FILE NO. 016.4

ENVIRONMENTAL ASSESSMENT COVER SHEET

DS-251

APPLICANT Department of State Lands

TYPE OF OPERATION Hoffman Gulch Timber Sale

LOCATION N½ Section 16, T8S, R7W

PERSON PREPARING EA Rick Strohmyer/Dillon Unit Forester

( ) DRAFT EIS
(X) NO DRAFT EIS

DATE PREPARED 3-9-92 EXPECTED IMPLEMENTATION DATE 7/1/92

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

REVIEWED BY _____ RECOMMENDATION ( ) DRAFT EIS (X) 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 page 24	
4. WATER; Quality, quantity, distribution					See Hydrologist Report pg.18	
5. AIR; Quality					X	X

PHYSICAL ENVIRONMENT(cont)	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 * page 26	X
2. VEGETATION; quantity, quality, species					X	X
3. AGRICULTURE; grazing, crops, production					X	X

*NOTE Streamside Preservation Act page 27

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(cont)	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 Archaeologist Report page 30	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)

Page 3 of 3

Table of Contents

	Page
EA Cover Sheet	1 - 3
Project Summary	
A. General Description	4
B. Issues and Concerns	5
C. Alternatives Considered	7
D. Individuals Consulted	9
Silvicultural Prescription	
Unit 1	10 - 11
Unit 2	12 - 13
Unit 3	14 - 15
Marking Guides	16 - 17
Specialists' Reports	
Hydrology	18 - 23
Soils	24 - 25
Wildlife	26
Stream Preservation Act "124" Permit	27 - 29
Archaeology	30
Road Appraisal	31 - 33
Temporary Easement	34 - 36
Noxious Weed Management Plan	37
Maps	
Sale	38
Vicinity	39

A. Project Summary

1. General Description

The Hoffman Gulch Timber Sale is located in Section 16, T8S, R7W, approximately 10 air miles southeast of Dillon, Montana. This state classified grazing section includes 640 acres isolated in the Sweetwater Hills among both private and scattered federal (BLM) ownerships. Timber is found along the Sweetwater Hills on northern aspects and has been selectively harvested in close proximity to this proposed harvest by private landowners and the BLM. Commercial forest land comprises 158 acres of this parcel. Non-commercial forested land amounts to 30 acres with the balance of the parcel being rangeland.

State Section 16 has 188 acres of timber located primarily on moderately steep north facing slopes (30-55%). The state forested acreage is part of a block of an estimated 1800 acres of timber situated on federal (BLM), private and state ownership. Approximately 80 acres of privately owned timber was harvested 15 to 20 years ago directly east and adjacent to the proposed harvest. Also the BLM harvested 120 acres directly north of this proposed harvest. Both of these entries were individual tree selection harvests with approximately 40 to 50% crown cover remaining intact. There are currently no additional plans to conduct harvest activity on any of the adjacent ownerships.

The timber on the State ownership consists primarily of Douglas fir with additional components of lodgepole pine and spruce distributed throughout the parcel.

Stand #1 consists of 78 acres of an overmature dominant Douglas Fir overstory (200+ years) that are possibly remnant seed trees of an entry of approximately 80 to 100 years past. An intermediate codominant Douglas Fir, lodgepole pine second growth component is also present and is predominantly stagnated and unmerchantable. Spruce is scattered throughout the stand on microsites associated with areas having a shallow water table. This intermediate stand component is 80+ years old. The site productivity is described as low to moderate as indicated by the PSME/CARU habitat type.

Stand #2 consists of 2 acres of primarily overmature dominant Douglas Fir overstory (200+ years old) with a stagnated intermediate component (80+ years old). This stand is bordered by perennial stream channels that will require road bed stream crossings on the east and west sides of the unit. The site productivity is generally low as indicated by the PSME/ARCO habitat type.

Stand #3 is very nearly a repeat of the conditions presented in Stand #1 with the structure, age classes, and conditions being identical. The stand size is 24 acres.

This proposed harvest would result in the cutting of an estimated 304 MBF of primarily overmature and intermediate Douglas Fir, lodgepole pine and spruce from 3 individual units composed of 104 total acres. An estimated total of 7500 feet of new road construction will be required to access the harvest units.

The access to the sale area is from the Sweetwater Road across land owned by Art Christensen. Temporary road use agreements have been secured from this landowner. The road is not open to public use due to established landowner gate access on the Christensen ownership. The road is of a low standard and will be used with minimal development for this low volume sale. At the landowner's request, all permanently established erosion developments on the temporary easement across private ownership will be developed and maintained by only the landowner. This arrangement was made as a requirement of our temporary access arrangements and has been allowed for through compensation in the signed easement agreement. The lessee, Ron Benson, has also been notified of these developments regarding this leased parcel and has expressed his agreement.

B. Issues and Concerns

Issues and concerns were determined by input solicited from Department of State Lands (DSL) staff, other agency specialists, the DSL lessee, adjoining landowners, and the public.

1. Hydrology and Soils

The sale area was reviewed in the field by DSL hydrologist, Gary Frank and soil scientist, Jeff Collins. Their concerns deal with water quality

protection and possible soil displacement. Several sagponds are located within Units #1 and 2 and equipment use around and through them will be only on designated skid trails and during snow-covered frozen winter conditions. Streamside Management Zone (SMZ) locations on the east and west boundaries of Unit #2 will be developed per guidelines established in the hydrologist's report. A sediment filtration strip will be developed along the east side of Unit #2 where the roadbed crosses the existing stream at the preferred location but on a steep grade approach on a steep slope, per guidelines recommended in the soil specialist's report. A "124" permit has been obtained for culvert installation. No significant cumulative effects are anticipated from this sale.

2. Wildlife

A field review of the sale was conducted by Bob Brannon, Wildlife Biologist, Montana Department of Fish, Wildlife and Parks (MDFW&P). He expressed, through his Regional Supervisor Robert Martinka, concern for loss of elk security during hunting season and thermal cover during winter. There was also concern expressed that little regeneration would develop after this proposed harvest. The DFW&P recommends in their response that, due to these concerns, an alternative to consider would be to perform a more intense harvest in Unit #1 and defer harvest of Units #2 and #3.

3. Cultural Resources

The DSL archaeologist Dori Passman determined that there are no known sites in the area, and inventory is not required. If, during any operations on the sale area a cultural resource is found, all operations in the vicinity of the resource will be stopped immediately and the DSL archaeologist will be contacted for further evaluation.

4. Noxious Weeds

Both landowner and lessee have pursued weed eradication vigorously in the past and this effort is reflected by the fact that no noxious weed presence is readily apparent on either the private ownership or the leased parcel. Herbicide will be provided to the landowner as agreed to in the temporary access agreement to assist in maintaining his eradication program on areas along the R/W route.

All areas disturbed by road construction or road reconstruction and all landings will be seeded to grass. A weed management plan has been filed with the Beaverhead County Weed Board.

C. Alternatives Considered

1. The harvest of additional volume under an even-aged and/or a more intensive uneven-aged entry system was considered. This alternative would have harvested an additional 100 to 150 MBF of timber and provide an estimated $5000.00 to $15,000.00 of immediate income to the School Trust. However, this alternative was not selected due to wildlife, aesthetic, soils, and hydrologic cumulative effect considerations.

   Wildlife security values would be reduced for 10 to 20 years until tree regeneration could develop to heights of 6 to 12 feet. The DSL Elk Winter Range Guidelines would be exceeded. Soil and hydrology values would be compromised due to the additional disturbance of soil and water table locations by a comprehensive site development. Aesthetic values would be reduced due to the rather prominent visual location of the parcel in the Sweetwater Hills southeast of Dillon.

2. The harvest of approximately 304 MBF from Units 1 and 2 was considered. Immediate income to the School Trust would be slightly increased due to reduced road construction cost, although future development costs would be increased. Future income from Stand #3 would be decreased due to losses from mortality and growth stagnation. This alternative was recommended by MDFWP for elk winter range/security. The viewshed from Dillon would be impacted since heavy harvesting would make these units highly visible. Soil creep could occur in Unit #1 with heavy removal of vegetation that is currently helping hold soil in place.

3. The preferred alternative will harvest approximately 304 MBF of timber and produce an estimated income of $16,600.00 to $33,200.00 to the School Trust. The overall health and vigor of the timber values on the parcel will be enhanced and provide long term benefit to soils, hydrology, and wildlife.

   Aesthetic disturbance will be minimal due to road and harvest unit placement and the individual tree selection method of harvest. Soil and hydrology disturbance also will be minimized due to theforementioned items. The harvest systems (even and

uneven-aged) will maintain security and thermal cover for elk and other wildlife. 45% of the DSL ownership would remain unharvested, meeting DSL's Elk Winter Range Guidelines. Additional security cover would be left in the units since all unmerchantable, and some merchantable timber would remain after individually marked trees are harvested. There is no legal public access for General Recreational Use to this tract. Of the 1800 acres of timber in the analysis area, cutting 104 acres of DSL will bring the total area harvested to 304 acres, or 16%, leaving 84% of the area in undisturbed security/thermal cover.

4. The no action alternative would result in a loss of immediate and long term income to the trust. The majority of the trees being harvested are overmature and decadent. Minimal additional growth could be anticipated on these trees should harvest be delayed. Codominant trees that are currently overstocked would produce less future volume than the preferred alternative because thinning could not be conducted without a considerable investment of TSI funds. The opportunity for weed infestations would be less because additional road construction would not occur.

No significant impacts will occur as a result of the selected alternative and further analysis is not required.

D. Individuals Consulted

Benson, Ron, Dillon, Montana, Adjacent Landowner and Lessee

Branine, Allan, Forester, Central Land Office, Montana Department of State Lands, Helena, Montana

Brannon, Robert D., Wildlife Biologist, Montana Department of Fish, Wildlife & Parks, Sheridan, Montana

Christensen, Art, Box 186, Dillon, Montana, Adjacent Landowner

Collins, Jeff, Soil Scientist, Montana Department of State Lands, Forestry Division, Missoula, Montana

Egan, Tim, Forester, Dillon Unit, Montana Department of State Lands, Dillon, Montana

Frank, Gary, Hydrologist, Montana Department of State Lands, Forestry Division, Missoula Montana

Harry, Lee, Silviculturist, Beaverhead National Forest Supervisor's Office

Jordan, Larry, BLM Resource Manager, Dillon BLM Resource Area, Bureau of Land Management, Dillon, Montana

Oswald, Richard A., Fisheries Manager, Montana Department of Fish, Wildlife & Parks, Dillon, Montana

Passman, Dori, Archaeologist, Resources Development Bureau, Helena, Montana

Vlahovich, Stan, Unit Manager, Dillon Unit, Montana Department of State Lands, Dillon, Montana

Williams, Garry, Forest & Lands Program Manager, Central Land Office, Montana Department of State Lands, Helena, Montana

TWP: 8S RG: 7W SEC: 16 STAND: 1 AC: 78 Date: 2/4/92
Aspect: N STAND: AC:
Slope: 10 to 50% STAND: AC: Prepared by: R.STROHMYER
Avg. Elevation: 7300' STAND: AC: Unit: DILLON
range: 600' STAND: AC:
Parent material/soils: SHALLOW HEAVY SILTY GRAVELLY LOAM OVER BEDROCK
Habitat type(s): PSME/CARU
Productivity: LOW TO MODERATE Management Objective: TIMBER MANAGEMENT

DESCRIPTION OF EXISTING STAND:
This existing stand is primarily composed of a mix of overmature old growth overstory Douglas fir & a stagnated intermediate commercial & non-commercial DF & LPP understory. The overstory is approximately 120+ years with the intermediate understory variable between 80 to 120 year groups.

INSECTS/DISEASE: Evidence points towards significant spruce budworm activity in the recent past but currently it seems to be limited. Spruce bark beetle mortality is also present on the parcel.

CONSTRAINTS: Shallow soils may be contributing to soil creep & a perched water table requiring use of designated skid trails & winch lines only. Wildlife - elk winter range considerations require limited entry & a light sanitization-selection harvest to preserve security cover & thermal cover during hunting season & the winter period. Harvest season will be limited to winter snow-covered, frozen conditions.

Due to the accumulation of decadent, unmerchantable material, a considerable amount of slashing will be required by hand to integrate the harvest with elk security & hydrologic concerns.

TARGET STAND -- Structure: UNEVEN-AGED
Species composition: 48% DF, 13% ES, 39% LPP
Conditions @ age: 80-120 yr. TPA: 54 Crown ratios: 30-50% Min. % stocked: 70%
Comm. thin @ age: 65 yr. Stocking (BA or SDI): 300 Avg. DBH: 10"
Harvest @ age: 120 yr. Stocking (BA or SDI): 300 Avg. DBH: 14"
Harvest method: TRACTOR WITH DESIGNATED SKID TRAILS
Regeneration period: UNEVEN-AGED MANAGEMENT - INDEFINITELY
Other targets: Sanitation/cull tree thinning to release merchantable residual & long term selection harvest - uneven-aged management.

ANALYSIS -- Does stand currently meet target conditions: NO
Can existing stand be managed to meet target conditions: YES

DISCUSSION: Through sanitation/selection harvest of overmature & mature DF, LPP, & ES this stand can be managed indefinitely. Elk security & winter range considerations will be addressed as well as hydrologic & slash accumulation concerns by exclusive use of designated skid trails throughout the unit during the harvest & limiting harvest to snow-covered, frozen winter conditions.

(continued)

PRESCRIBED TREATMENTS	ACRES	EST.COST PER ACRE	EST.TOTAL COST	EST.DATE
:-select harvest of mature & overmature DF, ES, LPP	78	N/A	N/A	May 1992
:-spot machine pile	78	25.38	1979.64	1994-95
:-REHAB skid trails, landings, fencelines along south & east unit boundaries - windrows &/or fence	20	60.00	1200.00	1994-95
:-slashing, unit inaccessable to machine pile operations	60	150.00	9000.00	1994-95
:-sanitation thinning & cull tree removal	78	60.00	4680.00	1994-95
:-burn machine & landing area	78	6.00	480.00	Oct.1995
:-selection harvest & commercial thinning	78	N/A	N/A	2047

IMPLEMENTATION NOTES:

TWP: 8S RG: 7W SEC: 16 STAND: 2 AC: 2 Date: 2/4/92
Aspect: N STAND: AC:
Slope: 10-25% STAND: AC: Prepared by: R.STROHMYER
Avg. Elevation: 7150' STAND: AC: Unit: DILLON UNIT
range: 200' STAND: AC:
Parent material/soils: SHALLOW HEAVY SILTY LOAM OVER BEDROCK
Habitat type(s): PSME/ARCO
Productivity: LOW Management Objective: TIMBER MANAGEMENT

DESCRIPTION OF EXISTING STAND: The stand composition is primarily overmature old growth DF & ES in a 120 yr.+ age class. The intermediate DF & ES understory is also in 120 yr.+ age class & stagnated. While some of the intermediate stems are of a commercial size class, the majority is submerchantable. Once harvest is completed, the submerchantable residual could not be expected to release due to age limitations. No regeneration-class component is present on or near the unit. A seed-tree regeneration harvest is recommended for this unit to reduce slash accumulation & establish regeneration.

INSECTS/DISEASE: Spruce bark beetle mortality is evident directly adjacent to the stand.

CONSTRAINTS: This unit is located in a draw bottom that may take longer to regenerate due to cold air drainage. Seed-trees will be left in place until regeneration is established. Harvest operations must be confined to the unit to protect streamside management zones.

TARGET STAND -- Structure: EVEN-AGED MANAGEMENT
Species composition: 70% DF, 27% ES, 3% LPP
Conditions @ age: 80-120 yr. TPA: 54 Crown ratios: 30-50% Min. % stocked: 75%
Comm. thin @ age: 65 Stocking (BA or SDI): 300 Avg. DBH: 10"
Harvest @ age: 120 Stocking (BA or SDI): 300 Avg. DBH: 14"
Harvest method: TRACTOR
Regeneration period: WITHIN 10 YEARS OF HARVEST
Other targets: Maximize elk security & winter range protection by keeping regeneration harvests to an absolute maximum of 2 acres for the parcel.

ANALYSIS -- Does stand currently meet target conditions: NO
Can existing stand be managed to meet target conditions: YES

DISCUSSION: Through a seed-tree regeneration harvest this site will be brought back to maximum productivity. Harvest will be limited to snow-covered, frozen winter conditions to address hydrologic concerns.

(continued)

PRESCRIBED TREATMENTS

	ACRES	EST.COST PER ACRE	EST.TOTAL COST	EST.DATE
:-seed-tree regeneration harvest/tractor	2	N/A	N/A	May 1992
:-machine pile of entire unit & landings & machine scarification	2	25.38	50.76	1994-95
:-burn machine & landing piles	2	100.00	100.00	1994-95
:-pre-commercial thin unit	2	150.00	150.00	2014
:-remove seed trees (permit)	2	N/A	N/A	2015

IMPLEMENTATION NOTES:

TWP: 8S RG: 7W SEC: 16 STAND: 3 AC: 24 Date: 2/5/92
Aspect: N STAND: AC:
Slope: 10 to 50% STAND: AC: Prepared by: R.STROHMYER
Avg. Elevation: 7200' STAND: AC: Unit: DILLON
range: 300' STAND: AC:
Parent material/soils: SHALLOW HEAVY SILTY GRAVELLY LOAM
Habitat type(s): PSME/CARU
Productivity: LOW TO MODERATE Management Objective: TIMBER MANAGEMENT

DESCRIPTION OF EXISTING STAND:
This existing stand is primarily composed of a mix of overmature old growth overstory Douglas fir & a stagnated intermediate commercial & non-commercial DF & LPP understory. The overstory is approximately 120+ years with the intermediate understory variable between 80 to 120 year groups.

INSECTS/DISEASE: Evidence points towards significant spruce budworm activity in the recent past but currently it seems to be limited. Spruce bark beetle mortality is also present on the parcel.

CONSTRAINTS: Shallow soils may be contributing to soil creep & a perched water table requiring use of designated skid trails & winch lines only. Wildlife - elk winter range considerations require limited entry & a light sanitization-selection harvest to preserve security cover & thermal cover during hunting season & the winter period. Harvest season will be limited to winter snow-covered, frozen conditions.

Due to the accumulation of decadent, unmerchantable material, a considerable amount of slashing will be required by hand to integrate the harvest with elk security and hydrologic concerns.

TARGET STAND -- Structure: UNEVEN-AGED
Species composition: 46% DF, 39% ES, 14% LPP, 1% AF
Conditions @ age: 80-120 yr. TPA: 54 Crown ratios: 30-50% Min. % stocked: 70%
Comm. thin @ age: 65 yr. Stocking (BA or SDI): 300 Avg. DBH: 10"
Harvest @ age: 120 yr. Stocking (BA or SDI): 300 Avg. DBH: 14"
Harvest method: TRACTOR WITH DESIGNATED SKID TRAILS
Regeneration period: UNEVEN-AGED MANAGEMENT - INDEFINITELY
Other targets: Sanitation/cull tree thinning to release submerchantable residual & long term selection harvest - uneven-aged management.

ANALYSIS -- Does stand currently meet target conditions: NO
Can existing stand be managed to meet target conditions: YES

DISCUSSION: Through sanitation/selection harvest of overmature & mature DF, LPP, & ES this stand can be managed indefinitely. Elk security & winter range considerations will be addressed as well as hydrological concerns by exclusive use of designated skid trails throughout the unit during the harvest & limiting harvest to snow-covered, frozen winter conditions.

(continued)

PRESCRIBED TREATMENTS	ACRES	EST.COST PER ACRE	EST.TOTAL COST	EST.DATE
:-select harvest of mature & overmature DF, ES, LPP	24	N/A	N/A	May 1992
:-spot machine pile	24	25.38	609.12	1994-95
:-REHAB skid trails, landings, fencelines along south & east unit boundaries - windrows &/or fence	10	10.00	100.00	1994-95
:-slashing, unit inaccessable to machine pile operations	24	125.00	3000.00	1994-95
:-sanitation thinning & cull tree removal	24	25.00	600.00	1994-95
:-burn machine & landing area	24	6.00	144.00	Oct.1995
:-selection harvest & commercial thinning	24	N/A	N/A	2047

IMPLEMENTATION NOTES:

Hoffman Gulch Timber Sale
Marking Guides

1. Road Right of Way

All merchantable volume is designated for removal within the clearing limits of the new road construction, as described in "Road Development A" - items 1 & 2.

2. Unit Boundary

The harvest unit boundaries are marked:

a. with a blue painted circled "⊠" facing into the unit

and/or

b. vertical blue painted stripes along the unit boundary or facing into the unit

3. Unit #1 and Unit #3

a. Silvicultural methods:

(1) Individual tree selection - harvest overmature Douglas fir that exists throughout the units.

(2) Commercial thin - harvest intermediate/codominant Douglas fir, lodgepole pine, and Engelman spruce components.

(a) Species priority = #1. Douglas fir
#2. Engelman spruce
#3. Lodgepole pine

(b) Maintain stand vigor by leaving the most physically and genetically superior individual trees on the unit.

(c) Spacing of the commercial thin harvest should be 25 X 25 feet allowing for a variation of 50%. Maximum variation would be 38 feet between individual trees.

b. Marking methods:

(1) Mark to cut
(2) Paint = blue
(3) Configuration:

(a) horizontal strip at breast height
(b) horizontal strip at ground level

4. Unit #2

a. Silvicultural methods:

(1) Seed-tree regeneration harvest -
All merchantable stems are to be harvested except Douglas fir leave that are marked to leave as stated below.

b. Marking methods:

(1) Leave trees are marked
(2) Paint = blue
(3) Configuration: four longitudinal strips are painted down the leave tree from breast height to ground level.

5. Equipment Exclusion Areas

a. Paint = orange
b. Configuration:
Dots facing outside the exclusion area and along the area perimeter at breast height.

December 6, 1991

562

TO: GARY WILLIAMS, ACTING AREA MANAGER, CLO
PAT FLOWERS, SUPERVISOR, STATE LAND MANAGEMENT
STAN VLAHOVICH, SUPERVISOR, DILLON UNIT
RICK STROHMYER, DILLON UNIT

FROM: GARY FRANK, HYDROLOGIST GF

SUBJECT: HOFFMAN GULCH TIMBER SALE (Sec 16, T8S R7W).

This proposed sale was reviewed in the field by Stan Vlahovich, Rick Strohmyer, Jeff Collins and Gary Frank on November 14, 1991.

WATERSHED: The sale is located in the Hoffman Gulch watershed. Hoffman Gulch is a 4th order tributary to the Beaverhead River. Streamflow appears to be diverted into several irrigation ditches prior to its confluence with the Beaverhead River. The sale area itself is drained by the 3rd order perennial mainstem of Hoffman Gulch. The stream drains a highly dissected and rugged terrain in a 2970 acre drainage area. Most of the land in the basin is under private ownership and is largely non-forested rangeland and foothills. Three small reservoirs are located in the middle portion of the drainage.

There are existing water rights on file for irrigation and livestock watering immediately downstream of the sale area.

CUMULATIVE EFFECTS: There are no cumulative watershed effect constraints in the Hoffman Gulch drainage. This conclusion is based on the following: 1) The watershed is largely non-forested; 2) The area receives little precipitation (15-20") resulting in low runoff; 3) Flows in Hoffman Gulch are diverted into several large irrigation systems in the Beaverhead Valley; 4) Moderate amount of existing development and harvest activity; 5) The sale prescription is for only partial canopy removal (overstory removal and individual tree selection) therefore a significant portion of the canopy cover will be retained.

ROADS: The timber sale will utilize an existing county and private ranchland road to access the sale section. For the most part, the private road is in good condition and can be used without major modifications or improvements. Additional road surface drainage is needed and some of the existing drain-dips need to be improved to adequately meet BMP's. Approximately 1 3/4 mile of new road will be constructed on State land and private land immediately adjacent to the state section. Site specific recommendations are as follows:

Site #1 - Relocate short segment of new road construction to avoid steep grade as discussed in the field.

Site #2 - Small sagpond (wetland at head of old slump) directly up slope from preliminary road location. Need to maintain a 25 ft. minimum buffer between wetland and area disturbed by road construction.

Site #3 - Road crossing of a broad swale. Construct a drive thru drain dip in swale bottom. Construct a ditch at the bottom of the cut-slope thru the swale to route water to the drain dip.

Site #4 - Road crossing of small swale. Construct a drive-thru drain dip in swale bottom.

Site #5 - Install a 36" cmp at perennial stream crossing. Divert streamflow into a lined ditch to ensure a dry streambed during installation.

The east approach to the stream crossing traverses a steep open hillslope immediately adjacent to the channel. Because of restrictions imposed by the nature of the topography in the area, no feasible alternate crossing sites could be located.

To mitigate potential water quality impacts, construct approximately 30-50 ft. of filter fabric sediment control fence as discussed and flagged in the field (see attached diagram and specifications). The filter fence must be in place before road construction to prevent road fill materials from entering the stream channel. The filter fence should be installed at the base of and parallel to the fill slope.

Construct a slash filter windrow between filter fence and cmp location as discussed and flagged in the field. Slash must be kept out of the stream channel and placed so it does not interfere with the functioning of drainage structures.

Site #6 - Install a 30" cmp at perennial stream crossing. Divert streamflow during installation as instructed for Site #5.

Site #7 - New road construction immediately adjacent to wetland. Locate roadway so that disturbed area is at least 25 feet away from wetland area. Construct ditch along cut slope to drain dip.

Site #8 - Draw crossing using native materials on existing road. Crossing is located on private land. There is no channel or evidence of concentrated surface runoff in draw bottom. Native structure appears to be sound and there is no erosion or washing occurring. Crossing should be adequate for use with this sale. Drain dips need to be constructed in the road surface above the crossing.

HARVEST UNITS: Several sagponds and wetlands occur within or adjacent to Harvest Units #1 and #3 (see Map #2). These areas should be protected by excluding them from equipment operation. Establish equipment restriction zones with a minimum width of 25

feet. Merchantable tree may be removed from the equipment restriction by directional felling and cable winching.

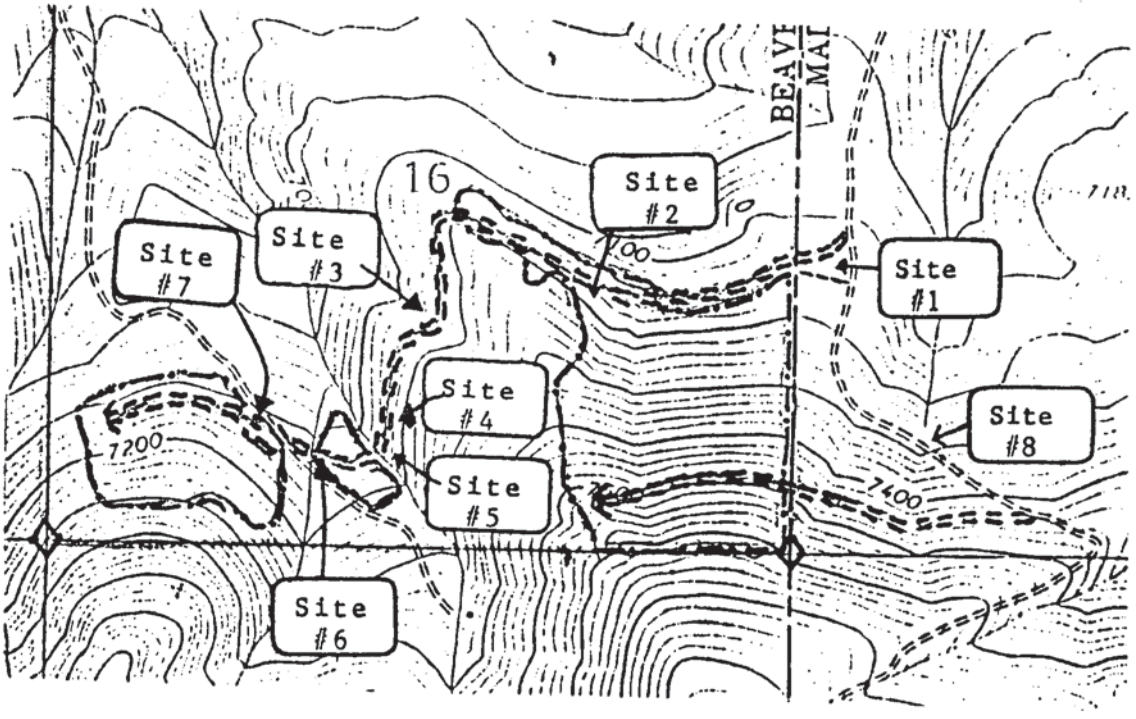
In Harvest Unit #1 there is a series of wet areas located between the upper and lower road. These areas can be identified by the presence of aspen, deciduous shrubs and wet site plant indicators. Limit equipment operation in these locations to designated trails and crossings as discussed in the field.

Harvest Unit #2 is bordered by two perennial streams. Establish a Streamside Management Zone (SMZ) with a minimum width of 50 feet on both stream channel. In accordance with House Bill 731, the following practices are prohibited in the SMZ: 1) The operation of wheeled or tracked equipment except for on established roads; 2) the construction of new roads except for where it is associated with a stream crossing; 3) the silvicultural practice of clearcutting; 4) the deposit of slash into stream channels or wetlands; 5) side-casting of road material into stream. 6) broadcast burning.

I do not anticipate any significant water quality impacts with this timber sale as currently planned if my recommendations and BMP's are fully implemented.

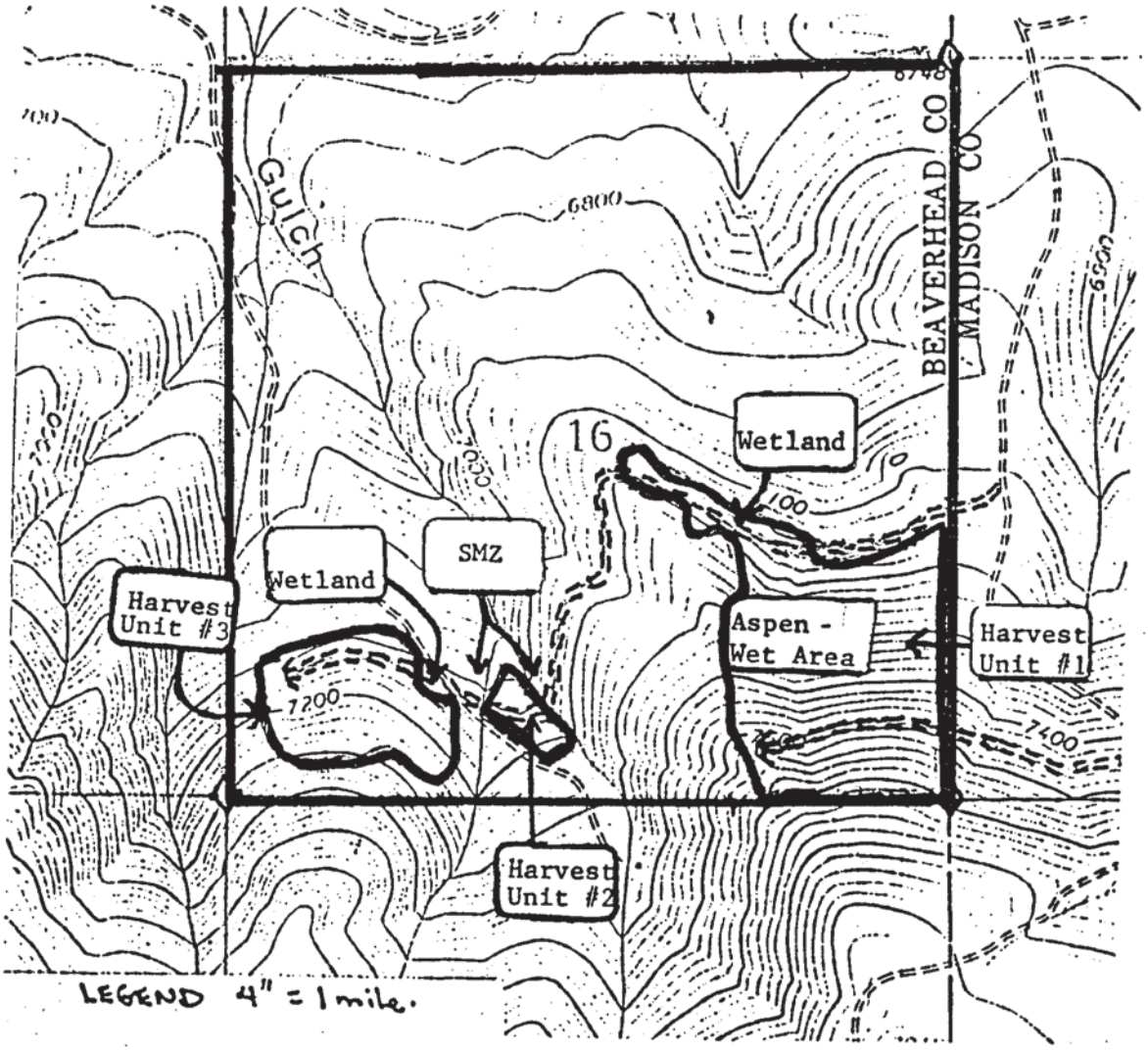
HOFFMAN GULCH TIMBER SALE

Proposed Road Locations
and Site Specific Recommendations

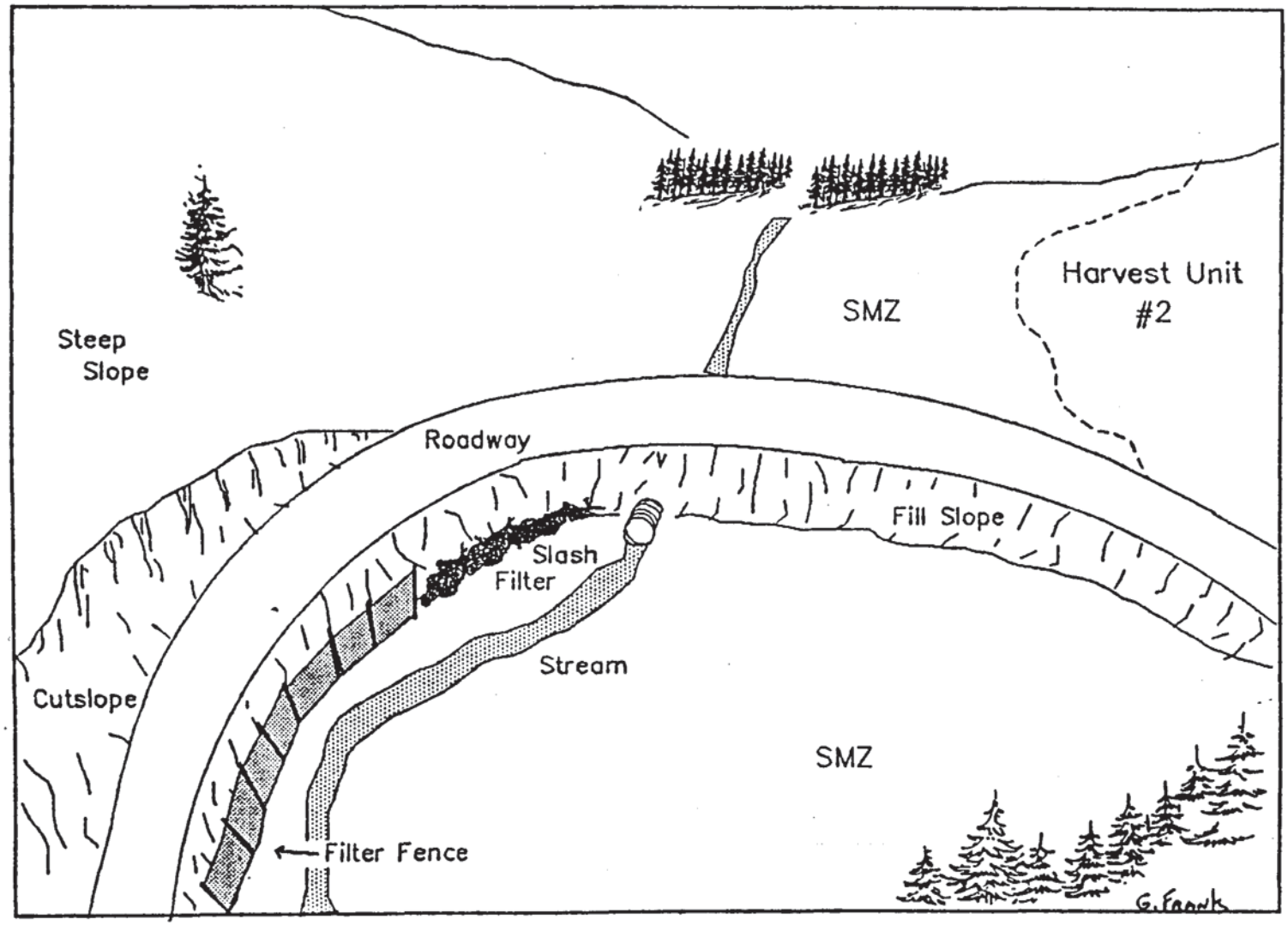


HOFFMAN GULCH TIMBER SALE

Proposed Harvest Units
and Site Specific Recommendations



HOFFMAN GULCH TIMBER SALE
STREAM CROSSING / SEDIMENT MITIGATION



V-5

FILTER FENCE
(SILTFENCE)

DEFINITION

A low fence made of filter cloth and fencing material.

PURPOSE

To filter runoff water prior to discharge.

APPLICABILITY

Any construction site or other site of disturbance where the danger of discharge of sediment-laden water exists.

PLANNING CRITERIA

A filter fence can be substituted for a filter berm at approximately equal cost, but the filter fence is easier to maintain and remove. Care must be taken to insure that all runoff water must pass through, not over, under or around, the filter cloth. This only applies to sites which will not be subjected to significant hydrostatic pressure or to vehicular traffic.

METHODS AND MATERIALS

- The filter fence to be used during the period from May 1 to October 15 should be designed to filter the design storm without overtopping, collapsing, becoming sedimented in, or being skirted by runoff flows.
- The fence should be constructed with "T" -section fench posts and "hog-wire" (4"x4" or 6"x6" wire mesh) or "chicken-wire" of #14 or heavier gauge wire. The fence should be constructed as shown in Figure V-5.
- A trench should be excavated at the uphill base of the fence to a depth of at least 6 inches.
- Filter cloth (Mirafi 140 or equivalent) should be draped over the wire fencing material and lowered into the trench.
- The trench should be backfilled to grade and compacted.

MAINTENANCE

Inspect periodically and after each storm for damage and repair or replace damaged sections. Remove sediment accumulations when the capacity of the filter is impaired.

February 4, 1992 552

TO: GARRY WILLIAMS, Silviculturist, Central Land Office
STAN VLAHOVICH, Field Supervisor, Dillon Unit
RICHARD STROMEYER, Fire Forester, Dillon Unit
TIM EGAN, Forester, Dillon Unit
PAT FLOWERS, Supervisor,State Land Management Section

FROM: JEFF COLLINS, Soil Scientist

SUBJECT: HOFFMAN GULCH TIMBER SALE, Section 16, T8S, R7W

The Hoffman Gulch sale area is located on moderate to steep slopes with soils weathering from mixed bedrock of gneiss type metamorphic rock. This rock is hard to rip and may require blasting for deep excavation.
Ridges and convex slopes are shallow to moderate depth with (4-6")sandy loam topsoils over cobbly sandy loams and silt loam subsoils. These soils are well-drained, tend to be droughty, and have a long season of use.

Lower slopes of Unit 1 & 3 have deeper cobbly silt loam and cobbly sandy loam soil. Topsoil is 6-8 " gravelly silt loams. These soils support more productive timber stands and are well suited to tractor operations.

Recommendations:
Equipment operations should only be done when soils are relatively dry. At 7200 ft. elevation on a North aspect, I do not expect soils will dry out until early June. The upper slopes of unit 1 will probably dry out first.

Designated skid trails are recommended for unit 2. The logger and sale administrator should agree to a general skidding plan prior to operations.

PTS A Wet areas of fine textured soils and marginal slope stability are indicated by aspen and brush. Mark a 25ft. equipment restriction zone to avoid skidding except at approved crossing sites. OK to winch timber out of this strip.

Roads: Existing private access road across sections 10 & 15 has numerous steep pitches and is eroded. Shallow waterbars have been installed in portions of the road, but have washed out in spots. Water erosion hazard is moderate/high and can be mitigated by providing adequate drainage on roads and skid trails. Additional drain-dips or waterbars must be installed to meet BMP's. Driveable waterbars are more abrupt than drain-dips for steeper road grades.

* PT B Short steep pitch on private owned existing road is eroded and could be improved by minor relocation of about 1/4 mile length. Apparently landowner is not interested in road improvement. I recommend installing drivable waterbars when sale completed.

High cobble and stone content of soil makes road excavation and construction difficult. A tractor of at least D-6 size with hydraulic angle blade will be required for road construction. Backslope road cutslopes at 1:1 for common material and 1/2:1 for rock.

* PT C Hard gneiss bedrock at shallow depth on 30-40% sideslopes will require ripping for 200-300ft. and possibly short reach of blasting.

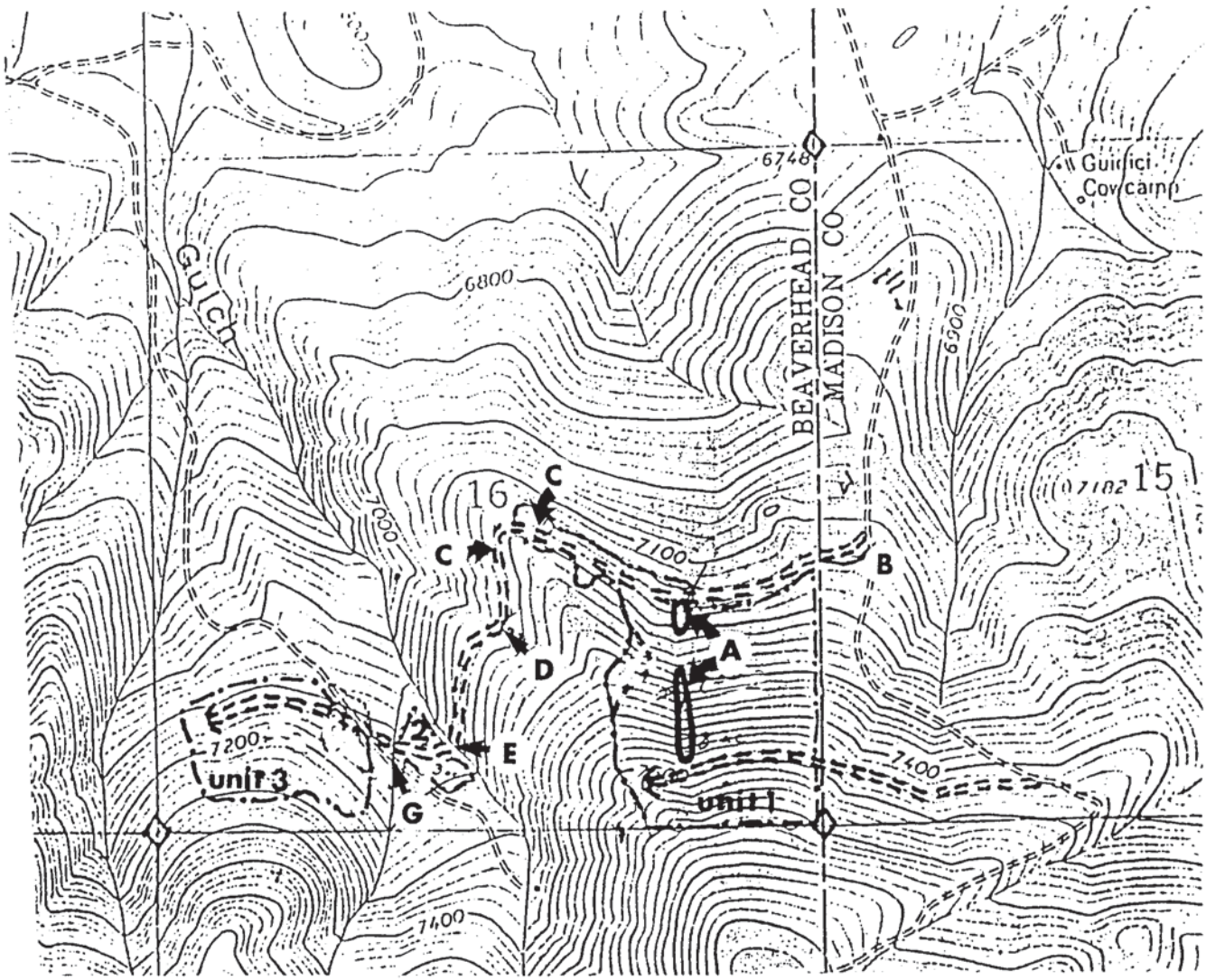
* PT D Road relocated below moist aspen patch on otherwise dry hillside. Soils have a black micaceous surface over deep cobbly silt loams of poor bearing strength. Plan to muck-out and blade to side the black surface soils for 75 to 100ft.(about 8-10 depth) and ditch for about 200ft. to drain-dip.

* Draw crossing (PT E on map) was relocated to avoid excavation of steep side-slope. I expect a fairly deep roadcut will encounter bedrock which requires ripping. Recommend slope staking of location for at least 100 ft. on both sides of draw. Install sediment filter as outlined in hydrology memo. This site needs quick grass establishment to reduce erosion. Consider spot application of annual ryegrass or barley as nurse cover for perennial grasses.

Site G Existing 2 track road has water diverted and is a sediment problem. Install waterbar in existing road and grass seed.

All new road cut and fill slopes should be promptly revegetated with site adapted grasses.

* I do not expect any significant soils related impacts with this sale if these recommendations and BMP's are followed.



JAN 2 4 1992

Montana Department of Fish, Wildlife & Parks

January 22, 1992

Stan Vlahovich
Dillon Unit
Department of State Lands
Dillon, MT 59725

Dear Stan:

The following are our Department's comments on the proposed Hoffman Gulch Timber sale.

As you are aware from your field work there, the Hoffman Gulch area is winter range for elk that winter in the Sweetwater Hills. As a result the cover there is important for security during the hunting season as well as for thermal cover during the winter period. The percentage of the bull harvest the first week of the general season in the hunting district where this sale is proposed does not exceed our elk plan objective. However, we are concerned about the limited amount of cover that presently exists in the area and its potential to allow the survival of some bulls through the hunting season. Also, the BLM and some private landowners have harvested some timber on this north side of the Sweetwater Hills and field observations have indicated to us that there is little regeneration occurring in these area.

With the above concerns in mind we have one important recommendation for this proposed sale. We suggest that harvest unit 3 should be dropped from its present location because of the importance of that area as elk security cover. The harvest from this unit we would prefer be taken from area of unit 1 perhaps by increasing the intensity of harvest in this unit.

Thank you for the opportunity to comment on this proposed sale.

Sincerely,

Robert R. Martinka
Regional Supervisor

RRM:pb

Montana Department of Fish, Wildlife & Parks

1400 S. 19th
Bozeman, MT 59715

March 9, 1992

Rick Strohmyer
Dept. State Lands
730 N. Montana
Dillon, MT 59725

SUBJECT: Permit No. MISC-9-92 R-3 Waterbody:Hoffman Cr.
Project Name:Hoffman Timber Sale Water Code: N/A

Dear Rick:

Relative to the Montana Stream Preservation Act, the Department has completed our review of your proposed project on Hoffman Gulch. Your project has been approved with the following special conditions:

1. All in-stream work shall be completed in an expeditious manner to avoid unnecessary impacts to the streams;

2. Extra precautions shall be taken to preserve existing riparian vegetation;

3. All construction activities performed in the stream and immediate vicinity, shall be conducted in a manner to reduce in-stream turbidity along with minimizing disturbances to the streambed and/or streambank;

4. All streambank and adjacent areas disturbed by the construction activity shall be protected with temporary erosion control measures during the construction activities. These areas shall be reclaimed with long-term erosion control measures and revegetated immediately after construction;

5. Diversion during installation shall be accomplished as per accompanying hydrologist report. Such temporary diversion shall be backfilled after construction. Fill slopes at culverts will be stabilized against erosion with irregular rock rip rap applied on backslope.

NOTE: This permit is valid for **one year** from the date of receipt.

__ This project will cause a significant increase in turbidity, therefore, the Department of Health and Environmental Sciences, Water Quality Bureau, should be contacted for an exemption from the surface water quality standards (3-A Authorization).

_X_ This project will <u>not</u> cause significant turbidity and a 3-A Authorization will not be required.

Sincerely,

Richard A. Oswald
Fisheries Biologist
MDFWP, Dillon, MT

c: Ken Chrest
Jack Thomas,Water Quality Bureau

FWP Use Only
_____ Form Letter to Applicant
Water Code: _____
Appl. No. _____

STREAM PRESERVATION ACT PERMIT APPLICATION

"Notice of Construction"
(Please Print or Type)

Address: *(see reverse side)*

To: MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS

Region #3 Bozeman Attn: Fish Manager
ATTN: Dick Vincent
1400 South 19th
Bozeman, MT 59715

SPONSORING AGENCY: MT Dept. of State Lands
Address: 730 North Montana Street
Dillon, MT 59725

Contact Person: Rick Strohmyer
Title: Sale Forester/Fire Supervisor
Telephone: 683-3994

Official In Charge: Stan Vlahovich
Title: Unit Manager

Telephone: 683-6305

PROJECT IDENTIFICATION: Project Name: Hoffman Gulch Timber Sale
Project No. N/A Waterbody: Upper Hoffman Gulch

Location: Township T8S Range R7W Section 16 County: Beaverhead
Location to Nearest Town: 12 miles southeast of Dillon on Sweetwater Road

Project Features:

___ Bridge	* X Culvert	___ Other	
___ Work Bridge and Removal	___ Dredging	* culvert installation: "2 ea"	
___ Bridge Demolition	___ Hydraulic Structure		
___ Core Drill	___ Channel Change		
	X Bank Stabilization		

Project Scheduling: Contract Letting 7 / 1 / 92
Construction Period 7 / 15 / 92 to 11 / 1 / 93

Allow sixty (60) days for application processing. A set of preliminary plans or sketches of the proposed project **must** accompany this application. (NOTE: Dept. of Hwy. sponsored projects require **two** sets of plans sent with this form to Helena FWP address.)

___ Plans X Sketches X Other Map & Hydrologist's Report

Rick Strohmyer
Signature

Date

Distribution: White/Yellow -- Region Pink -- Applicant
Form: 124SPA 5/89

OCT 18 1991

DEPARTMENT OF STATE LANDS

STAN STEPHENS, GOVERNOR

CAPITOL STATION

STATE OF MONTANA

(406) 444-2074

1625 ELEVENTH AVENUE
HELENA, MONTANA 59620

October 17, 1991

MEMORANDUM

TO: Rick Strohmyer, Fire Supervisor/Forester, Dillon Unit, CLO

FROM: Dori Passmann, Archaeologist, Land Management Section

RE: Hoffman Gulch Timber Sale
S½ 16-8S-7W

There are no sites recorded on this section. The sale map shows that activities are located on steep side slopes, an area unlikely to contain significant cultural properties. A field review is not required and the sale has archaeological clearance.

Please let me know if I can be of further assistance.

/ns

ROAD APPRAISAL SHEET

ROAD NAME "A" Spur Hoffman Gulch Timber Sale

100'Sta.	%ss	Earthwork cost			Clearing cost		Drainage		Remarks
		Yards	Rate	Cost	Item	Cost	Item	Cost	
0+00	20%								BEGIN "A" Spur off existing road to fenceline & thru existing
									fence - fence gate to be constructed by landowner
2+00	20%	(60)	.94	56 40					open sage with no clear limits follow ℄
4+00	16%	(50)	↓	47 00					
6+00	20%	(60)		56 40					
8+00	15%	(50)		47 00			ROLL DIP	50 00	Install ROLL DIP
10+00	20%	(60)		56 40					Painted clear limits begin entering timber
12+00	20%	(60)		56 40					Entering sagpond zones
13+00	15%	(25)		23 50					
15+00	15%	(50)	↓	47 00					
16+00	20%	(30)	4.67	140 10					17+00 = Begin Rock rip - End Rock rip @ 18+00
18+00	25%	(70)	.94	65 80					
20+00	40%	(138)	.94	129 72			ROLL DIP	50 00	Install ROLL DIP
22+00	40%	(138)	4.67	644 46					BEGIN Rock RIP @ 22+00
23+00	45%	(87)	4.67	406 29					
24+00	40%	(69)	4.67	322 23					25+00 is on Ridge top and end of Rock rip
25+50	30%	(65)	.94	61 10					
26+50	25%	(35)	.94	32 90					Into open sage with 0% clearing
28+00	25%	(53)	↓	49 82					
29+50	25%	(53)		49 82			ROLL DIP	50 00	Install ROLL DIP
31+50	20%	(60)	↓	56 40					
33+50	20%	(60)	1.64	98 40					Begin ditching to Drain Dip @ 36+50
35+50	20%	(60)	1.64	98 40					
PAGE TOTAL				2545 54				150 00	2695 54
ROAD TOTAL									

ROAD NAME "17" Spur - continued

100'Sta.	%ss	Earthwork cost			Clearing cost		Drainage		Remarks
		Yards	Rate	Cost	Item	Cost	Item	Cost	
36+50	20%	(30)	1.64	49 20			ROLL DIP	50 00	Install Rolling Dram Dip #1-A
38+00	15%	(38)	.94	28 20					
39+00	15%	(25)	.94	23 50					
40+50	25%	(53)		49 82					
42+50	25%	(70)		65 80					
44+10	40%	(111)		104 34			ROLL DIP	50 00	Install Rolling Dip #2-A
45+50	40%	(97)		91 18					Enter timber and begin painted clear limits
46+50	55%	(137)		128 78			SEDIMENT FILTER TRAP	450 00	Begin Sediment filtration establishment (50')
47+00	15%	(13)		12 22			ROLL DIP	50 --	Install Rolling Dip #3-A
47+20	20%	(6)		5 64			36"x20'	# 1214 00	Instal CMP #1 @ Creek bottom/END SEDIMENT
48+00	20%	(25)		23 50			ROLL DIP	50 00	12% cut adverse grade Intall Roll Dip #4-A
49+00	25%	(35)		32 90	LIGHT				
50+00	15%	(25)		23 50	CLEARING COSTS				
50+35	20%	(11)		10 34	= $600 00 /	Acre	30" x 20	948 00	Install CMP #2 @ Creek bottom
51+35	10%	(16)		15 04	(1.7) Acres x	600			
53+35	10%	(31)		29 14	=	1020 00			
54+00	10%	(10)		9 40					
56+00	10%	(31)		29 14					ON EXISTING 4x4 Road
56+75	20%	(23)		21 62			ROLL DIP	50 00	install Roll Dip # 5-A to tie in with existing road.
58+75	20%	(61)		57 34					
60+00	20%	(38)	.94	35 72					END "A" SPUR
PAGE TOTAL				846 32		1020 00		3012 00	
ROAD TOTAL				3391 86		1020 00		3162 00	7573 86 ÷ 304 MBF 24 90/MBF

ROAD APPRAISAL SHEET

Page 1 of ___

ROAD NAME "B" Spur Hoffman Gulch Timber Sale

100'Sta.	%ss	Earthwork cost			Clearing cost		Drainage		Remarks
		Yards	Rate	Cost	Item	Cost	Item	Cost	
0+00	20%								"B" Spur begins off existing road - on to old existing
1+00	20%								skid road.
3+00	25%								EXISTING ROAD
5+00	↓								↓
7+00									
9+00									
11+00									
13+00									
14+50		-							BEGIN new construction off existing spur road on
16+50		(70)	.94	65.80	LIGHT CLEARING		ROLL DIP	50.00	private ownership - Install Roll DIP B-1
18+50		(70)	.94	65.80	= COSTS $600.00	/Acrea			17+34 @ State/private boundary - 18+96 is
19+50		(35)	.94	32.90	(.4) Acres x	(600)			leaving existing pioneered skid trail
20+50		(35)	.94	32.90	=	240.00			20+50 is @ Doghair LPP
21+50		(35)	.94	32.90					thicket
22+50	↓	(35)	.94	32.90			ROLL DIP	50.00	Install Roll DIP B-2
23+50		(35)	2.81	98.35					St. 23+13 - Begin Rock Rip 24+00 End Rock RIP
24+50	35%	(55)	2.81	154.55					24+50 - out of LPP Doghair
25+50	35%	(55)	2.81	154.55					25+50 Begin Rock Rip
27+00	35%	(83)	2.81	233.23					
29+00	25%	(70)	2.81	196.70			Turn Around	200.00	29+00 - End Rock Rip: Construct Turnaround - 50' radius
29+78	25%	(27)	.94	25.38					END "B" Spur
PAGE TOTAL				1125.96		240.00		300.00	1665.96 ÷ 304 MBF 5.48/MBF
ROAD TOTAL				1125.96		240.00		300.00	1665.96 5.48/MBF

TEMPORARY EASEMENT

I hereby grant to the State of Montana and its timber purchaser a temporary easement to use the existing road shown in red on the attached map.

The temporary easement is to expire one year after the termination of the timber sale, in order to allow the State and its contractor sufficient time to properly dispose of the slash created in Section 16, T8S, R7W. The estimated closing date is October 1, 1995.

It is further agreed:

1. Any and all damage to existing fencelines or other improvements due to the state timber sale will be repaired immediately.

2. All gates will be left as found upon entering and leaving the Christensen Ranch property.

3. Access is limited to dry use only or when road surface is frozen. Christensen Ranch has the right to forbid travel over the road when and if they feel the road is too wet to haul logs or drive on.

4. The Department of State Lands will pay the Christensen Ranch $2.00/MBF for a road maintenance fee. Half of this fee will be paid up front and the balance will be paid upon completion of the sale.

5. The Department of State Lands will supply the Christensen Ranch with 1 gallon of Tordon for weed control.

6. One each access gate will be installed by Christensen Ranch on the Christensen Ranch/DSL boundary at location ▲ . Please see map attached.

   Christensen Ranch and DSL also agree to a gate closure at this gate location during and upon termination of the easement. This controlled access will be accomplished through a combination lock and chain on the gate, provided by the DSL.

7. A livestock barrier consisting of a "slash windrow" will be constructed by DSL along the Christensen Ranch/DSL boundary at the location between the two new proposed roads and above the upper spur road. Please see map attached.

The tract of land of said easement is further described as follows:

Main access road to Christensen Ranch from Sweetwater county road right of way. Main road passes Christensen Ranch headquarters and leads to Section 16, T8S, R7W. (See attached map.)

Christensen Ranch

Esther Christensen

Accepted:
Department of State Lands
Division of Forestry

James J. Mills

Missing page in original

Department of State Lands
Dillon Unit - Central Land Office
Weed Management Plan

Description of Activity: Hoffman Gulch Timber Sale

Location: N½ Section 16, Township 8 South, Range 7 West

County: Beaverhead

Date activity is to commence: July 1, 1992

Date activity is to be completed: November 1, 1994

Proposed Activity:	Acres:
New Road Construction	2.1
Rehab Landings and Skidtrails	3
Harvest Units	
Partial harvest	102
Seed Tree Regeneration Harvest	2
Total	109

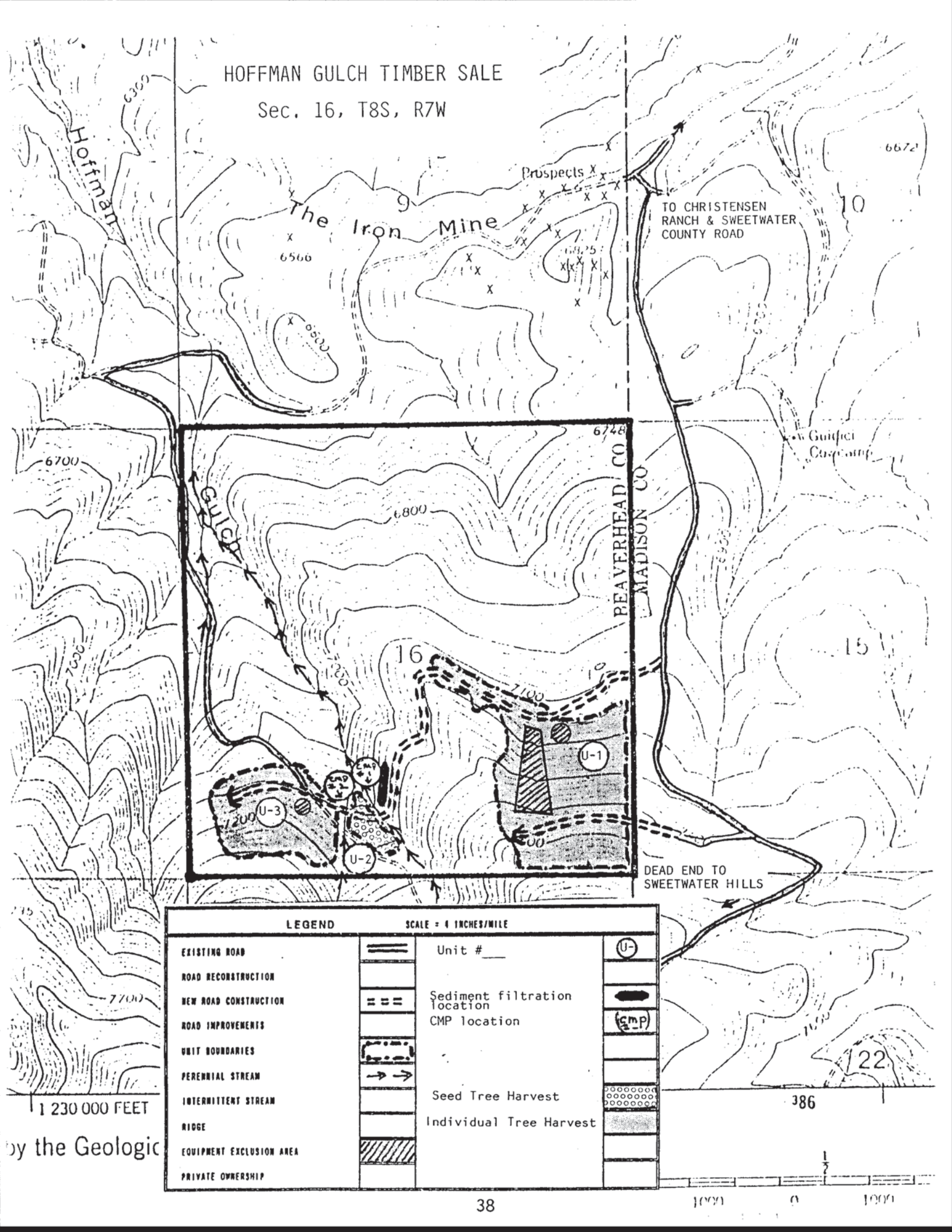
Acres to be seeded with grass: 5.1

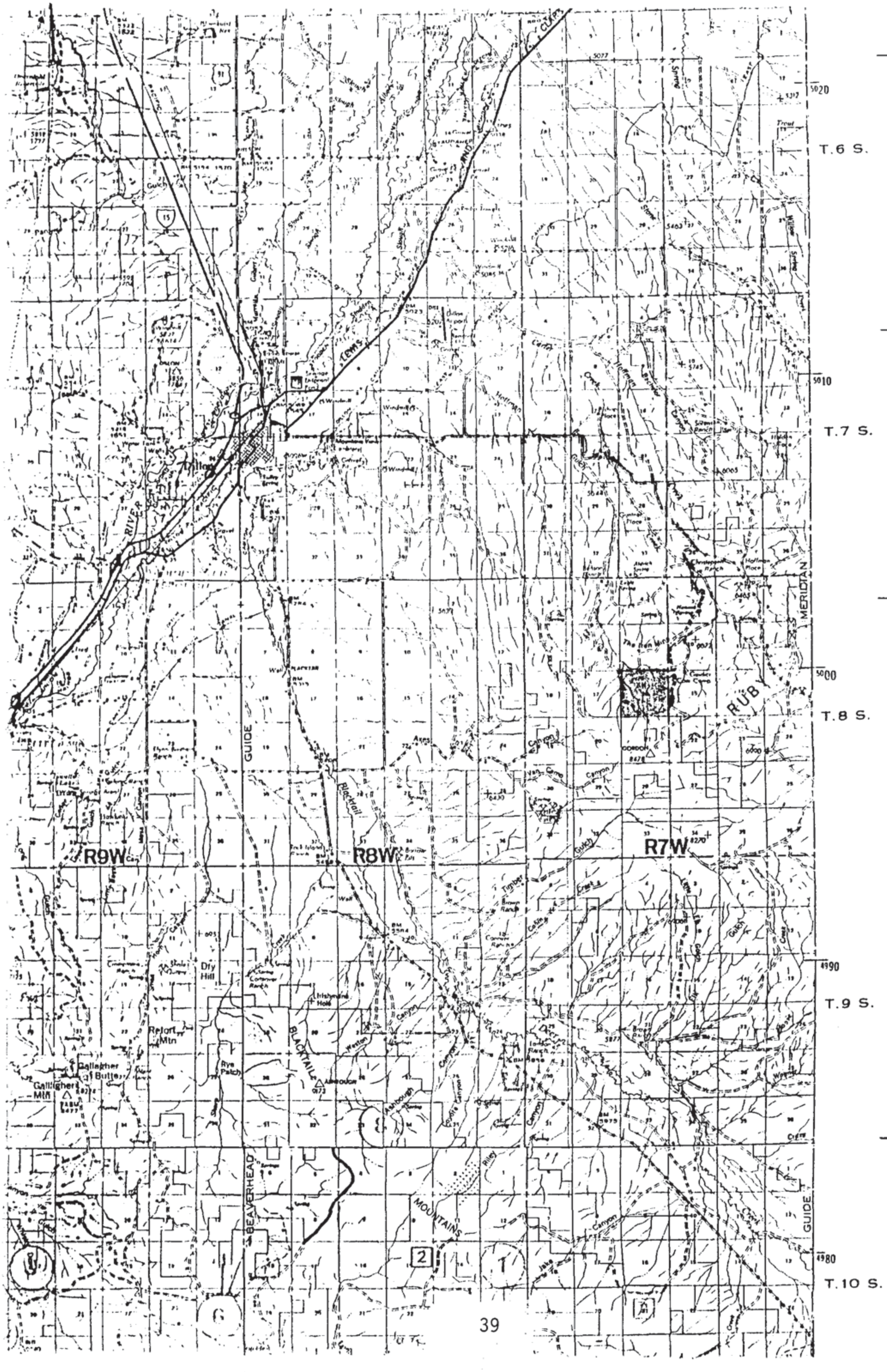
Mixture:

"Potomac" Orchard grass	2.5	lbs.
Intermediate wheatgrass	2.5	lbs.
Total	5	lbs./Acre

The timber sale contract will include provisions requiring all off-road machinery (i.e. dozers, skidders, etc.) to be steam washed and inspected prior to moving on the site.

New road construction, as well as decking areas, and heavily used skid trails, will be seeded with grass at the conclusion of the sale.


HOFFMAN GULCH TIMBER SALE
Sec. 16, T8S, R7W
Hoffman
The Iron Mine
Prospects
TO CHRISTENSEN RANCH & SWEETWATER COUNTY ROAD
BEAVERHEAD CO
MADISON CO
GULCH
DEAD END TO SWEETWATER HILLS
U-1
U-2
U-3
16
9
10
15
22
6700
6800
7000
6566
6748
LEGEND
SCALE = 4 INCHES/MILE
EXISTING ROAD
ROAD RECONSTRUCTION
NEW ROAD CONSTRUCTION
ROAD IMPROVEMENTS
UNIT BOUNDARIES
PERENNIAL STREAM
INTERMITTENT STREAM
RIDGE
EQUIPMENT EXCLUSION AREA
PRIVATE OWNERSHIP
Unit #___
Sediment filtration location
CMP location
Seed Tree Harvest
Individual Tree Harvest
1 230 000 FEET
by the Geologic
1000
0
1000


20'
5020
T.6 S.
15'
5010
T.7 S.
RIVER
10'
MERIDIAN
5000
T.8 S.
GUIDE
RUB
R9W
R8W
R7W
Dry Hill
4990
T.9 S.
Retort Mtn
BLACKTAIL
Rye Patch
Gallagher Butte
Gallagher Mtn
45° 00'
BEAVERHEAD
MOUNTAINS
GUIDE
4980
T.10 S.