stands are poor. The stands are overstocked and suppressed and have heavy infestations of Douglas fir beetle and Spruce Budworm. Overall, live Douglas fir have poor to fair crown ratios. Dominate trees are 60-70’ and co-dominates are 40-55’ with an age range of 100-200 years. Yield capacity is 30 cu. ft/acre. Regeneration is light and understory vegetation is sparse. Coarse woody debris is light. Heavy livestock use in all stands.

Treatments for Douglas-fir cover types would target dead, dying and at-risk trees for removal. While the younger age classes would be favored for the residual stand, all age classes have been affected with insect infestations. Douglas fir beetle infesting the larger trees and Spruce budworm heavily defoliating the small to medium sized sawtimber and all seedling/sapling size trees. Sawtimber trees of all age classes exhibiting signs of insect/disease, poor health and/or poor tree form characteristics would be designated for harvest. Additionally, overall stand density would be reduced by 55-70% of the merchantable volume, targeting trees exhibiting overstocked/suppressed conditions, utilizing group selection/selection harvests. This stand density reduction would be concentrated in areas of the stands containing younger-aged/small to medium sized trees while retaining some of the healthy older trees, if available and applicable. Large live trees, live cull trees, snags, cull snags, and coarse woody debris and fine materials would be protected and retained in sufficient quantities where applicable.

Severity of stand conditions would dictate harvest method used, emulating moderately severe ground fire to stand replacing fire. Harvest prescription would recover value from resources before it is lost, reduce overstocking, fire hazard, and additional insect and disease while promoting forest health, vigor and productivity. Additionally, harvest would open the stands to encourage natural regeneration of shade intolerant species; maintain lodgepole pine and Douglas-fir cover types while maintaining a semblance of historic stand conditions; and promote existing aspen stands.

<u>Aspen Areas</u> - A regeneration harvest of all conifer sawtimber within 50-75 feet of the aspen clone would be used to reduce conifer encroachment into aspen stands and promote aspen regeneration. Submerchantable conifer and aspen would not be protected during harvest operations to further reduce

conifer encroachment and induce suckering of aspen. Post harvest treatment to fall and lop any remaining submerchantable conifer trees.

Retain all fine litter and 5-10 tons/acre of large woody debris >3" diameter as feasible. Consolidate remaining slash at landings for burning. Conduct regeneration survey in 7-9 years and a thinning survey in 15 years.

There is currently more total forest cover in Beaverhead County than in prior historical conditions. The proposed harvest represents ~8.8% of the total forested acres within the State parcels. Harvesting an estimated 350 MBF of timber would alter the forest cover on approximately 45 acres. The proposed levels of harvest and subsequent reduction in forest canopy would be similar or less than what would be expected to occur under the present natural conditions. Natural regeneration would be expected. No rare plants or cover types have been noted or observed within the project area.

MEASURES RECOMMENDED TO MITIGATE POTENTIAL IMPACTS:

1) Compliance with Forestry Best Management Practices (BMP's), Streamside Management Zone (SMZ) laws, the Montana Stream Protection Act (124 Permit) and applicable DNRC Forest Management Administrative Rules.
2) Limit equipment operations to periods when soils are dry (less than 20% soil moisture), frozen or snow covered (12 inches packed or 18 inches unconsolidated) to minimize soil compaction, rutting, vegetative disturbance and maintain drainage features. Control erosion by installing adequate drainage on roads and skid trails.
3) The Forest Officer shall approve a plan for felling, yarding and landing location in each harvest unit prior to the start of operations in the unit. The locations and spacing of skid trails and landings shall be designated and approved by the Forest Officer prior to operations and skid trails will not be spaced less than 60 feet. Retain all fine litter as feasible and 5-10 tons/acre of large woody debris >3" diameter. Minimize soil disturbance by general skid trail planning and limit sustained tractor skidding to slopes ≤50%. Limit scarification to 30-40% of the harvest area. Slash would be left in the harvest units where feasible, and distributed on skid trails upon completion of use, for nutrient cycling, to control erosion and to provide shade and protection for seedlings.
4) For slope stability on the road construction segments, construct cutslopes at 1:1 (run/rise) in common material and 1/4:1 for rock. Install adequate road drainage to control erosion concurrent with harvest activities and road opening and new construction. Provide effective sediment filtration along drainage features near crossing sites. On State lands, new construction would have adequate drainage provided and major skid trails would be closed with slash and debris and/or barriers, and adequate drainage provided.
5) All road and logging equipment would be power washed and inspected prior to being brought on site. Sale area would be monitored for weeds following harvest and a treatment plan would be developed should noxious weeds occur.
6) At sale closure, grass seed roads, skid trails (where needed) and landings with an appropriate seed mixture.
7) One snag and one snag recruit per acre, of the largest diameter class, would be retained where available and applicable. Cull live trees and cull snags would be retained where available and applicable.
8) Retain live, healthy older trees and stand attributes suitable for old growth development where available and applicable.
9) Contact DNRC wildlife biologist should any threatened or endangered species be encountered within the proposed project area.

ATTACHMENT G

WHITE LINE SALVAGE TIMBER PERMIT
CHECKLIST FOR ENDANGERED, THREATENED AND SENSITIVE SPEICES

Pertains to Section II. 9. of the DS-252 DNRC Environmental Checklist
(Rev. August 1, 2007)
CENTRAL LAND OFFICE

Prepared by Chuck Barone August 10, 2010

Threatened and Endangered Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Grizzly Bear (*Ursus arctos*) Habitat: recovery areas, security from human activity	[N] The proposed project area lies outside of any grizzly bear recovery area. The nearest recovery area is the Yellowstone Grizzly Bear Recovery Zone (USFWS 1993) situated ~57 miles southeast of the project area. The project area is comprised of dry forest types not typically preferred by bears. Grizzly bear use of the Pioneer Mountains may occur, however, the project area is currently considered outside of occupied habitat (Interagency Occupied Habitat Map, September 2002). Riparian habitats preferred by bears occur in the project area along White Creek. This creek supports relatively low levels of hiding cover, and human access levels are presently moderate. Approximately 1100 feet of temporary, minimum standard new road would be constructed and physically closed at the end of the project. Potential for any measurable increases in bear-human conflicts following project activities are not expected. Due to the size, nature, duration and location of the proposed project, activities associated with this proposal are not expected to affect grizzly bears. Adverse direct, indirect and cumulative impacts to grizzly bears as a result of this project are expected to be minimal.
Lynx (*Felis lynx*) Habitat: mosaics--dense sapling and old forest >5,000 ft. elev.	[N] The proposed project area is located along the fringes of preferred lynx habitat. Suitable lynx habitat is potentially present in the Pioneer Mountains (MNHP 2009) and Lynx could occasionally use the project area. However, habitats high in coarse woody debris that are preferred for denning, and large acreages (>50 acres) of dense conifer regeneration at high elevations that are preferred for foraging are not present in the project area. Lynx habitat is marginal due to naturally induced fragmentation, and the high level of interspersion of native grassland habitat and dry forest types. The majority of the habitat on the two State parcels would be categorized as “other” (349 ac – 82%) and mature foraging (78 ac-18%) habitat. Additionally, there are

	~80 acres of “temporary non” habitat. There is no identified young foraging or denning habitat within the State parcels. Of the ~427 acres of potential lynx habitat on the State parcels, ~38 acres of “other” habitat are proposed for harvest. This would leave ~38 acres converted to temporary non habitat. Preferred lynx habitat is marginal within the proposed project area due to the lack of highly desirable habitat conditions for lynx and their primary prey, snowshoe hares. Adverse direct, indirect or cumulative impacts to lynx as a result of this project are expected to be minimal.
Gray Wolf (*Canis lupus*) Habitat: ample big game pops., security from human activity	[N] The proposed project area falls within the Central Idaho Nonessential Experimental Area for gray wolves. The Grasshopper Pack resides in the vicinity of the project area. Individuals from this pack or transients from other packs could occasionally use portions of the project area; however, due to the size, nature, duration and location of the proposed project, activities associated with this project are not expected to affect wolves or recovery efforts. Should a new den be located within one mile of the project area, activities would cease and a DNRC Biologist would be contacted immediately. Mitigations would then be developed and implemented to minimize adverse impacts to wolves prior to initiating any activity.

DNRC Sensitive Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Bald Eagle (*Haliaeetus leucocephalus*) Habitat: late-successional forest <1 mile from open water	[N] Bald Eagles have been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). No nesting habitat occurs on, or within one mile of the proposed project area, and the project area likely occurs outside of any Bald Eagle nesting home range. No direct, indirect or cumulative effects to Bald Eagles associated with this project are anticipated.
Black-Backed Woodpecker (*Picoides arcticus*) Habitat: mature to old burned or beetle-infested forest	[N] Black-backed woodpeckers have not been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). However, stands found within the proposed project area are presently experiencing heavy insect activity and could attract birds. Foraging and nesting opportunities are likely to increase in the area due to present increase in insect activity. No recent burns (≤5 years old) have occurred within the State tracts or adjoining sections. Due to the size, location and short duration of this proposed project only minor potential for direct, indirect or cumulative effects to black-backed woodpeckers would be expected to occur.

Black-tailed Prairie Dog (*Cynomys ludoviscianus*) Habitat: Prairie, shortgrass prairie, badlands	[N] Grassland habitats suitable for use by black-tailed prairie dogs do not occur within one mile of the proposed project area. Impacts to black-tailed prairie dogs are not anticipated.
Flammulated Owl (*Otus flammeolus*) Habitat: late-successional ponderosa pine and Doug.-fir forest	[N] Flammulated Owls have been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). The parcel involved in the proposed project maintains elevations that range from about 6,600-7,800 feet. Flammulated Owls have been found in warm, dry Douglas-fir cover types. The parcels involved in this project have similar vegetative conditions, represented by small, scattered patches but the associated higher elevations are not their preferred habitat. Direct, indirect and cumulative effects to Flammulated Owls would not be expected to occur under the alternatives considered.
Greater Sage-grouse (*Centrocercus urophasianus*) Habitat: sagebrush semi-desert	[N] Sage Grouse have been documented in the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). Sagebrush semi-desert habitats suitable for use by Sage Grouse do occur within one mile of the project area. No leks, lek areas or core areas have been identified within one mile of the project area or haul route. Should sage grouse be present in the vicinity of the project area, any effects to habitat or disturbance-related effects would be expected to be minimal, due to the late start-up date of activities (i.e., post June 15), and preferred sagebrush habitat would not be altered. Impacts to Sage Grouse are not anticipated.
Harlequin Duck (*Histrionicus histrionicus*) Habitat: white-water streams, boulder and cobble substrates	[N] Harlequin ducks have not been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). No high gradient streams suitable for use by harlequins occur within the project area or along proposed haul routes. No impacts to Harlequin Ducks would be expected to occur as a result of this project.
Mountain Plover (*Charadrius montanus*) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] Mountain Plovers have not been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). No short-grass prairie or prairie dog towns occur on, or within one mile of the proposed project area. No impacts to Mountain Plovers are expected as a result of this project.
Northern Bog Lemming (*Synaptomys borealis*) Habitat: sphagnum meadows, bogs, fens with thick moss mats	[N] No sphagnum meadows or bogs occur in the proposed project area. No impacts to Bog Lemmings would be expected to occur as a result of this project.

Peregrine Falcon (*Falco peregrinus*) Habitat: cliff features near open foraging areas and/or wetlands	[N] Transient/migrant Peregrine Falcons have been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). Cliff features suitable for use by nesting Peregrine Falcons do not occur within 1 mile of the project area. No direct, indirect or cumulative effects associated with this project are anticipated.
Pileated Woodpecker (*Dryocopus pileatus*) Habitat: late-successional ponderosa pine and larch-fir forest	[N] Indirect evidence of breeding Pileated Woodpeckers has been documented within the quarter latilong (L36D) that encompasses the proposed project area (Skaar 1996, MNHP 2010). The project area is poorly suited for use by Pileated Woodpeckers. As suitable habitat is not present in the project area, no impacts to Pileated Woodpeckers would be expected to occur as a result of this project.
Townsend's Big-Eared Bat (*Plecotus townsendii*) Habitat: caves, caverns, old mines	[N] The DNRC is unaware of any mines or caves within the proposed project area or close vicinity that would be suitable for use by Townsend's big-eared bats. Impacts to Townsend's big-eared bats are not anticipated as a result of this project.

* Skaar, P.D. 1996. Montana bird distribution, fifth edition. Montana National Heritage Program 2010. National Heritage Tracker.