FILE NO. 016.

ENVIRONMENTAL ASSESSMENT COVER SHEET

DS-251

APPLICANT Montana Department of State Lands, Southwestern Land Office

TYPE OF OPERATION Fish Forks Timber Sale, 270 acres, 1.298 MMBF

LOCATION Section 26, Township 14 North, Range 25 West

PERSON PREPARING EA Jeff Wilson

( ) DRAFT EIS
(X) NO DRAFT EIS

DATE PREPARED February 20, 1992 EXPECTED IMPLEMENTATION DATE July 1992

REVIEWED BY _____ RECOMMENDATION ( ) DRAFT EIS
(X) NO DRAFT EIS

REVIEWED BY _____ RECOMMENDATION ( ) DRAFT EIS
( ) NO DRAFT EIS

REVIEWED BY _____ RECOMMENDATION ( ) DRAFT EIS
(X) NO DRAFT EIS

ADMINISTRATOR'S SIGNATURE _____ RECOMMENDATION ( ) DRAFT EIS
(X) NO DRAFT EIS

SUMMARY OF POTENTIAL IMPACTS

PHYSICAL ENVIRONMENT	SIGNIFICANT		INSIGNIFICANT WITH MITIGATION		INSIGNIFICANT AS PROPOSED	
	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM
1. TOPOGRAPHY					X	X
2. GEOLOGY: stability					X	X
3. SOILS: quality, distribution			(See Soils Report)		X	X
4. WATER: quality, quantity, distribution			(See Hydrology Report)		X	X
5. AIR: quality					X	X

PHYSICAL ENVIRONMENT (continued)	SIGNIFICANT		INSIGNIFICANT WITH MITIGATION		INSIGNIFICANT AS PROPOSED	
	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM
6. UNIQUE, ENDANGERED, FRAGILE, or LIMITED environmental resources					X	X
BIOLOGICAL ENVIRONMENT						
1. TERRESTRIAL, AVIAN, and AQUATIC; species and habitats			(See Wildlife Report)		X	X
2. VEGETATION; quantity, quality, species			(See Silvicultural Prescriptions)		X	X
3. AGRICULTURE; grazing, crops, production					X	X
HUMAN ENVIRONMENT						
1. SOCIAL; structures and more					X	X
2. CULTURAL; uniqueness, diversity					X	X
3. POPULATION; quantity and distribution					X	X
4. HOUSING; quantity and distribution					X	X
5. HUMAN HEALTH & SAFETY					X	X
6. COMMUNITY AND PERSONAL INCOME					X	X

HUMAN ENVIRONMENT (continued)	SIGNIFICANT		INSIGNIFICANT WITH MITIGATION		INSIGNIFICANT AS PROPOSED	
	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM
7. EMPLOYMENT; quantity and distribution					X	X
8. TAX BASE; local and state revenue					X	X
9. GOVERNMENT SERVICES; demand on					X	X
10. INDUSTRIAL, COMMERCIAL and AGRICULTURAL activities					X	X
11. HISTORICAL and ARCHAEOLOGICAL			(See Archaeology) Report)		X	X
12. AESTHETICS					X	X
13. ENVIRONMENTAL PLANS and GOALS local and regional					X	X
14. DEMANDS on ENVIRONMENTAL RESOURCES of land, water, air and energy					X	X
15. TRANSPORTATION networks and traffic flows					X	X

Route copies to: Environmental Quality Council (EQC)
File 016.4

FISH FORKS TIMBER SALE

ENVIRONMENTAL PACKAGE

TABLE OF CONTENTS

ITEM	Page(s)
ENVIRONMENTAL ASSESSMENT COVER SHEET	1
ENVIRONMENTAL ASSESSMENT	
Project Description	4
Issue Development	4
Scoping and Public Involvement	4
Issues	5
How Issues Were Addressed	5
Alternatives	8
Environmental Impacts	9
Recommendations	10
Record of Decision	**11**
Exhibits	
Exhibit A - Vicinity Map	12
Exhibit B - Alternative 2 Map	13
Exhibit C - Alternative 3 Map	14
Exhibit D - Hydrology Reports	15
Exhibit E - Soils Report	22
Exhibit F - Archaeology Report	24
Exhibit G - Wildlife Report	25
Exhibit H - Timber Stand Map	26
SILVICULTURAL PRESCRIPTIONS	
Stands 1 and 4	27
Stands 2 and 3	29
Stands 5 and 6	31
Stand 7	33
BRUSH AND TSI PLAN	35

ENVIRONMENTAL ASSESSMENT

FISH FORKS TIMBER SALE

I. Project Description

The Department of State Lands proposes to harvest timber from State owned trust land in the north half of Section 26, T14N - R25W. This harvest is intended to generate immediate revenue for the School Trust and to create suitable environments for commercial timber production into the future. Harvest activities are planned with the concept of balancing economic objectives with environmental and political issues.

The overstory within this section is moderately stocked and consists of primarily mature Ponderosa pine, Douglas-fir, Western Larch and Grand fir. These trees are left from the logging in the early 1950's. At that time, over three million board feet of sawtimber was cut from the State land. The north and east aspects have an overstocked understory of 30 year old Douglas-fir and Grand fir saplings. These trees originated at the time of the last cutting. Sawtimber growth is currently far below potential due in large measure to the advanced age of the dominant trees. The understory is gradually becoming stagnated due to heavy competition with overstory trees and adjacent saplings.

The main treatment proposed is overstory removal of decadent trees in combination with thinning of thrifty sawlog-sized trees. This treatment is intended to reduce mortality, improve sawtimber growth and utilize the existing understory for the next timber crop. Following harvest, precommercial thinning of sapling sized trees is planned.

In addition to the overstory removal treatment, there are small areas of clearcut and/or seedtree harvest planned (treatment method varies with alternative chosen). These areas do not have a good understory of healthy young trees. The objective in these units is to remove overmature trees and to establish a new crop of trees through natural seeding.

Estimated return from proposed alternatives range from $200,000 to $300,000.

II. Issue Development

A. Scoping and Public Involvement

The sale vicinity is not an area of high public concern or involvement. The entire Fish Creek drainage is very steep and mountainous. Very few people live in the immediate area. During the fall, the area receives a moderate amount of big game hunting pressure. Surrounding lands are owned by Champion International. These lands have all received some level of cutting in the past 30 years and are being managed as industrial forests. Specialists within the Department of State Lands (DSL) and the Department of Fish, Wildlife and Parks (DFW&P) were contacted and solicited for their comments regarding the proposed action.

B. Issues

The following issues were raised by specialists from DSL and DFW&P:

1. Hydrology: DSL Hydrologist, Gary Frank, conducted several field reviews of the general sale area (GSA) during the planning stages of the sale. His written comments can be found in Exhibit D. Gary's concerns centered around providing adequate road surface drainage, proper placement of culverts (CMP's) and planned harvest operations in a streamside management zone (SMZ).

2. Soils: DSL Soil Scientist, Jeff Collins, conducted a field review of the sale area during the planning stages of the project. His written comments can be found in Exhibit E. Jeff's concerns centered around season of use, protection of the streamside management zone, operations on steep slopes and proper location of roads.

3. Archaeology: DSL Archaeologist, Dori Passmann, was contacted during the planning stages of the project. Her written comments may be found in Exhibit F. Dori's primary concern was for possible archaeological sites in the harvest area.

4. Wildlife: DFW&P Biologist, Bob Henderson, was contacted during the planning stages of the project. His written comments can be found in Exhibit G. Bob's primary concern is reduction of cover and associated impacts to forage availability and thermal and hiding characteristics for wintering deer and elk. In addition, the sale area is within the DFW&P management unit that emphasizes the carry-over of mature bull elk. Bob requested that DSL make very effort to restrict any additional public road access.

5. Income: DSL's immediate concerns are for the loss of timber volume caused by natural death and decay, and unacceptably slow growth of overmature trees. In addition, there is a window of opportunity for managing the young trees which have become established since the last logging. If left too long, the prospects for managing these young trees becomes less desirable. To meet land management objectives, the overmature timber should be harvested and the overcrowded timber thinned.

C. How Issues Were Addressed

Upon receipt of responses to initial scoping, DSL developed a list of issues regarding this proposal. Issues were than developed and clarified through field trips to the sale area. The purpose of these activities was to gain mutual understanding of the issues, goals and objectives of all parties. DSL then evaluated the issued and developed mitigation measures which both addressed the issues and satisfied the project objectives.

The following is a listing of the specific issues raised and a discussion of how they have been addressed. Three issues (Hydrology - Site #12; Wildlife - item 4.a.; and Income - item 5 (in bold print below)) were the basis for development of Alternative 3. All other issues/mitigations have been incorporated into all action alternatives.

1. Hydrology: Refer to Exhibit D for the specific issues raised by DSL Hydrologist, Gary Frank. The issues will be discussed in the same order as they appear in Exhibit D.

   Roads:

   Site #1: Any sale agreement will contain language specifying the removal of the existing CMP and installation of a new CMP at this location.

   Site #2: Any sale agreement will contain language specifying the re-establishment of a catchment basin and ditching to the existing CMP. The contract will also state that a drive-thru dip must be constructed at the adjacent draw crossing.

   Site #3: Any sale agreement will contain language specifying the purchase of an 18" CMP and installation of said CMP. Installation shall include the building of a catchment basin and ditches reaching from the side slopes on both sides of the catchment basin to the catchment basin itself.

   Site #5: Any sale agreement will contain language specifying the purchase and installation of three 22 foot water diverters.

   Site #'s 7, 8 and 9: Any sale agreement will contain language specifying the purchase and installation of three 24 foot water diverters.

   Site #10: A drive-thru drain dip would be installed according to specified language contained in any sale agreement.

   Site #11: Any sale agreement will contain language specifying the purchase and installation of one 18" CMP. Installation shall include ditching from the side slopes to the CMP inlet.

   Site #13: Gary called for a conveyor belt type water diverter and a strawbale/filter fabric sediment trap at this site. On a later field trip, an existing culvert was discovered. Rather than install the water diverter, the plan was changed to route road drainage through the existing culvert and install the strawbale/filter fabric sediment trap below the culvert outlet. Five straw bales and filter fabric will be purchased and installed according to specific language contained in any sale agreement.

Harvest Units:

Site #12: Gary Frank, DSL Hydrologist, was initially concerned that planned cutting in Winkler Gulch (Alternative 2) would create excessive water yields.

In response to this concern, and to concerns regarding the costs required to access this timber, a third alternative was developed. This third alternative excludes all cutting (12 acres) on State land within the Winkler Gulch Drainage.

Gary later decided that the planned cutting in Winkler Gulch outlined in Alternative 2 is acceptable given that stream channel stability is good and proposed treatment will only remove approximately 30% of the canopy from 12 acres within this drainage.

DSL Hydrologist, Gary Frank, anticipates no significant hydrologic environmental impacts resulting from this action if all hydrologic recommendations and Best Management Practices are incorporated into the sale plans. All hydrologic recommendations except Site #12 have been incorporated into all action alternatives. Best Management Practices will be applied.

2. Soils: Refer to Exhibit E for specific issues raised by DSL Soil Scientist, Jeff Collins. The issues will be discussed in the same order as they appear in Exhibit E.

   Roads:

   a. Any sale agreement will contain language specifying the installation of drain dips on a spacing recommended for these soils (erosion index 40).

   b. Access Road A: Refer to Hydrology (Site #'s 5 through 9).

   c. Access Road B: Refer to item Hydrology (Site #13).

   Harvest:

   Due to the small area with side slopes less than 45%, all action alternatives require 100% of the timber to be cable yarded.

   DSL Soil Scientist, Jeff Collins, anticipates no significant soils related environmental impacts if all soil recommendations are incorporated into sale plans. All soils recommendations have been incorporated into all action alternatives. Best Management Practices will be applied.

3. Archaeology: DSL Archaeologist, Dori Passmann, completed a review of the sale area for cultural resources (Exhibit F). No sites were recorded within the sale area. The sale agreement contains specific language which protects cultural resources should they be discovered during harvest operations.

4. Wildlife: Refer to Exhibit G. DFW&P's Biologist, Bob Henderson, performed a field review of the sale area. The issues of importance to him are discussed in the order in which they appear in the exhibit.

   a. **Elk and deer winter range value: Bob states that the proposed clearcuts in Alternative 2 (32 acres) would have some negative impacts on elk and deer winter range values. He went on to say that because of the small size of the clearcuts, they would not have any large impacts on these populations.**

      In response to Bob's concerns as well as "in house" budgetary concerns regarding planting, the third Alternative changed the clearcut treatment to overstory removal and seedtree harvest with natural regeneration.

   b. Road closure: All action alternatives include provisions for closing the road system to the general public following logging.

   DFW&P's Biologist, Bob Henderson, anticipates no significant environmental impacts to elk or deer populations resulting from either action alternative, if wildlife recommendations are incorporated in the sale plan. All recommendations have been incorporated into all action alternatives.

5. **Income: Alternative 2 was developed based upon an assessment of the need for treatment of all timber on this State tract. In order to treat this acreage, some areas would required investing more money in new roads than would be received in the harvesting of timber. Additionally, much of this new road would not be on State land. Alternative 3 excludes 50 acres from treatment, in part to address the access problems.**

III. Alternatives

A. Alternative 1 - No Action: This alternative is to conduct no timber harvesting at this time. Implementation would result in the loss of revenue to the School Trust as a result of suppressed tree growth and mortality of overmature trees. Intrinsic to this alternative is the least short term environmental impact. This alternative could have the greatest long term impact due to the increasing potential for catastrophic resource damage (fire and natural pathogens).

B. Alternative 2 - See Exhibit B, Alternative 2 Map: This alternative represents the sale as originally proposed. The emphasis is on sawlog timber production. All stands needing silvicultural treatment to enhance sawlog growth would be treated. Approximately 12,053 feet of new road construction and 12,433 feet of road reconstruction would occur. All mitigation measures discussed in II.C. (except Site #12 - Hydrology; item 4.a. - Wildlife; and item 5 - Income) would be incorporated into this alternative.

This alternative would involve seven cutting units totaling approximately 320 acres. Three units (Units 3, 4 and 5 - 32 acres) would have all sawlog-sized trees harvested. One unit (Unit 6 - 15 acres) would be seedtree cut. Three units (Units 1, 2 and 7 - 273 acres) would be treated by overstory removal and commercial thinning. After harvest, approximately 275 acres would be precommercially thinned.

Estimated volume removed through implementation of this alternative is two million board feet. Estimated return is $300,000.

C. Alternative 3 - See Exhibit C, Alternative 3 Map: This alternative strives to strike a balance between sawlog timber production, economics and environmental/political issues. Approximately 11,063 feet of new road construction and 11,773 feet of road reconstruction would occur. All mitigation measures discussed in II.C. have been incorporated into this alternative.

This alternative involves four cutting units totaling approximately 270 acres. Two units (Units 1 and 2 - 240 acres) would be overstory removal and commercial thinning. Two units (Units 3 and 4 - 30 acres) would be seedtree harvested. After harvest, approximately 235 acres would be precommercially thinned.

Estimated net volume removed through implementation of this alternative is 1.3 million board feet. Estimated return is $200,000.

IV. Environmental Impacts

A. Hydrology:

Cumulative watershed effects: DSL Hydrologist, Gary Frank, has determined that neither action alternative would cause significant short term water yield impacts. No significant cumulative hydrologic effects are anticipated with implementation of either action alternative if all hydrologic recommendations are incorporated into the sale plan. All such recommendations have been incorporated into all action alternatives.

B. Soils:

No soils related problems are anticipated if recommendations and BMP's are followed. All such recommendations have been incorporated into all action alternatives.

C. Wildlife:

1. Cumulative effects: Champion International Corporation has harvested on all four sides of the State land. This harvesting has taken place within the last ten to thirty years. With the implementation of either action alternative, the reduction of security cover and thermal cover will have no significant effect on wildlife according to Bob Henderson.

2. On all action alternatives, access would be controlled by gating and berming road systems.

V. Recommendations

Alternative 3 is the suggested preferred alternative. This alternative was developed through a cooperative effort which included input from DSL foresters, DSL specialists and specialists from DFW&P. Although both action alternatives are acceptable to all specialists, Alterntaive 3 best meets the objectives of all interests.

FISH FORKS TIMBER SALE

RECORD OF DECISION

I have decided in favor of implementation of Alternative 3. This alternative does the best job of both meeting land management objectives and addressing environmental issues associated with the timber harvest proposal. The alternative as proposed, will not cause significant environmental impacts. I find no need for preparation of an Environmental Impact Statement.

Charles E. Wright — Sept. 16, 1992

CHARLES E. WRIGHT
Area Manager
Southwestern Land Office

Date

EXHIBIT A

FISH FORKS TIMBER SALE

VICINITY MAP

N½ Section 26 T14N-R25W

Scale: 0.425" = 1 mile

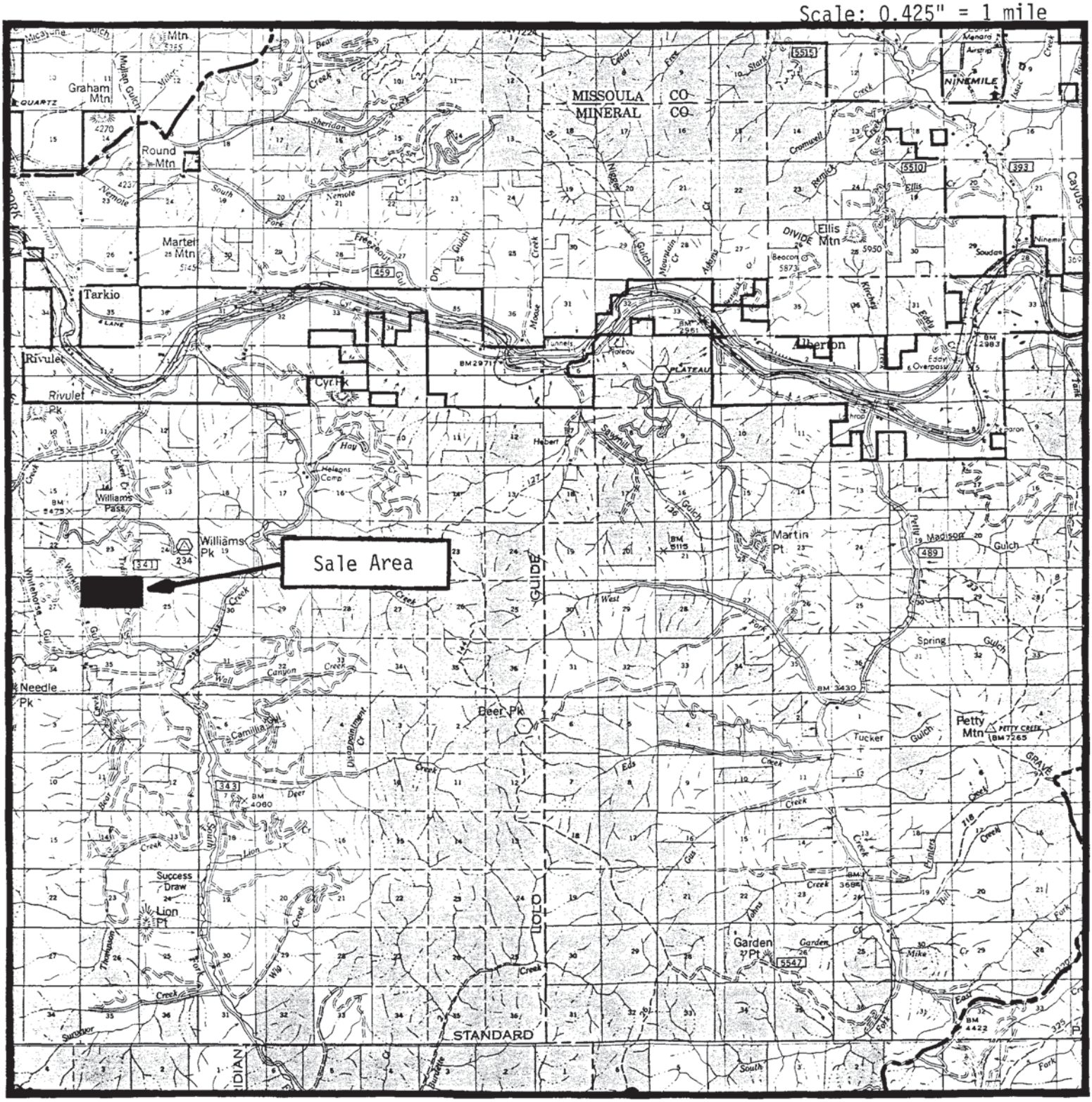


EXHIBIT B

FISH FORKS TIMBER SALE

ALTERNATIVE #2

SECTION 26 T14N R26W

LEGEND

OVERSTORY REMOVAL

SEEDTREE HARVEST

CUT TREE MARK IN SMZ

CLEARCUT

ROAD RECONSTRUCTION

ROAD NEW CONSTRUCTION

N

CONTOUR INTERVAL = 80'

SCALE: 1 MILE = 8"

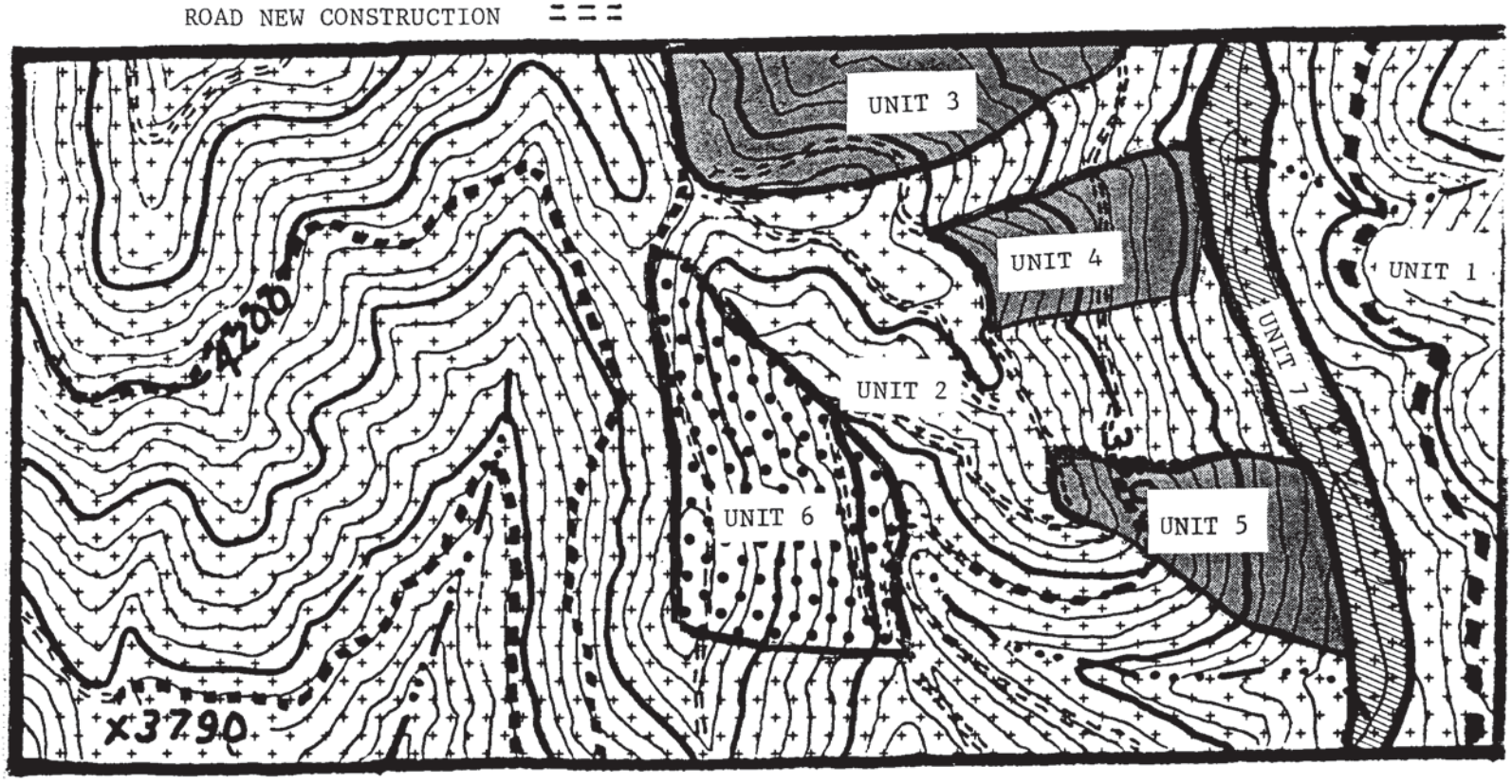


EXHIBIT C

FISH FORKS TIMBER SALE

ALTERNATIVE #3

SECTION 26 T14N R26W

LEGEND

OVERSTORY REMOVAL

SEEDTREE HARVEST

CUT TREE MARK IN SMZ

ROAD RECONSTRUCT

ROAD NEW CONSTRUCT

N

CONTOUR INTERVAL = 80'

SCALE: 1 MILE = 8"

EXHIBIT D

HYDROLOGY REPORTS

SOUTHWESTERN
LAND OFFICE

November 1, 1991

562

TO: CHUCK WRIGHT, AREA MANAGER, SOUTHWEST LAND OFFICE
RAY ERICKSON, UNIT MANAGER, MISSOULA UNIT
PAT FLOWERS, SUPERVISOR, STATE LAND MANAGEMENT
JEFF WILSON, FORESTER, MISSOULA UNIT

FROM: GARY FRANK, HYDROLOGIST GF

SUBJECT: FISH CREEK FORKS TIMBER SALE (SEC 36 T14N R25W).

WATERSHED: The sale area is drained by Trail Creek and Winkler Gulch as well as several smaller first order tributaries to the West Fork of Fish Creek. Most of the proposed harvest area lies with in Trail Creek and an unnamed first order tributary. Approximately 24 acres of States ownership lies within the Winkler Gulch watershed.

WATER USE: There are existing water rights for domestic use (surface water) and irrigation downstream of the sale area.

CUMULATIVE EFFECTS: The Trail Creek drainage was subjected to extensive harvest on private industrial forest land during the 1980's. I completed a water yield analysis using information compiled by the Lolo National Forest in 1989. The results indicate that residual water yield increases are approximately 8% and the proposed sale would increase water yields to approximately 10%. Channel stability in Trail Creek was evaluated and rated as "good". There are no cumulative watershed effects constraints in the Trail Creek drainage.

A water yield analysis was also completed for Winkler Gulch. Winkler Gulch is 2nd order perennial tributary to the West Fork of Fish Creek with a drainage area of approximately 682 acres. The watershed has been extensively harvested in the past. Estimated water yield increases from existing activity are approximately 18%. While this value is high, channel stability is good and there is no evidence of channel scouring or bank failure. The state's proposal is to remove approximately 30% of the canopy from approximately 12 acres. There are no cumulative watershed effect constraint with the states proposal as currently planned.

ROADS: The sale will utilize existing roads for access to the States section. Several miles of new road construction and road reconstruction are proposed to access harvest units within the states ownership (referenced attached map). Site specific recommendations are as follows:

Site #1 Replace the existing 18" CMP with new 18" CMP at location flagged in field. Construct ditch on both sides of inlet catch basin as flagged in field.

Site #2 Re-establish catchment basin and ditch on existing 18" cmp. Construct drive thru dip at adjacent draw crossing.

Site #3 Ephemeral draw crossing on an existing road. Past skidding in draw bottom has made it difficult to determine if a definable stream channel exist. However, there is water seeping immediately above the crossing and it is ponded on the road surface. Install an 18"cmp with a catch basin at its inlet. Construct a ditch back to sideslope on both sides of the catch basin to facilitate drainage.

Site #5 Road switchback with steep grade (12+ %). Install 3 water diverters at locations discussed in the field.

Site #6 Ephemeral draw with no active stream channel. SMZ law is not applicable.

Site #7,8,9 Steep road grade immediately adjacent to ephemeral draw. Install 3 water diverters at location discussed and flagged in the field.

Site #10 New road crossing of an swale or shallow draw bottom. Construct a drive-thru drain dip at this location.

Site #11 Ephemeral draw with no active stream channel. Past skidding has altered the draw bottom making it difficult to ascertain if there originally was a naturally occurring stream channel. It appears that some surface runoff is intercepted by an old skid trail located immediately adjacent to the draw. The trail is inhabited with wet site plant indicators. Install an 18" cmp in draw bottom. Ditch thru adjacent "wet area" (old trail) to CMP inlet.

HARVEST UNITS: The current proposal is to treat most of the States ownership with overstory removal and individual tree selection. Two small clearcut units are also proposed. An SMZ was delineated and marked along Trail Creek and individual trees were selected and marked to cut from within the SMZ. Trees rooted in the streambank were not selected for harvest. The entire sale area including the SMZ will be cable logged.

In one of the previous section of this memo I summarized the results of a water yield analysis on Winkler Gulch. Based on those conclusions, I can recommend that you go ahead with the harvest plans for the 12 acre portion of the unit lying with in the Winkler Gulch watershed (Site #12 on map).

EXHIBIT D

HYDROLOGY REPORTS

FISH CREEK FORKS TIMBER SALE

Existing Road

Reconstruction

New Road

Site Referenced

Clearcut Unit

Overstory Removal

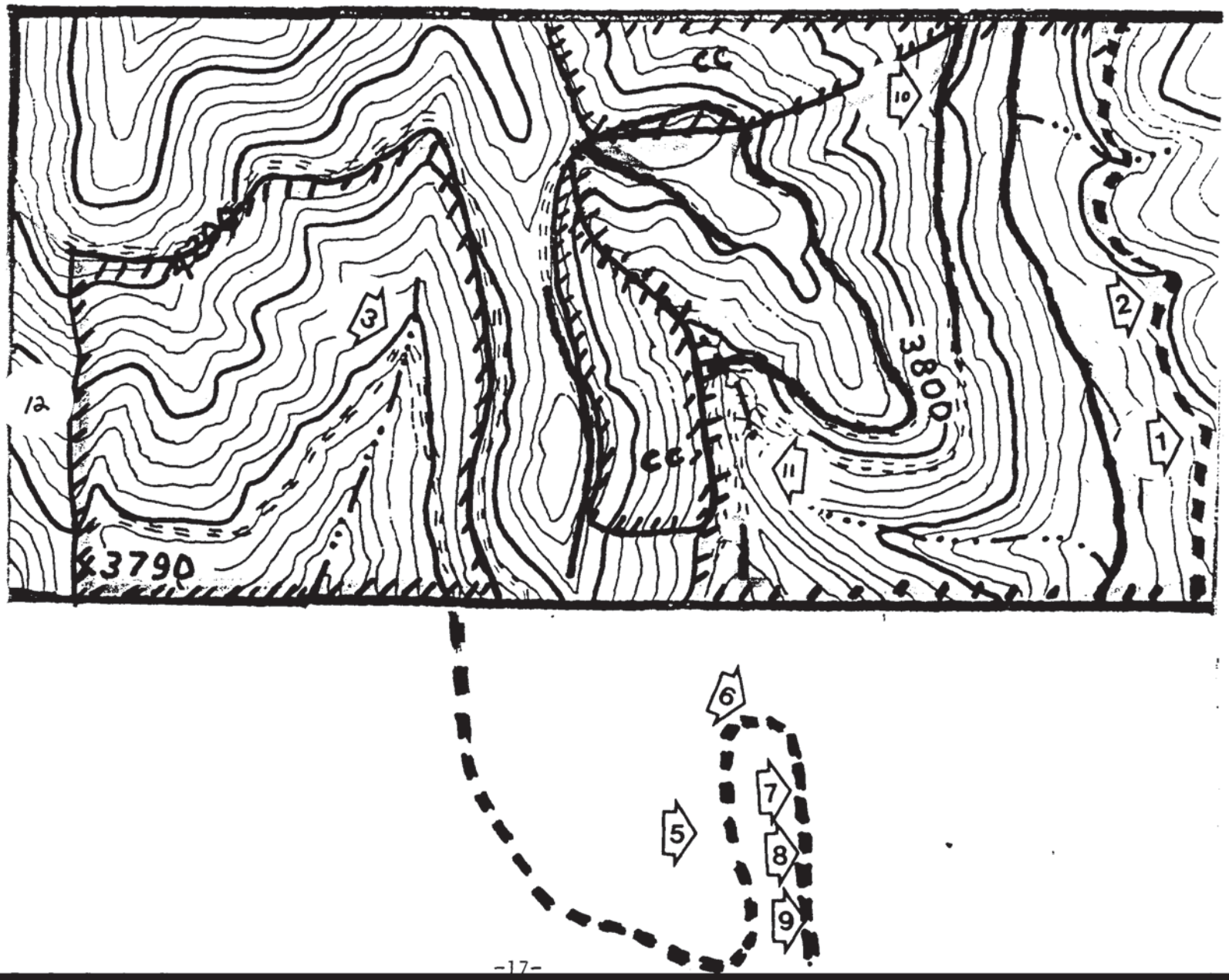


EXHIBIT D

RECEIVED
DEC 06 1991
SOUTHWESTERN
LAND OFFICE

HYDROLOGY REPORTS

December 3, 1991

562

TO: CHUCK WRIGHT, AREA MANAGER, SOUTHWEST LAND OFFICE
RAY ERICKSON, UNIT MANAGER, MISSOULA UNIT
PAT FLOWERS, SUPERVISOR, STATE LAND MANAGEMENT
JEFF WILSON, FORESTER, MISSOULA UNIT

FROM: GARY FRANK, HYDROLOGIST GF

SUBJECT: ADDENDUM TO FISH CREEK FORKS TIMBER SALE WRITE-UP (SEC 36 T14N R25W).

I inadvertently omitted a site from my initial write-up and recommendations for the Fish Creek Forks Timber Sale. Please add this site description with attached map and diagrams to my original report.

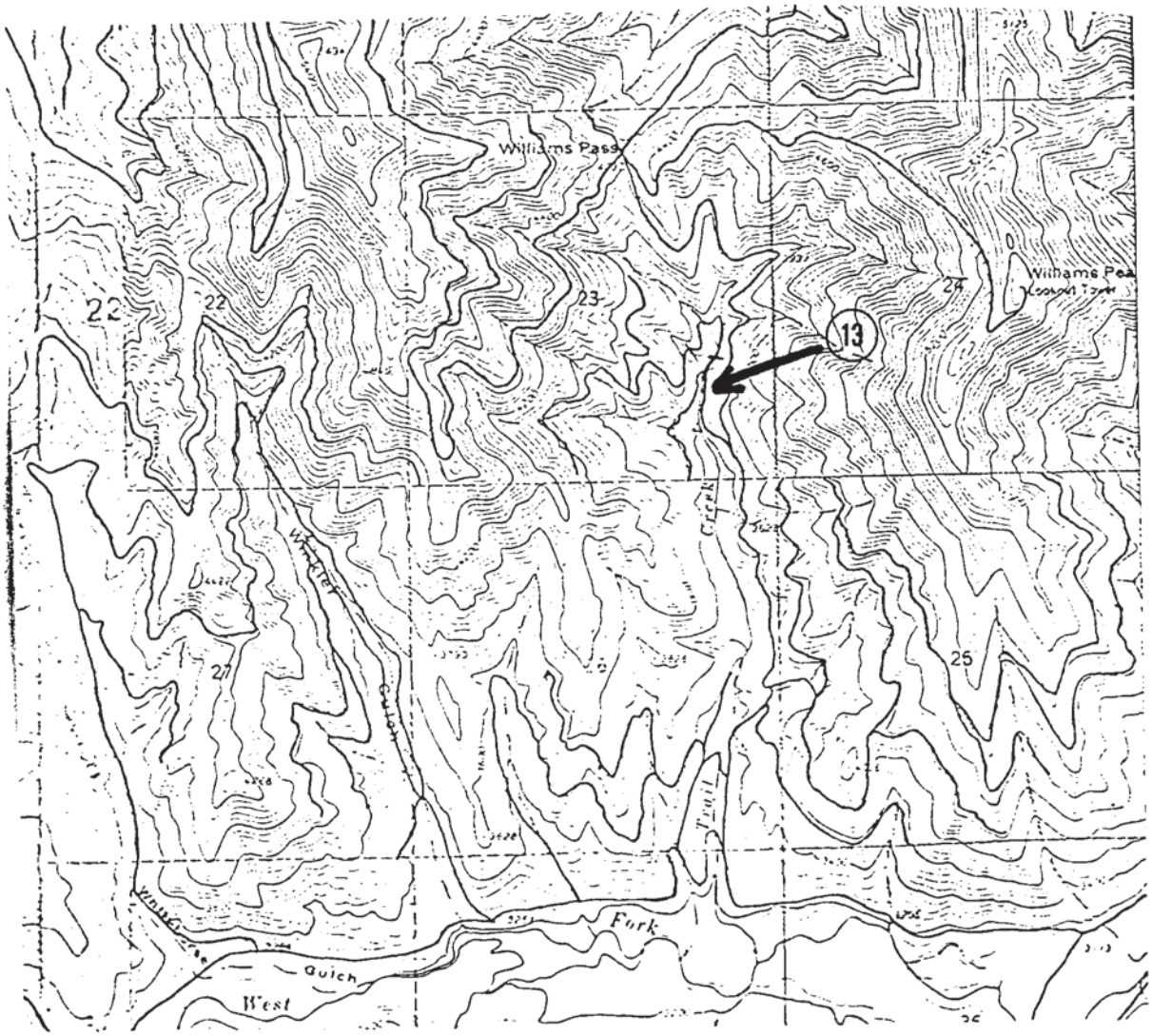
The site (Site #13 on map) is an existing Champion International road located immediately adjacent to a perennial stream channel. This segment of road is also located immediately downstream of a connecting spur road stream crossing. During the field review it was determined that additional road surface drainage was necessary at this location to fully comply with BMP's.

Because of the roads close proximity to the stream, there is no means of providing an adequate buffer to route road drainage. The road drainage structure will have to be installed with a sediment retention structure at its outlet. This is necessary to prevent direct delivery of sediment from the drainage structure (road surface) to the stream.

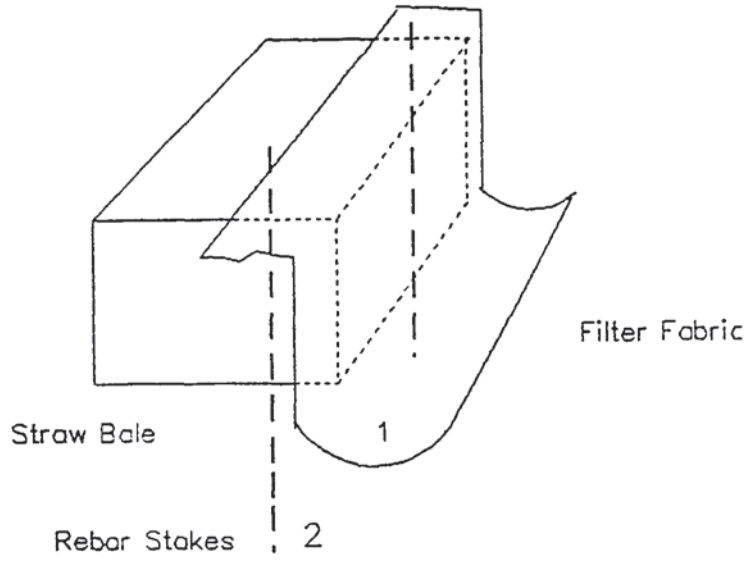
I recommend using a water diverter (conveyor belt type) with a straw bale / filter fabric sediment retention structure constructed at its outlet and below the toe of the fill slope (see attached diagrams).

EXHIBIT D

HYDROLOGY REPORTS

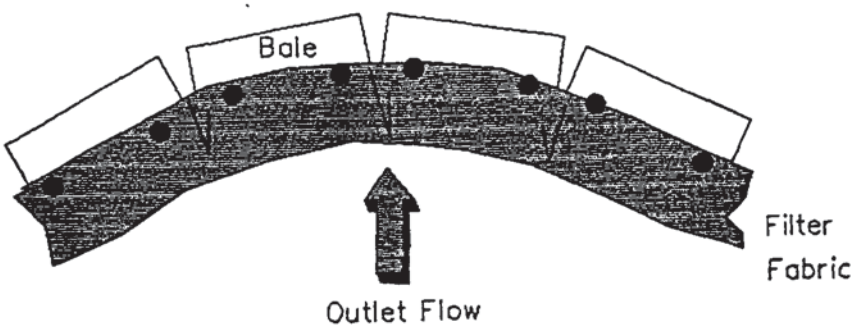


STRAW BALE / FILTER FABRIC SEDIMENT RETENTION STRUCTURE



1 The fabric is to be buried under the ground to prevent water flow under the bales.

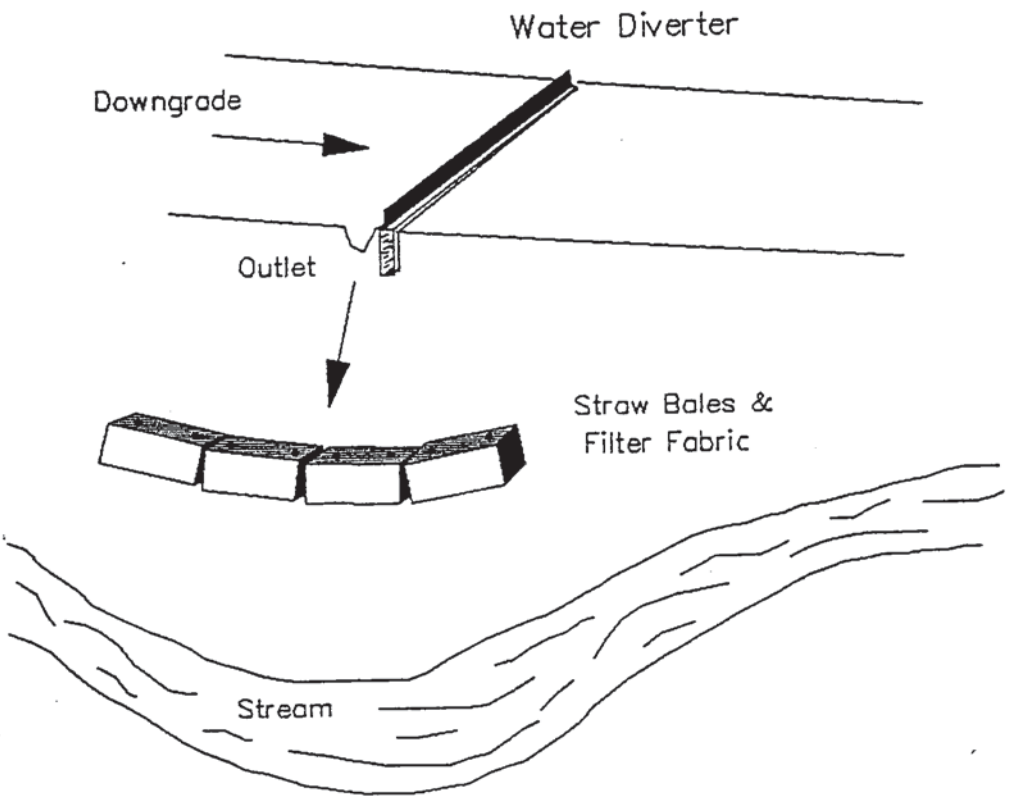
2 Rebar is to be driven thru fabric/bale and at least 12" into the ground. Two stakes per bale.



3 Bales should be arranged in cresent shape below road surface drainage feature.

Straw Bale / Filter Fabric Sediment Trap

Top View



Side View

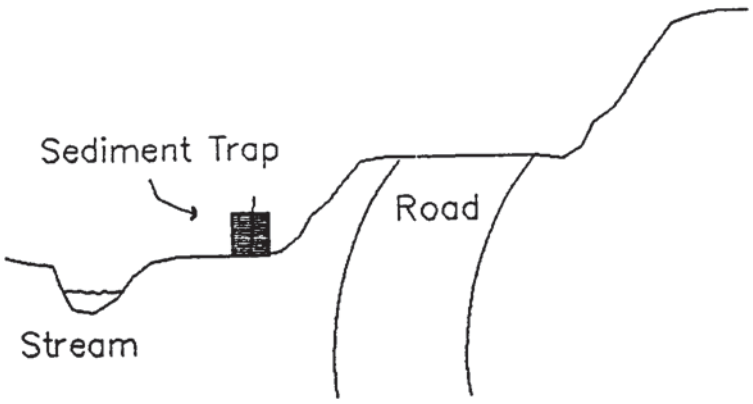


EXHIBIT E

SOILS REPORT

December 22, 1991 552

TO: CHUCK WRIGHT, Area Manager,Southwestern Land Office
PAT FLOWERS, Supervisor,State Land Management Section
RAY ERICKSON, Field Supervisor,Missoula Unit
BOB RICH, Forester,Missoula Unit
JEFF WILSON, Forester, Missoula Unit

FROM: JEFF COLLINS, Soil Scientist JC

SUBJECT: FISH FORKS TIMBER SALE Section 26, T14N, R25W

Soils of the sale area are mainly Nemotte gravelly loams and Tamely similar to the Helean's Camp area. The majority of the sale area will be cable harvested which will reduce effects to soils and water.

Nemotte gravelly loams on the steeper dry slopes and ridges. The coarse textured, Nemotte soils are excessively well drained gravelly sandy loam residual soils weathered from quartzite and argillite. Nemote has a shallow sandy topsoil and is droughty. Main soil concern is avoidin displacement and conserving the shallow topsoils,important for productivity and seedling establishment.

Tamely moderately deep gravelly loams occur on 35-60% slopes on northerly aspects and swales. Tamely soils are generally deeper with a 5-15 in. reddish brown gravelly silt loam, volcanic ash surface over gravelly sandy loams. Tamely soils are more productive than the Nemotte.

ROADS
New road construction and reconstruction will encounter fractured bedrock at shallow depth especially near ridges. The rock is mainly common excavation and minimal ripping is expected to be needed.

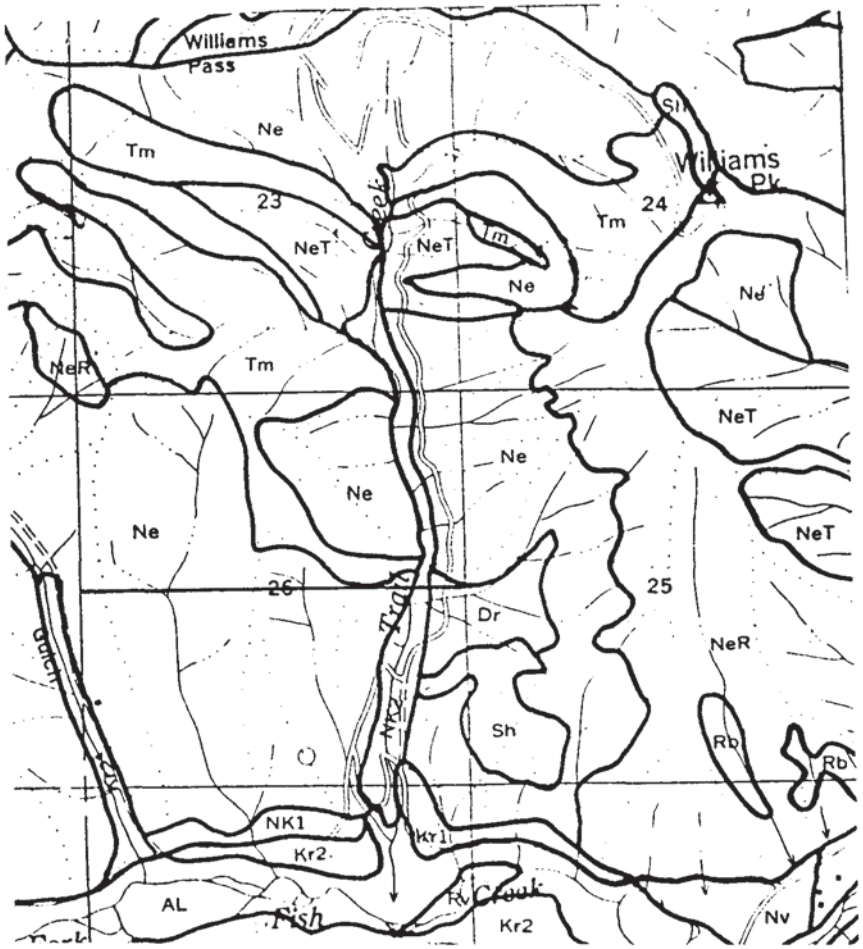
Materials are excellant for road construction and have a moderate erosivity. Install drain dips or waterbars using erosion index of **40.**
Access road **A**- On steep portions of this road drain-dips are not feasible. I recommend installing conveyor belt water deflectors for grades over 10% as discussed in the field.

Existing access Road **B** (refer to map) is adjaecent to creek channel for several 100 feet. Need to install several drainage dips with sediment traps at dip outlets (refer to hydro report).

HARVEST
tractor operations will be limited to slopes less than 45%. The unit locations and harvest methods are well chosen. I do not expect any significant soils related problems if recommendations and BMP's are followed.

EXHIBIT E

SOIL MAP · FISH FORKS



SOILS REPORT

Ne — Nemote soils, 35 to 90 percent slopes
NeR — Nemote-Rock outcrop complex, 35 to 90 percent slopes
NeS — Nemote-Sharrott association
NeT — Nemote-Tamely association
NK1 — Nevine-Krause association, gently sloping
NK2 — Nevine-Krause association, gently rolling
NK3 — Nevine-Krause complex, 8 to 35 percent slopes
Tm — Tamely soils, 35 to 65 percent slopes
Tmc — Tamely soils, cold, 15 to 65 percent slopes
TmR — Tamely-Rock outcrop complex, 35 to 90 percent slopes

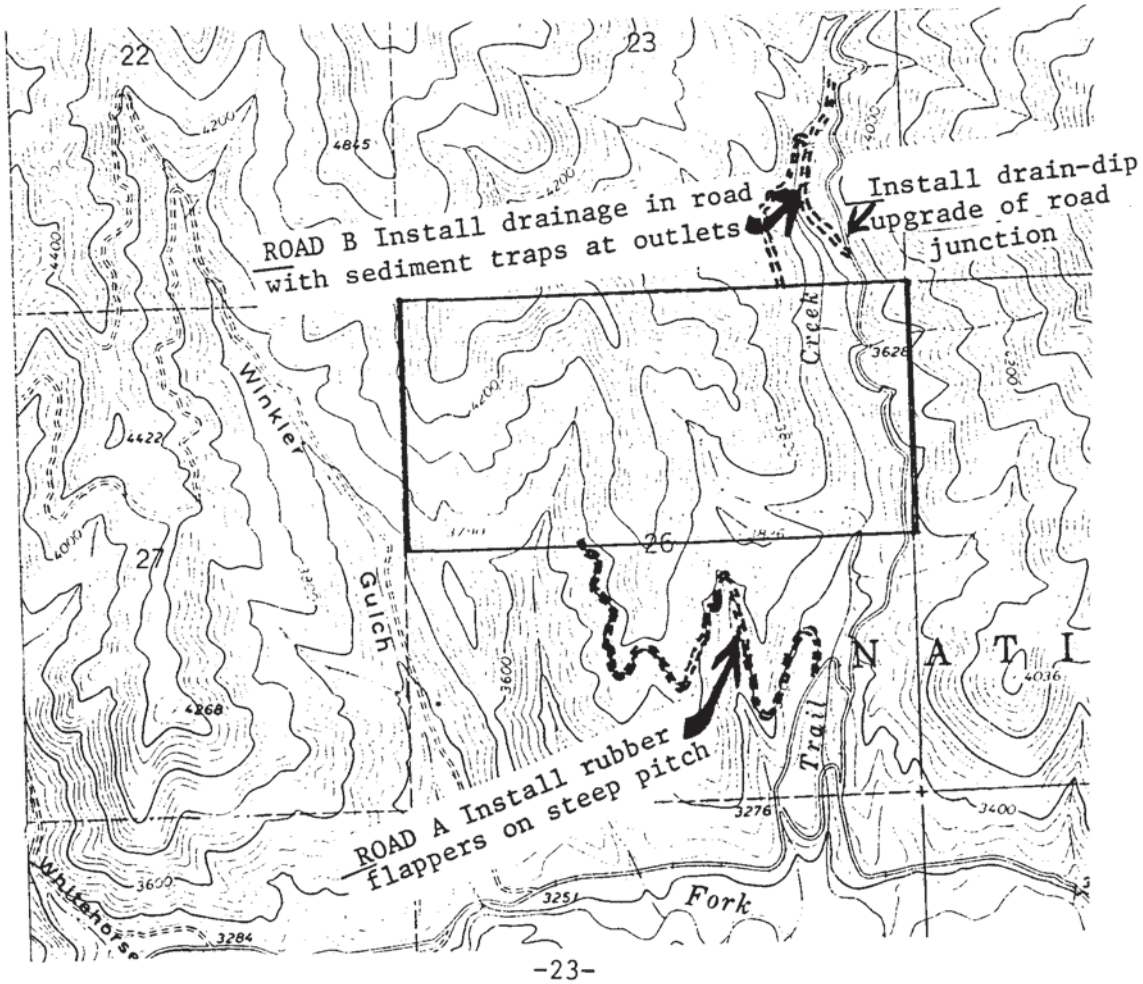


EXHIBIT F

ARCHAEOLOGY REPORT

DEPARTMENT OF STATE LANDS

STAN STEPHENS, GOVERNOR

CAPITOL STATION

STATE OF MONTANA

(406) 444-2074

1625 ELEVENTH AVENUE
HELENA, MONTANA 59620

September 11, 1991

MEMORANDUM

TO: Jeff Wilson, Forest Management Tech, Missoula Unit, SWLO

From: Dori Passmann, Archaeologist, Surface Management Section

RE: Fish Creeks Timber Sale
26-14N-25W N/2
6-13N-24W SE/4

Section 6 is steep slopes, a topographic feature unlikely to contain significant cultural properties.

Section 26 contains Trail Creek, an area of cultural concern. In our conversation of this sale you indicated that the drainage is narrow and steep sided. Therefore the area is unlikely to contain significant cultural properties.

This sale has cultural clearance. Please let me know if I can be of further assistance.

"AN EQUAL OPPORTUNITY EMPLOYER"

Montana Department of Fish, Wildlife & Parks

3201 Spurgin Road
Missoula, Montana 59801
June 18, 1991

Jeff Wilson
Department of State Lands
Southwest Lands Office
2705 Spurgin Road
Missoula, MT 59801

Dear Jeff:

Thank you for taking me out to look at the proposed Fish Forks Timber Sale in Sec. 26, T14N, R25W.

The sale area includes both elk and deer winter range values. The overstory removal units will have little effect on either the forage or cover requirements of these species. The clearcut units will cause some reduction in thermal and hiding cover components of the winter range. The limited size of those units should not have any large impacts on those populations.

The sale area lies within a FWP management unit that emphasizes the carryover of mature bull elk. Bulls become increasingly vulnerable during hunting seasons in which cold weather and early snow force them to low elevation winter ranges. To decrease that vulnerability I would recommend that you close the roads accessing this area, as soon as your operations are completed.

Thank you very much for your consideration.

Sincerely yours,

Bob Henderson
Wildlife Biologist

BH/pm

EXHIBIT H

FISH FORKS TIMBER SALE

TIMBER STAND MAP

N½ Section 26 T14N-R25W

Legend

TIMBER STAND BOUNDARY

SILVICULTURAL PRESCRIPTION

SALE NAME: Fish Forks DATE: 10-10-91

TWP: 14N RG: 25W SEC: 26 UNIT: MSO PREPARED BY: Jeff Wilson

Aspect: E, NE Stand: 1 & 4 Ac: 15 & 15 Unit #: 3 & 4 Ac: 15 & 15

Slope: 40-60%
Ave. Elevation: 3850
Range: 3700-4100
Soils/Parent Material: Tamely soils
Habitat Type(s): ABGR/LIBO/Libo
Productivity: High, Class II
Management Objectives: Timber Production

DESCRIPTION OF EXISTING STAND:

These stands were harvested in the early 1950's. The harvest at that time removed only the largest and best of the trees on the site. The current stands are very heterogeneous with the lower 1/3 of the slope having a major portion made up of Grand fir. Moving up the slope, the stands gradually change to Douglas-fir and lodgepole pine on the middle 1/3 of the slope. Finally, on the upper 1/3 of the slope, the stands change to a ponderosa pine and a western larch species mix. The large dominant trees on the site are of poor quality and appear to produce light seed crops. Underneath is a very suppressed pole or small sawlog size class. This size class shows very little or no growth. There are a few small openings present with regeneration present. Overstory -- 40% DF, 40% LP, 10% GF, 10% WL, T-PP.
Understory -- 40% DF, 30% GF, 30% LP.

TARGET STAND AND SILVICULTURAL PLAN:

Target Stand Description: These stands are not manageable in their present condition. A seed tree system will be applied. The target stands should be 40% DF with 60% WL and PP. Five years after logging, check to be sure the site is regenerated.

Structure: Even-aged

Species Composition: 50% DF, 50% WL

Silvicultural Objectives:

Constraints: Cable logging required.

Regeneration discussion: Will take advantage of existing patches of regeneration in Stand 4. Natural regeneration planned in unstocked areas. Will need to conduct regeneration surveys.

Management plan:

Calendar Year	Rotation Year	Treatment
1992	0	Seedtree - Harvest
1993	1	Evaluate need for underburning in Stand 1.*
1993	1	Precommercially thin Stand 4.
1994	2	Evaluate natural regeneration.

PRESCRIBED TREATMENTS:

Treatment	Acres	Est Cost Per Acre	Est Total
Seedtree Harvest	30		
Construct hand fireline - Stand 1*	35 chains	$40/chain	$1,400
Underburn - Stand 1*	15	$125/acre	$1,875
Precommercial thin - Stand 4	15	$75/acre	$1,125
Lopping	30	$25/acre	

IMPLEMENTATION NOTES:

* We need to evaluate the need for the fireline and underburn in Stand 1 following harvest.

SILVICULTURAL PRESCRIPTION

SALE NAME: Fish Forks DATE: 12-03-91

TWP: 14N RG: 25W SEC: 26 UNIT: MSO PREPARED BY: Jeff Wilson

Aspect: E, SE, S Stand: 2 & 3 Ac: 88 & 86 Unit #: 1 & 2 Ac: 88 & 69

Slope: 40-65%
Ave. Elevation: 3900
Range: 3500-4500
Soils/Parent Material: Nemote
Habitat Type(s): PSME/PHMA/Phma
Productivity: Moderate Class III
Management Objectives: Timber Production

DESCRIPTION OF EXISTING STAND:

These stands were harvested in the early 1950's. The harvest at that time took only the finest trees out of these stands. The current stands are very heterogenous with mature DF and PP being the main components of the overstory. These stands are very similar to Stands 5 and 6, however, they do not have the areas of overmature trees with no regeneration present.

TARGET STAND AND SILVICULTURAL PLAN:

Target Stand Description: These stands can be managed by altering their current structure. An overstory removal system will be applied. Remove the overstory (over mature trees). In most parts of these stands there is ample understory to keep the site well stocked. During the harvest, thin the small sawlog class to a 17 x 17 foot spacing. After harvest, precommercial thin the existing sapling size class to a 12 x 12 foot spacing. The thinning (both commercial and precommercial) should favor PP, DF & WL. The ideal target stand would be 30% DF, 30% PP, 30% WL & 10% LP.

Structure: Even-aged (3 layered)

Species Composition: 30% DF, 30% PP, 30% WL, 10% LP & GF

Silvicultural Objectives:

Constraints: Cable logging required.

Regeneration discussion: Adequate regeneration present.

Management plan:

Calendar Year	Rotation Year	Treatment
1992	0	Overstory removal and commercial thin.
1993	1	Precommercial thin.

PRESCRIBED TREATMENTS:

Treatment	Acres	Est Cost Per Acre	Est Total
OSR			
Precommercial thin	157	$75/acre	$11,775
Lopping	157	$25/acre	

IMPLEMENTATION NOTES:

Approximately 17 acres of Stand 3 will not be treated at this time due to poor access conditions and wildlife concerns.

SILVICULTURAL PRESCRIPTION

SALE NAME: Fish Forks DATE: 4-2-91

TWP: 14N RG: 25W SEC: 26 UNIT: MSO PREPARED BY: Jeff Wilson

Aspect: W, NW, SW Stand: 5 & 6 Ac: 36 & 37 Unit #: 1 & 2 Ac: 31 & 31

Slope: 40-60%
Ave. Elevation: 3800
Range: 3440-4240
Soils/Parent Material:
Habitat Type(s): PSME/PHMA/Caru
Productivity: Moderate Class III
Management Objectives: Timber Production

DESCRIPTION OF EXISTING STAND: These stands are very heterogeneous. The Northwest aspects have an overstory of PP & DF with a very thick understory of 70% DF and 30% PP. The Southwest aspects have old growth yellow pine with no understory. The age of the overstory on all aspects is 130+ years with some trees having growth rings too close to count.

TARGET STAND AND SILVICULTURAL PLAN:

Target Stand Description:

Structure: Even-aged (3 layered)

Species Composition: 60% DF, 40% PP

Silvicultural Objectives: Remove overstory and commercially thin where small sawlog sized treees occur.

Constraints: Cable skidding required.

Regeneration discussion: Regeneration is overstocked 30 year old saplings which will need precommercial thinning.

Management plan:

Calendar Year	Rotation Year	Treatment
1992	0	Overstory removal and commercial thin
1993	1	Precommercial thin

PRESCRIBED TREATMENTS:

Treatment	Acres	Est Cost Per Acre	Est Total
OSR (Cut tree mark) remove the old stagnated overstory. Thin the small sawlog size timber that is in bunches to a 17' x 17' spacing.			
Precommercially thin to a 12' x 12' spacing favoring the Ponderosa pine, Western Larch.	62	$75/acre	$4,650
Lopping	62	$25/acre	

IMPLEMENTATION NOTES:

Approximately 11 acres of these stands will not be treated at this time due to access constraints and wildlife concerns.

SILVICULTURAL PRESCRIPTION

SALE NAME: Fish Forks DATE: 3-19-92

TWP: 14N RG: 25W SEC: 26 UNIT: MSO PREPARED BY: Jeff Wilson

Aspect: Flat Stand: 7 Ac: 21 Unit #: 1 Ac: 21
Slope: 0%
Ave. Elevation: 3500
Range: 3400-3740
Soils/Parent Material: Nevine/Krause Association
Habitat Type(s): THPL/Clun
Productivity: High Class II
Management Objectives: Timber Production

DESCRIPTION OF EXISTING STAND: This stand is a stringer of timber along Trail Creek. The overstory is uneven-aged and a mix of most species found on wet sites in Western Montana. All age classes and size classes are present. The overall stand condition is poor and stagnated.

TARGET STAND AND SILVICULTURAL PLAN:

Target Stand Description: The stand on this site is manageable, but must have a sanitation cut performed on it. The target stand should have a good mix of all species and size classes;however, some trees that would normally be cut must be left due to the SMZ law. This stand should be managed on an uneven-age basis.

Structure: Uneven-aged

Species Composition: 15% WRC, 15% DF, 15% GF, 15% PP, 15% LPP, 15% Spruce, 10% Other.

Silvicultural Objectives:

Constraints: SMZ law applies. Cable logging required, directional falling away from the stream. Shade required over stream. No operation of equipment in SMZ.

Regeneration discussion: Although regeneration is too thick, in order to protect watershed values, the area will not be treated. TSI money should be spent on areas where there will be a greater return on investment.

Management plan:

Calendar Year	Rotation Year	Treatment
1992	0	Overstory removal/selection harvest

PRESCRIBED TREATMENTS:

Treatment	Acres	Est Cost Per Acre	Est Total
OSR	21		
Lopping	21	$25/acre	

IMPLEMENTATION NOTES:

FISH FORKS TIMBER SALE

BRUSH/TSI PLAN

Sections 26 T14N - R26W

Unit 1	(140 acres)	Overstory removal	
	(119 acres)	Precommercial thinning @ $75.00/acre	= $ 8,925.00
	(140 acres)	Lopping @ $25.00/acre	= $ 3,500.00
Unit 2	(100 acres)	Overstory removal	
	(100 acres)	Precommercial thinning @ $75.00/acre	= $ 7,500.00
	(100 acres)	Lopping @ $25.00/acre	= $ 2,500.00
Unit 3	(15 acres)	Seed tree cut	
	(15 acres)	Broadcast underburn* @ $125.00/acre	= $ 1,875.00
	(35 chains)	Handline* @ $40.00/chain	= $ 1,400.00
	(15 acres)	Lopping @ $25.00/acre	= $ 375.00
Unit 4	(15 acres)	Seed tree cut	
	(15 acres)	Precommercial thinning @ $75.00/acre	= $ 1,125.00
	(15 acres)	Lopping @ $25.00/acre	= $ 375.00
TOTALS			
	(234 acres)	Precommercial thinning @ $75.00/acre	= $17,550.00
	(15 acres)	Broadcast underburning @ $125.00/acre	= 1,875.00
	(35 chains)	Handline @ $40.00/chain	= 1,400.00
	(270 acres)	Lopping @ $25.00/acre	= 6,750.00
			$20,825.00

* The broadcast underburning and the handline will be evaluated after harvest operations are complete. They may or may not need to be done.

BRUSH AND TSI COST APPRAISAL SUMMARY

Timber Sale: Fish Forks

Estimated Volume: 1.298 MMBF

BRUSH / TSI

ITEM	SALE AGREEMENT	DOZER RENT	CONTRACTED SERVICES	FTEs	TOTAL
Broadcast Underburning (15 acres)				$1,875	$1,875
Precommercial Thinning	0		$17,550		$17,550
Handline (35 chains)				$1,400	$1,400
Lopping (270 acres)	$6,750				$6,750
TOTALS	$6,750 0		$17,550	$3,275	$10,025 $17,550
				Total of Non-Sale Agreement Items	