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ENVIROMENTAL ANALYSIS
FOR THE
SWEENEY CREEK TIMBER SALE



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March 2003

**Montana Department of Natural Resources and
Conservation
Hamilton Unit Office**



Checklist Environmental Assessment

Project Name: Sweeney Timber Sale

Date: March 2003

Proponent: Montana Department of Natural Resources and Conservation
Hamilton Unit - Southwest Land Office

Type and Purpose of Action:

1. Harvest between 0.7 and 1.4 million board feet (MMBF) of sawtimber from 310 acres, to generate revenue for the Public School (CS) trust grant.
2. Maintain and/or restore forested stands on School Trust Lands to an ecological condition which is sustainable and provides for a wide variety of resources that would maintain and/or enhance the potential for income generation in the future. See Action Alternative (pg 2).

Location: (See "Vicinity Map" Appendix A)

Sweeney Section - E1/2 NE1/4, W1/2 NW1/4, S1/2 Section 16, T10N, R20W

County: Ravalli County

I. PROJECT DEVELOPMENT

1. **Public Involvement, Agencies, Groups and Individuals Contacted:**

Comments from the general public, interest groups and agency specialists were solicited in the Fall of 1999. Newspaper ads were run in the Missoulian and Ravalli Republic beginning October 12, 1999, and public notices were posted along roads within the proposed sale area and the Florence Post office. Scoping letters were mailed to 19 organizations and individuals (a list of the organizations/individuals contacted is available in the project file). Written and/or verbal comments were received from the following individuals and organizations: Kirk Bloxham, Friends of The Bitter Root, Robert Touse, and Gail Goheen.

Concerns raised by groups and individuals and discussed in the body of this EA include: Spread of noxious weeds (pg.9), potential truck traffic hazards (pg.15), protection of irrigation ditches & fences (pg.16), closing roads to reduce illegal dumping and trespass of motorized vehicles (pg.6), new road construction (pg 6), potential water quality impacts (pg.4); economic impacts (pg. 17), vegetative cover, historic and current (pg. 8); big game cover (pg 10); and potential threatened and endangered (T&E) sensitive species habitat (pg.12).

The following resource specialists were involved in the project design, assessment of potential

impacts and development of mitigation measures: Mike McGrath - Wildlife Biologist, Southwest Land Office (SWLO); Jeff Collins - Soil Scientist, Forest Management Bureau (FMB); Gary Frank - Hydrologist, FMB, DNRC, Missoula; Pat Rennie - Archeologist, Agriculture and Grazing Management Bureau, DNRC, Helena.

Concerns raised by resource specialists and discussed in the body of this EA include: potential soil compaction/displacement impacts (pg.3); potential water quality impacts (pg.4); vegetative cover, historic and current (pg.8); noxious weed concerns (pg.9); big game cover (pg.10); potential T & E and sensitive species habitat (pg.12); safety concerns (pg.15); and other appropriate social/economic uses (pg.17). Also, all individuals and groups were encouraged to contact the project leader at any time during the sale planning and implementation phase of this proposal.

2. **Other Governmental Agencies with Jurisdiction -List of Permits Needed:**

State of Montana, Department of Fish, Wildlife and Parks - Stream Preservation Act (124)
Permit for the installation of two temporary drainage culverts.

3. **Alternatives Considered:**

Action Alternative: Harvest between .7 and 1.4 million board feet (MMBF) of sawtimber. Relocate out of the SMZ 0.35 miles of road and abandon 1.8 miles of road. For the Sweeney sale area the DNRC would like to maintain and/or enhance historic vegetative communities and the ecological processes which sustained them. Specifically, this would involve: decreasing the relative density of ponderosa pine (PP) and proportion of Douglas-fir (DF); enhancing the growth and reproduction of the largely fire-adaptive seral tree species such as ponderosa pine (PP) and western larch (WL); and retaining coarse woody material such as standing snags. The DNRC would also like to minimize the spread of noxious weeds and maintain riparian and designated overstory/understory cover for aesthetic and wildlife concerns.

No-Action Alternative: No land management activities would be implemented under this proposal. Under this alternative tree growth would be expected to slowly decrease over time and would result in continued decreasing health and vigor. Stands are currently denser than would have occurred with naturally occurring fires. In addition without openings in the stands, fewer ponderosa pine would become established. The area would come under increasing risk of a stand replacement wildfire and/or major insect or disease outbreak with, subsequent loss of existing forest cover and potential revenue to the school trust. Existing roads and trails with inadequate drainage and uncontrolled use would continue to erode without maintenance. No timber revenue would be collected under this alternative for the schools trust fund.

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

4. **Geology and Soil Quality, Stability and Moisture:** *(Are fragile, compactible or unstable soils present? Are there unusual geologic features? Are there special reclamation considerations?)*

Geology:

There are no unique or unstable geologic features on the sale area.

The Sweeney project area is located on moderate to steep slopes with soils weathering from mainly granitics on the upper slopes and ridges, with highly weathered granitic/tertiary age valley fill deposits forming the midslopes and footslopes of the Bitterroot Mountains below Sweeney Peak. The granitics consist mainly of micaceous granodiorites, which are weak and brittle when weathered and break down into coarse sands that are easily eroded. The tertiary deposits are a mixture of granitics and sandy clays.

Soils:

Predominant soils are Bass, Blodgett, and Como cobbly and stony sandy loams weathering from granitics. These soils vary mainly by slope, terrain position, and stone content. Topsoils are typically 3-8 inch coarse sandy loams over moderately deep gravelly and cobbly loamy sands. Duff layer are thin (1/4-1 inch) and sparse on southerly aspects and slightly deeper on north and east aspects. These soils are excessively well drained and droughty which can stress seedlings, mainly on south aspects, and road cutslopes can be difficult to revegetate. Erosion hazard is high on bare granitic soils and increases with slope. Compaction hazard is low and less of a concern than rutting when soils are wet. Soils are slightly acidic with moderate productivity from the weathered granitics. These soils have a long season of use. Primary concern for soil productivity is maintaining the shallow topsoils, by minimizing displacement, controlling erosion and retaining a portion of woody debris for long term nutrient cycling. On the eastern half of the Sweeney section, there are some footslope draws and drainages separated by broad convex ridges. Soils are shallow on the ridges and deeper in the draws supporting more productive timber stands.

Cumulative effects to soil productivity:

Cumulative effects would occur from repeated entries into the harvest area. Past harvest and recreational use have left numerous trails, which access most proposed ground skidding units in the Sweeney section. Most of the old skid trails are mainly re-vegetated but some of the trails and roads used by recreation traffic are poorly vegetated, have inadequate drainage and are eroding.

Primary soil concerns are potential rutting, compaction or displacement associated with harvest operations and site preparation. Potential site impacts are difficulty with regeneration, reduced site productivity and increased runoff and erosion. Susceptibility to impact varies with soil type.

harvest method, type of equipment and season of use.

Proposed Mitigation Measures:

Direct and cumulative impacts of the proposed actions on soils would be avoided or minimized through project controls and mitigations. These include:

Harvest Schedule: Harvest would occur during winter months when ground is relatively frozen, snow covered, or dry (less than 20%).

Skidding Limitations: Ground based logging systems (tractor, skidder, and mechanical harvesters) would be limited to slopes less than 40%.

Skid trail Planning: Existing landings and trails would be used, however, trails and old roads that do not comply with Best Management Practices (BMP's) would not be used and may be closed with additional drainage installed to improve site conditions. The contractor and DNRC sale administrator will agree to a general skidding plan prior to initiating cutting and skidding operations. Access across relatively steep and/or sensitive areas will be as designated by the DNRC sale administrator.

Course Woody Debris: Approximately 5-10 tons per acre of downed trees, logged tops, and other course woody material will also be retained on the site where possible to provide course woody debris for nutrient recycling.

Slash Disposal: Tractor piling will be limited to slopes less than 35%. Very little slash will be left on site within 100 feet of Sweeney Creek Rd #1315, or within 100 feet adjacent to private property boundaries.

Roads: Roads that are currently rutted and poorly drained will be spot graded, turnpiked, outsloped and/or cross-ditched. Roads in draw bottoms and poor locations will be closed off with drainage features installed. All relocated and reconstructed roads will be re-vegetated with site adapted grass seed mix. Road closures may include obliteration, earth berms, fencing, or trampling slash on the road to prevent traffic.

For additional information on geology/soils, see Soils, Geology, Weed Report (Attachment B).

5. **Water Quality, Quantity and Distribution:** *Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?)*

The proposed timber sale is located within a single parcel of state owned land that is located on the western flank of the Bitterroot valley just south of Florence, Montana. The parcel is drained by an unnamed face drainage, Child's Creek, and an ephemeral draw within the Sweeney Creek watershed. Roads accessing the proposed harvest areas are located in these same watersheds. A

short description of each watershed within the affected environment follows. More detailed stream inventories and channel descriptions are available in the hydrology project file.

Face Drainage: Approximately 303 acres of Section 16 are drained by several small, unnamed and discontinuous streams and ephemeral draws which dissect the lower mountain slopes and foothills on the west side of the Bitterroot Valley. Isolated segments of these drainage features contain spring fed perennial and/or intermittent stream channels. However, all surface discharge is intercepted by a series of irrigation ditches either located on the State section or immediately downstream on adjacent private land.

Sweeney Creek:

Approximately 105 acres in the Southwest $\frac{1}{4}$ of the State section is located in the Sweeney Creek watershed. Sweeney Creek is a large third order perennial stream that drains a watershed area of approximately 16 square miles. Most of the watershed area consists of rugged, high elevation, mountainous terrain that is located within the Selway-Bitterroot Wilderness Area. The proposed harvest area is actually drained by an ephemeral draw that contains a short limited segment of intermittent stream channel in its upper reaches. All stream segments within this draw are discontinuous. There is neither a discernable stream channel nor evidence of concentrated surface runoff in the lower reaches where the draw leaves the State section.

Child's Creek:

Approximately 209 acres in the north $\frac{1}{2}$ of the State parcel are drained by Child's Creek and an unnamed intermittent / ephemeral tributary to Child's Creek. Child's Creek is a second order intermittent tributary to One Horse Creek. The confluence of the two streams is located at the Highway 93 crossing of One Horse Creek. Child's Creek drains a watershed area of approximately 584 acres. The mainstem stream channel is perennial on the State section. However, flows from this channel are largely if not entirely diverted into several irrigation ditches located on the State section and downstream on adjacent private land. Direct surface delivery to Lost Horse Creek is probably limited to peak runoff during spring snowmelt

Other Water Resources:

There are two irrigation ditches, the Schreckendgust Ditch and the Lunceford-Schreckendgust Ditch, which flow across the Northeast $\frac{1}{4}$ of the State parcel. Both of these ditches carry water that is diverted from One Horse Creek approximately $\frac{3}{4}$ miles north of the State parcel. A portion of the flow from the Schreckendgust Ditch is diverted into a lateral ditch at a headgate, which is also located in the Northeast $\frac{1}{4}$ of the State parcel. The lateral ditch traverses the eastern edge of the State section and exits it at the Southeast corner. All of these ditches are used to flood irrigate pastures located immediately adjacent to the State ownership.

Water Quality:

No impact to water quality or other downstream beneficial uses are expected to result from the proposed harvest activities.

All existing roads and proposed road locations within and accessing the timber sale area have been reviewed and inventoried by a DNRC hydrologist and soil scientist. The existing roads and proposed road locations were evaluated to determine both existing and potential risk of erosion and sources of sediment delivery to streams. Many of the existing roads within the proposed sale area do not fully comply with minimum BMPs. Several segments of existing road are eroding and were determined to be contributing direct sediment delivery to streams or at risk of contributing to direct delivery.

Proposed Mitigation Measures:

Under the proposed action alternative, approximately 2.6 miles of existing road will be improved to a standard that fully complies with minimum BMPs. These improvements include:

1. Installation of additional road surface drainage features and ditch relief drainage structures
2. Maintenance and or improvement of existing stream crossings and relief drainage structures
3. Approximately 1.8 miles of existing road would be permanently closed and abandoned
4. Approximately 0.35 miles of existing road will be relocated to a location that also poses a lower risk to water quality and is more suitable for timber sale activities.

All proposed harvest stands have also been reviewed and evaluated. Selection of appropriate operating seasons, limiting equipment operations to suitable slopes or designated trails and appropriate ground conditions, and implementation of appropriate BMPs and mitigation measures will be used to reduce the risk and severity of soil erosion and potential sediment delivery to streams and ephemeral drainage features (see Soils Section).

There is no means of direct sediment delivery from the proposed harvest area to Sweeney Creek. The portion of the state parcel located in the Sweeney Creek watershed is drained by an ephemeral draw that does not contain a discernable stream channel in the lower segments. The draw bottom is well vegetated with brush, grasses and forb species. Any concentrated ephemeral discharge flowing continuously down the draw is intercepted by one of several irrigation ditches that bisect the draw bottom down slope of the state ownership. Equipment restriction zones will be utilized to limit erosion risk within all ephemeral draw bottoms.

Cumulative Watershed Effects:

The risk of detrimental levels of water yield increase (increased magnitude or duration of peak flows) due to timber harvest is low for all potentially affected watershed under the proposed action alternative. This conclusion is based on the natural and existing levels of forest canopy cover, low annual basin precipitation in the Unnamed face drainage and Child's Creek, and the partial canopy removal prescriptions included in the proposed action.

For additional information on Water Quality, Quantity and Distribution see Attachment C.

Fisheries:

No impact to cold-water fisheries or other downstream beneficial uses are expected to result from the proposed harvest activities.

The Bitterroot National Forest completed fisheries surveys in Sweeney Creek in 1995. Both day-time and night-time snorkeling observations were made on a 1000 meter reach of Sweeney Creek starting at the Forest Boundary in 20 T10N R20W. These surveys found both bull trout and Westslope cutthroat trout present. A few brook trout were also noted during these surveys. This Westslope cutthroat population is considered to have a high potential for genetic purity.

Fish population surveys have not been completed for Child's Creek. However, westslope cutthroat trout were observed in Child's Creek by a DNRC hydrologist while completing stream surveys within the project area.

Bull trout are currently listed as a threatened species under the Federal Endanger Species Act (ESA). As of this date, the U.S. Fish and Wildlife Service has not finalized the draft bull trout recovery plan. However, the Montana Bull Trout Restoration Team has developed guidelines that are contained in the State's Bull Trout Restoration Plan. Additional guidance is contained in the DNRC forest management administrative rules and the State Forest Land Management Plan.

Westslope cutthroat trout are recognized as a Class A species by the State of Montana. Class A species are defined as having limited numbers and/or limited habitats both in Montana and elsewhere in North America; elimination from Montana would be a significant loss to the gene pool of the species or subspecies. DNRC has entered into a statewide conservation agreement for westslope cutthroat trout. A Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana was finalized by MDFWP and signed by DNRC and other cooperators in May of 1999. This agreement was a collaborative effort developed by the Westslope Cutthroat Steering Committee that is represented by numerous state and federal resource agencies, conservation and industry organizations, sportsmen and private landowners. Under the MOU, DNRC has agreed to protect all genetically pure and slightly introgressed (less

than 10% introgressed) WCT populations. Protection includes maintaining or developing high quality habitat to prevent extirpation.

Proposed Mitigation Measures:

1. The SMZ harvest would be limited to 7 acres of selective harvest (thinning) of a stand located adjacent to Childs Creek. The light harvest would only occur in the outermost portion of the SMZ. No trees would be harvested immediately adjacent (within 25') to the stream. Therefore no substantial reduction in the levels of potential large woody debris recruitment, stream shading and no increases in stream water temperatures are expected under the proposed action.
2. SMZ widths will comply with the Montana Streamside Management Zone Law and the State Forest Land Management Plan.
3. The proposed road improvements, road abandonment and road relocation activities are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features within the proposed projected area (see Water Quality section). The anticipated impact of these activities would be improved water quality and improved protection of cold water fisheries habitat in Child's Creek.

Populations of Bull Trout within the Sweeney Creek drainage will not be affected by the proposed action. That portion of the State ownership lying within the Sweeney Creek watershed is actually drained by a discontinuous ephemeral draw. The draw contains isolated segments of intermittent stream channel. However, these segments are not fish bearing and discontinuous. There is no direct delivery of concentrated surface runoff from the proposed project area to Sweeney Creek.

6. **Air Quality:** *(Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed?)*

Prescribed pile and jackpot burning would produce a variable amount of smoke. Smoke may drift into residential areas near the proposed sale areas following prescribed burning activities. Smoke from other burning projects may also cumulatively add to the smoke produced from this project. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion (as determined by the MT Dept. of Environmental Quality and MT Airshed Group).

7. **Vegetation Cover, Quantity and Quality:** *(Will vegetative communities be permanently altered? Are any rare plants or cover types present?)*

Timber cover types include single and two-cohort stands of ponderosa pine (PP) on relatively dry sites (E1/2 NE1/4, S1/2); and mixed-cohort stands of Douglas-fir (DF), and western larch (WL) on more mesic sites (W1/2, NW1/4) part of Sec. 16.

Habitat Types: Douglas-fir/ninebark (PSME/PHMA) - draws and N aspects; Douglas-fir/snowberry (PSME/SYAL) - W and E aspects; Douglas-fir/pine grass – ponderosa pine (PSME/CARU-PIPO) - benches and flats; ponderosa pine/Idaho fescue- (PIPO/FEID) - SW aspects.

The PP cover types in the Sweeney Creek drainage evolved with frequent, low intensity surface fires every 5 to 15 years (Arno 1976). Historically, these fires maintained opened stands of mostly large, well-spaced PP with pockets of Douglas-fir (DF) in the more protected draws (1995). Currently, these stands are considered above their historic stocking levels due to the past 70 to 80 years of fire suppression (Arno 2002).

The proposed project plans are to remove by commercially thinning between 0.7 to 1.4 million board feet over a 310-acre area. The current estimated standing volume is 3.7 million board feet. This action would remove approximately 40% to 45% of the basal area and reduce stocking density to 50-70 sq. ft of basal area. The objective being to encourage regeneration of ponderosa pine over much of the area, release the existing understory and reduce potential long term fire danger within the urban interface. Approximately 5-10 tons per acre of downed trees, logged tops, and other coarse woody material would also be retained on the site where possible to provide coarse woody debris recruitment. Additional logging slash will be consolidated into piles throughout the sale area for jackpot and pile burning. No rare plants or cover types were identified within the proposed sale area.

The risk of detrimental effects due to timber harvest is low under the proposed action alternative. This conclusion is based on returning the stands to more natural and historic levels of forest canopy cover and the partial canopy removal prescriptions included in the proposed action. All treated stands would have current risk of stand-replacement fire reduced.

Existing Noxious Weeds:

Knapweed (*Centaurea maculosa*), and to a lesser extent sulphur cinquefoil (*Potentilla recta*) and Dalmation toadflax (*Linaria genistifolia*), occur within the project area. Knapweed is well established in the more open forest stands. A spot of leafy spurge also occurs within the section. Currently the section has two seasonal grazing licenses. Weed management treatments with herbicide control have been used on the E1/2 of the E1/2 within the section. Ground disturbance activities have the potential to introduce or spread noxious weeds in susceptible habitat types. In order to control and minimize the spread of noxious weeds the DNRC would incorporate an Integrated Weed Management Plan into the project design.

Specific mitigations for the proposed Sweeney Sale would include the following:

1. Timber harvesting activities would not occur in portions of the sale area where known infestations of (*Linaria genistifolia*) Dalmation toadflax are present.

2. Logging and road construction equipment would be cleaned of plant parts, mud and weed seed prior to moving on-site.
3. Disturbed soils on road cuts and fills would be re-seeded to site-adapted grasses to reduce weed encroachment and stabilize roads from erosion.
4. Weed-infested road sites would be sprayed with an applicable herbicide (under the supervision of a licensed applicator and following label directions in accordance with Department of Agriculture regulations and applicable laws and regulations of the Ravalli County Weed Board).

Implementing the above mitigations would reduce some existing weed infestations. Overall, for additional information on weeds see (Weeds Report Attachment B).

8. **Terrestrial, Avian and Aquatic Life and Habitats:** *(Is there substantial use of the area by important wildlife, birds or fish?)*

Avian Habitats: (See Unique, Endangered, Fragile or Limited Environmental Resources)

Aquatic Habitats: (See Water Quality, Quantity and Distribution)

Terrestrial Habitats:

Big Game Considerations:

Elk require security and winter range habitat during the fall and winter months. For security, elk require pole to mature forest ≥ 250 acres in size, ≥ 0.5 miles from any open road (Hillis et al. 1991). Currently, the project area has 4.2 miles of existing road and private residences reside within and adjacent to the section. Consequently, security cover does not exist within the project area. Within a 1-mile radius of the project area, there are 24.3 miles of road, leaving the only security cover in section 8 of T10N R20W. For winter range, elk require at least 20 acres of forest with canopy closure $> 50\%$, with the base canopy > 20 feet high, intermixed with open grassland areas, preferably away from human disturbance (e.g., roads, houses, etc.). Currently, open grasslands exist in the adjoining sections 8, 9, and 17, and approximately 1,200 acres of desired winter range forest conditions exist within the project area and an additional 1-mile radius. Of those acres, approximately 310 acres are proposed for treatment. Because of the road density and residences within and adjacent to the project area, benefits to elk from the cover and forage availability within the project area may be negated if stressors from human disturbance sources are high.

Environmental Consequences, Action:

310 acres of 1,200 acres (26%) of winter range habitat (within a 1-mile radius analysis area) are proposed for treatment which would reduce the proportion of Douglas-fir and the relative density of ponderosa pine in the affected stands. The proposed treatment would likely reduce canopy closure below 50% and remove Douglas-fir which would reduce snow interception and

wind blockage in the project area. As a result, the affected stands would likely no longer serve as thermal cover on the winter range. However, with private residences occurring both within and adjacent to the project area, elk would likely have low to moderate levels of human disturbance stressors. Thus, changes to winter range habitat within the project area would likely disperse animals to areas where there would be lower levels of human disturbance. Because there are 4.2 miles of existing road within the project area, elk security habitat is not present at this scale. Thus, there is low potential for direct, indirect, or cumulative effects to elk.

Mitigation for the Action Alternative:

Abandon 1.8 miles of road within the project area to decrease elk vulnerability and harassment while on winter range.

White-tailed Deer:

White-tailed deer require thermal cover habitat during the winter months. For thermal cover, white-tailed deer require at least 40 acres of forest with canopy closure > 70%, with the base canopy > 20 feet high, intermixed with open grassland areas, preferably away from human disturbance (e.g., roads, houses, etc.). Currently, open grasslands exist in the adjoining sections 8, 9, and 17, and approximately 1,200 acres of desired winter range forest conditions exist within the project area and an additional 1-mile radius. Of those acres, approximately 310 acres are proposed for treatment. Because of the road density and residences within and adjacent to the project area, benefits to white-tailed deer from the cover and forage availability within the project area may be negated if stressors from human disturbance sources are high.

310 acres of 1,200 acres (26%) of thermal cover habitat (within a 1-mile radius analysis area) are proposed for treatment, which would reduce the proportion of Douglas-fir and the relative density of ponderosa pine in the affected stands. The proposed treatment would likely reduce canopy closure below 70% and remove Douglas-fir which would reduce snow interception and wind blockage in the project area. As a result, the affected stands would likely no longer serve as thermal cover. However, with private residences occurring both within and adjacent to the project area, white-tailed deer would likely have low to moderate levels of human disturbance stressors. Thus, changes to winter range habitat within the project area would likely disperse animals to areas where there would be lower levels of human disturbance. Thus, there is low potential for direct, indirect, or cumulative effects to mule deer.

Mitigation for the Action Alternative:

Abandon 1.8 miles of road within the project area to decrease white-tailed deer vulnerability and harassment while on winter range.

Mule Deer:

Mule deer require security and winter range habitat during the fall and winter months. For

security, mule deer require pole to mature forest ≥ 250 acres in size, ≥ 0.5 miles from any open road (Hillis et al. 1991). Currently, the project area has 4.2 miles of existing road and private residences reside within and adjacent to the section. Consequently, security cover does not exist within the project area. Within a 1-mile radius of the project area, there are 24.3 miles of road, leaving the only security cover in section 8 of T10N R20W. For winter range, mule deer require at least 20 acres of forest with canopy closure $> 50\%$, with the base canopy > 20 feet high, intermixed with open grassland areas, preferably away from human disturbance (e.g., roads, houses, etc.). Currently, open grasslands exist in the adjoining sections 8, 9, and 17, and approximately 1,200 acres of desired winter range forest conditions exist within the project area and an additional 1-mile radius. Of those acres, approximately 360 acres are proposed for treatment. Because of the road density and residences within and adjacent to the project area, benefits to mule deer from the cover and forage availability within the project area may be negated if stressors from human disturbance sources are high.

310 acres of 1,200 acres (26%) of winter range habitat (within a 1-mile radius analysis area) are proposed for treatment, which would reduce the proportion of Douglas-fir and the relative density of ponderosa pine in the affected stands. The proposed treatment would likely reduce canopy closure below 50% and remove Douglas-fir which would reduce snow interception and wind blockage in the project area. As a result, the affected stands would likely no longer serve as thermal cover on the winter range. However, with private residences occurring both within and adjacent to the project area, mule deer would likely have low to moderate levels of human disturbance stressors. Thus, changes to winter range habitat within the project area would likely disperse animals to areas where there would be lower levels of human disturbance. Because there are 4.2 miles of existing road within the project area, mule deer security habitat is not present at this scale. Thus, there is low potential for direct, indirect, or cumulative effects to mule deer.

The risk of Cumulative effect to Threatened Endangered and Sensitive species are expected to be none to low, (See also "Checklist Environmental Assessment For Endangered, Threatened, Sensitive and Big Game Species Sweeney Timber Sale," Attachment G).

9. **Unique, Endangered, Fragile or Limited Environmental Resources:** *(Are any federally listed threatened or endangered species or identified habitat present?)*

Threatened and Endangered Species:

Bald Eagle (federally-threatened, proposed for de-listing):

Bald Eagle nests are located 2.85 miles to the east and 4 miles to the southeast of the project area, along the Bitterroot River. Because the project area is outside of each nesting pair's projected 4 km (2.49 mile) home range, no impact is likely to occur. Should nesting occur within 4 km of the project area, a DNRC biologist will be consulted for mitigations.

Grizzly Bear (federally-threatened):

The Bitterroot Grizzly Bear Ecosystem Recovery Zone extends to the western edge of the project area, however, this Ecosystem is currently not believed to be occupied by grizzly bears (USFWS 2000). In September 2002, a grizzly was sighted in the Burnt Fork drainage near Stevensville, approximately 13 miles southeast from the project area. Due to the proximity of big game winter range and riparian zones, the project area might serve as grizzly habitat. However, due to the proximity of the town of Florence and adjacent residences with unnatural bear attractants, providing grizzly bear habitat adjacent to human habitations would be detrimental to grizzly bears. Grizzly bears found in close proximity to human dwellings are often trapped and relocated because they are attracted to household garbage, bird feeders, pet food, etc., and become problem animals.

Under the proposed action, on approximately 360 acres, the relative density of ponderosa pine and proportion of Douglas-fir would be decreased, and 1.8 miles of road would be abandoned through ripping up the roadbed and seeding or depositing slash on the surface. As a result, there would be a short-term reduction in visual screening cover due to the reduced tree densities. However, due to the proximity of the aforementioned residences, the proposed action would aid in deterring use of the area by grizzly bears. At this time it is unlikely that grizzly bears occur within the analysis area and consequently, no direct or indirect impacts to grizzly bears are expected.

Gray Wolf (federally-endangered):

The nearest known wolf pack has been documented to use an area 8 miles to the northwest of the project area, in an area west of the Bitterroot Mountain divide. Wolves could use the area, due to the presence of deer and elk in the area, but with mitigations in place (i.e., suspending operations and restricting road use within a 1-mile radius of a known wolf den), there would be low potential for direct, indirect, or cumulative effects from either alternative. Other mitigations would include a DNRC wildlife biologist confirming current wolf status in the vicinity with the U. S. Fish and Wildlife Service prior to commencing activities in the area.

Lynx

Mosaics of dense lodgepole pine or Douglas-fir saplings with late successional forest for denning above 5,000 feet in elevation. The proposed action would affect approximately 360 acres that occur between 3500 and 4400 feet elevation, with ponderosa pine and Douglas-fir/snowberry and pinegrass habitat types. As such, these habitat conditions are currently outside of the range documented for lynx in Montana and are in close proximity to private residences (Ruediger et al. 2000). Thus, because of the lack of lynx habitat and proximity of residences, and associated human use, no direct, indirect, or cumulative effects are likely to occur for lynx.

Bull Trout (See Water Quality, Quantity and Distribution):

(See also "Checklist Environmental Assessment For Endangered, Threatened, Sensitive and Big Game Species Sweeney Timber Sale," Attachment G)

Sensitive Species:

Some sensitive species occur within the proposed sale area and some do not, (See "Checklist Environmental Assessment For Endangered, Threatened, Sensitive and Big Game Species Sweeney Timber Sale," Attachment G).

Other Sensitive Species Considered:

The following is a list of additional sensitive species that are known to occur on State Trust Lands, but were determined to have a low likelihood of occurring in the proposed Sweeney sale area due to limited or nonexistent habitats:

Coeur d'Alene Salamander	Ferruginous Hawk
Northern Bog Lemming	Columbia Sharp-tailed Grouse
Common Loon	Mountain Plover
Harlequin Duck	Townsend's Big-eared Bat

The risk of Cumulative effect to Threatened Endangered and Sensitive species are expected to be none to low. (See also "Checklist Environmental Assessment For Endangered, Threatened, Sensitive and Big Game Species Sweeney Timber Sale," Attachment G)

10. Historical and Archaeological Sites: (Are any historical, archaeological or paleontological resources present?)

No historical or archaeological sites have been identified within the proposed sale area. A site clearance by the DNRC Archaeologist has been given, (see attachment F).

11. Aesthetics: (Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?)

The proposed sale area is visible from both public roads and neighboring private ownerships. Aesthetics is typically a concern for most people (although none expressed this when contacted about this proposal). In response to this concern the proposed sale would be designed with the following features: 1) Retention of buffer trees near existing homes; 2) Retention of relatively large trees and snags; 3) Winter season logging restrictions (in order to minimize the spread of noxious weeds and potential skid trail impacts); and 4) Seeding of disturbed cuts and fills with site-adapted grasses.

The action alternative is not expected to adversely affect views from US Highway 93; however, those driving through the project area will experience more open stand conditions and further site distances. Some noise from harvesting equipment and log hauling may be heard by adjacent

landowners. This is expected to be short in duration and temporary (see also Logging & Truck Traffic).

12. **Demands on Environmental Resources of Land, Water, Air or Energy:** *(Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project?)*

The proposed project is not expected to use resources that are limited in the area nor are there other activities that would affect or be affected by the project.

13. **Other Environmental Documents Pertinent to the Area:** *(Are there other studies, plans, or projects on this tract?)*

Sweeney Creek Ponderosa Pine Restoration Project for 126 acres of commercial thinning, 695 acres of ecosystem underburning, and 36 acres of boundary fuels treatment in Sections 17, 18, 19, 20, & 21 of T10N R20W. Proponent: USDA Forest Service, November 1997; this is a planned project that borders the West and Southwest portions of the proposed project area.

III. IMPACTS ON THE HUMAN POPULATION

14. **Human Health and Safety:** *(Will this project add to health and safety risks in the area?)*

Logging and Truck Traffic:

Approximately 200 to 375 log trucks and/or loads would be expected to travel along county and sale area roads over a three year operating period, but would likely be concentrated within a 3 to 4 month period annually. Log hauling can create conflicts with other users of the road. There are also safety concerns regarding tight corners and children walking to the school bus stop. All active sale roads would be posted in order to minimize potential truck traffic hazards and some log hauling restrictions may be necessary on Sweeney Creek Road # 1315 when students are traveling to and from school. A 10 m.p.h. speed limit for log trucks will be required where the Sweeney Creek road passes through private lands. Prescribed burning would produce a variable amount of smoke (See Air Quality).

Air Quality:

Smoke may drift into residential areas near the proposed sale areas following prescribed burning activities. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion (as determined by the Montana Department of Environmental Quality and Montana Airshed Group). In order to reduce the potential threat of wildfire a majority of logging slash will be removed within (~100 ft) of public access roads and private property boundaries.

Snags:

Relatively few snags exist on the project area. All snags and snag recruitment trees would be retained to the fullest extent possible within applicable OSHA rules and guidelines.

15. **Industrial, Commercial and Agricultural Activities and Production:** *(Will the project add to or alter these activities?)*

The proposed project would lead to a temporary increase in industrial activity that is related to logging and log hauling. It will likely generate a relatively minor increase in revenue for the local timber and service industries with a corresponding minor increase in state and local tax revenue generated from these activities. Fences and irrigation ditches will be protected or repaired if damaged. Logging activities will occur when livestock will not be grazing.

16. **Quantity and Distribution of Employment:** *(will the project create, move or eliminate jobs?)*

It is unlikely that the proposed project would create, move or eliminate regional jobs.

17. **Local and State Tax Base and Tax Revenues:**

The proposed project would likely generate a relatively minor increase in state and local tax revenue.

18. **Demand for Government Services:**

It is unlikely that the proposed project would require a substantial increase in local or state services.

19. **Locally Adopted Environmental Plans and Goals:**

In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (SFLMP). The SFLMP established the agency's philosophy for the management of forested trust lands. The management direction provided in the SFLMP comprises the framework within which specific project planning and activities take place. This project was initiated after the approval of the SFLMP. The SFLMP philosophy has been incorporated into the design of the proposed action.

20. **Access to and Quality of Recreational and Wilderness Activities:**

The project area is used for hunting, hiking and motorized recreation. It is unlikely that the proposed project would adversely impact these activities.

21. Density and Distribution of Population and Housing:

It is unlikely that the proposed project would add to the local population or require additional housing.

22. Social Structures and Traditional Lifestyles:

It is unlikely that the proposed project would disrupt local native or traditional lifestyles.

23. Cultural Uniqueness and Diversity:

It is unlikely that the proposed project would adversely affect a local cultural attribute.

24. Other Appropriate Social and Economic Circumstances:

(See Economic Analysis for Proposed Sweeney Timber Sale, attachment E).

EA Checklist Prepared by:

PAUL MOORE
Name

Hamilton Unit Manager
Title

March 2003
Date

Literature Cited

Arno, S. F. 1976. The historical role of fire on the Bitterroot National Forest. Intermountain Forest and Range Experiment Station, Missoula, MT. USDA Forest Service Research Paper INT-187. pp.5

Arno, S.F. 2002. Retired Research Forester, Intermountain Fire Sciences Laboratory, Missoula, MT. Personal communication.

Arno, S.F. Scott, J.H. Hartwell, M.G. 1995. Age-Class Structure of Old Growth Ponderosa Pine/Douglas-fir Stands and Its Relationship to Fire History. USDA Forest Service Research Paper INT-RP-481.

IV. FINDING

An interdisciplinary team has completed the Environmental Analysis (EA) for the proposed Department of Natural Resources and Conservation (DNRC) Sweeney Timber Sale. After a thorough review of the EA, project file, public correspondence, and the proposed project's adherence to the State Forest Land Management Plan (SFLMP), I have made the following 3 decisions:

25. Alternative Selected:

Two alternatives are presented and were fully analyzed in the EA: The Action Alternative, which proposes harvesting between .7 and 1.4 million board feet of timber from 310 acres; and, the No-Action Alternative, under which no harvesting would take place.

For the following reasons, I have selected the Action Alternative without additional modifications:

- a. The Action Alternative meets the Purpose of Action and the specific project objectives listed in the EA on page 1.
- b. The analysis of identified issues did not reveal information compelling the Department not to implement the action alternative.
- c. The action alternative includes mitigations that address environmental concerns and issues identified during project development and scoping.

The No Action alternative does not generate revenue for the Public School (CS) trust grant and does not improve forest health and growth.

26. Significance of Potential Impacts:

I have reviewed the effects of the action alternative as described in this EA for the Sweeney Timber Sale and have determined that there will be no significant impacts as described in ARM 36.2.524 on the physical, biological, or social human environment. The impacts from implementation of this project are low and concerns have been mitigated for within the chosen alternative. The EA adequately addressed the issues identified during project development and displayed the information needed to make a decision. The Sweeney timber sale conforms with the management philosophy adopted by DNRC in the State Forest Land Management Plan and is in compliance with existing laws, policies, guidelines, and standards applicable to this type of action.

27. Need for Further Environmental Analysis:

Based on the information presented above, I have determined that an Environmental Impact Statement is not necessary and will not be prepared for this proposal.

EA Checklist Approved By: Steven B. Kamps Forest Management Specialist
Name Title

 March 10, 2003

-ATTACHMENTS-

ENVIRONMENTAL ANALYSIS

SWEENEY CREEK TIMBER SALE

- ATTACHMENT A PROPOSED SALE AREA MAPS
- ATTACHMENT B Soils, Geology, Weeds Report Section 16,
T10N, R20W
- ATTACHMENT C Watershed/Fisheries Material Sweeney
Timber sale EA
- ATTACHMENT D Endangered, Threatened, Sensitive, and Big
Game Species Sweeney Timber Sale
- ATTACHMENT E Economic Analysis for Proposed Sweeney
Timber Sale
- ATTACHMENT F Archaeology Report
- ATTACHMENT G Silvicultural Prescription



Proposed Timber Sale Map

Sec 16, T10N R20W

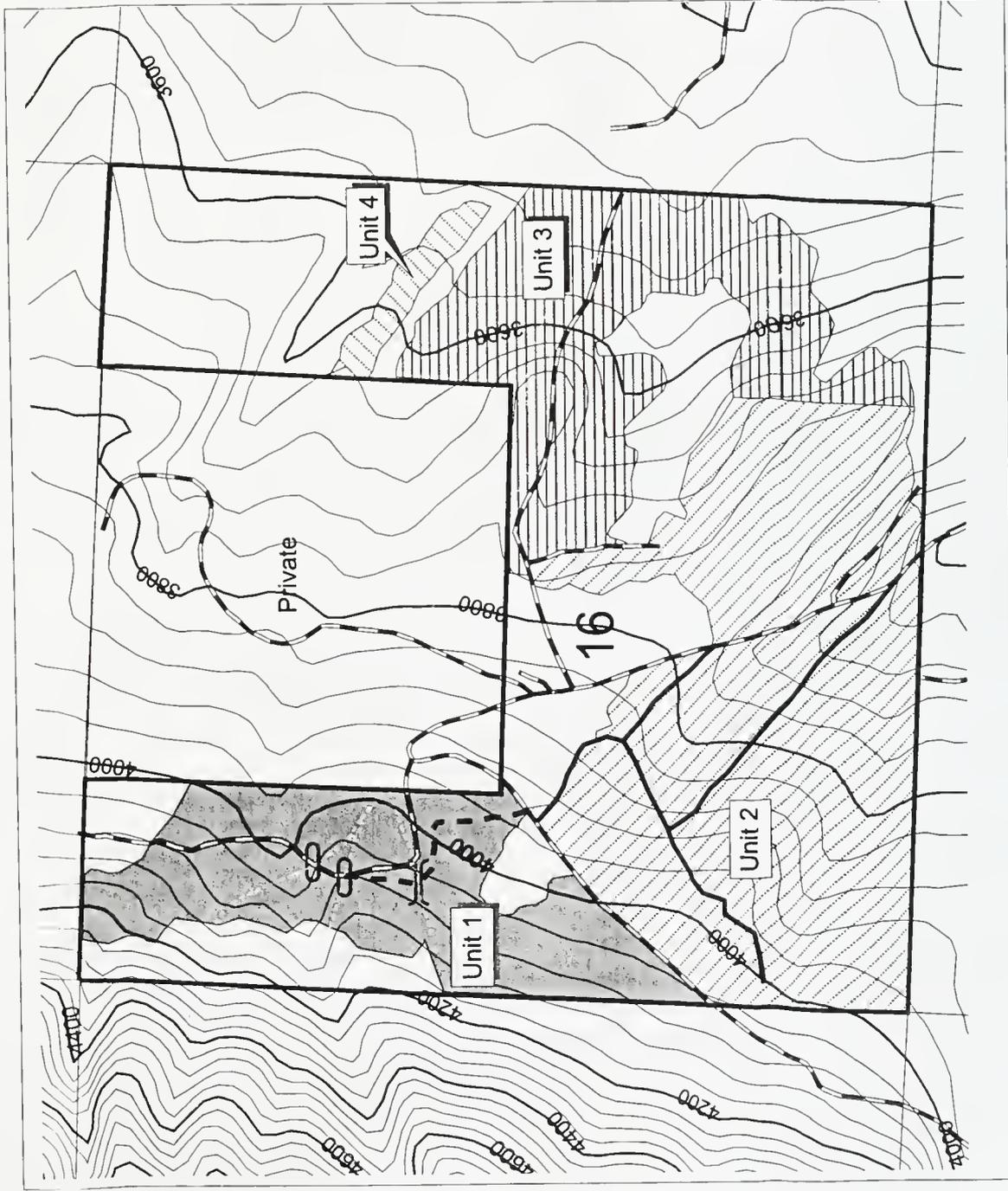
Acres	
Unit 1	66
Unit 2	161
Unit 3	76
Unit 4	7
Total	310

Legend

- 40 ft Contour Lines
- Streams
- Culverts
- Permanent
- Temporary
- Roads
- Existing Road
- Road Relocation
- Road Closed Post Logging

Units

- Harvest Unit 1
- Harvest Unit 2
- Harvest Unit 3
- Harvest Unit 4
- Non Harvest Area

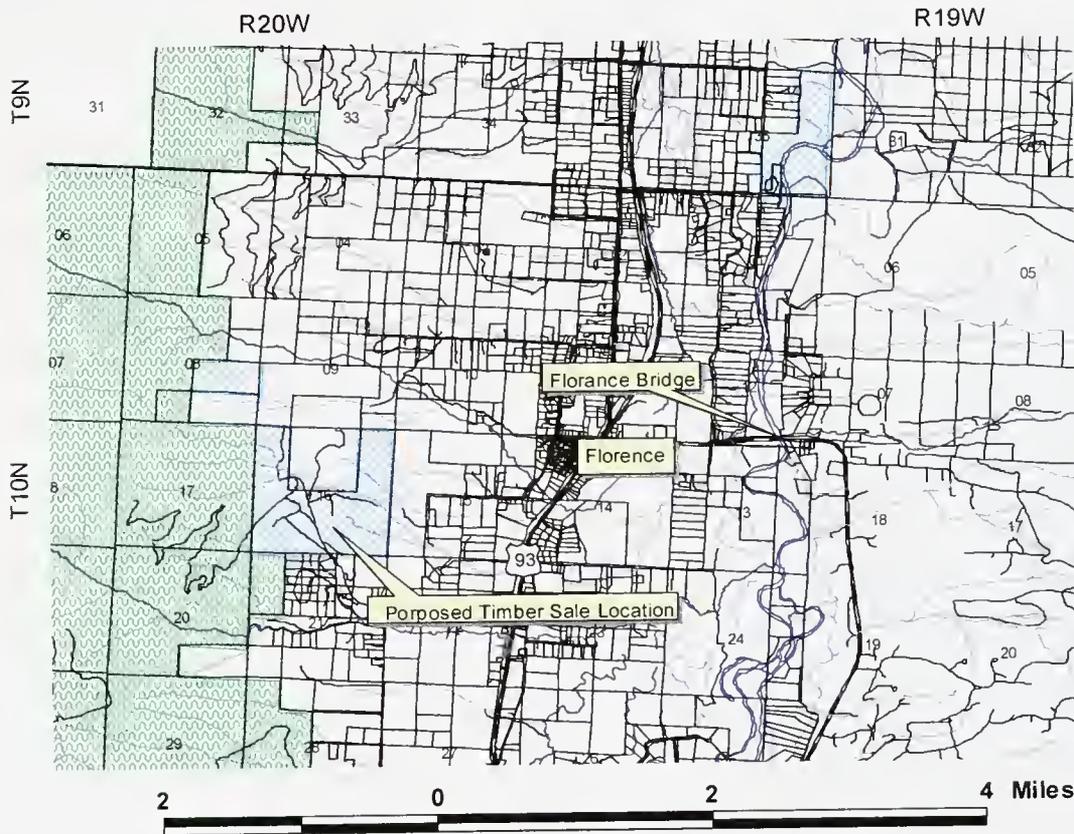


4000 Feet



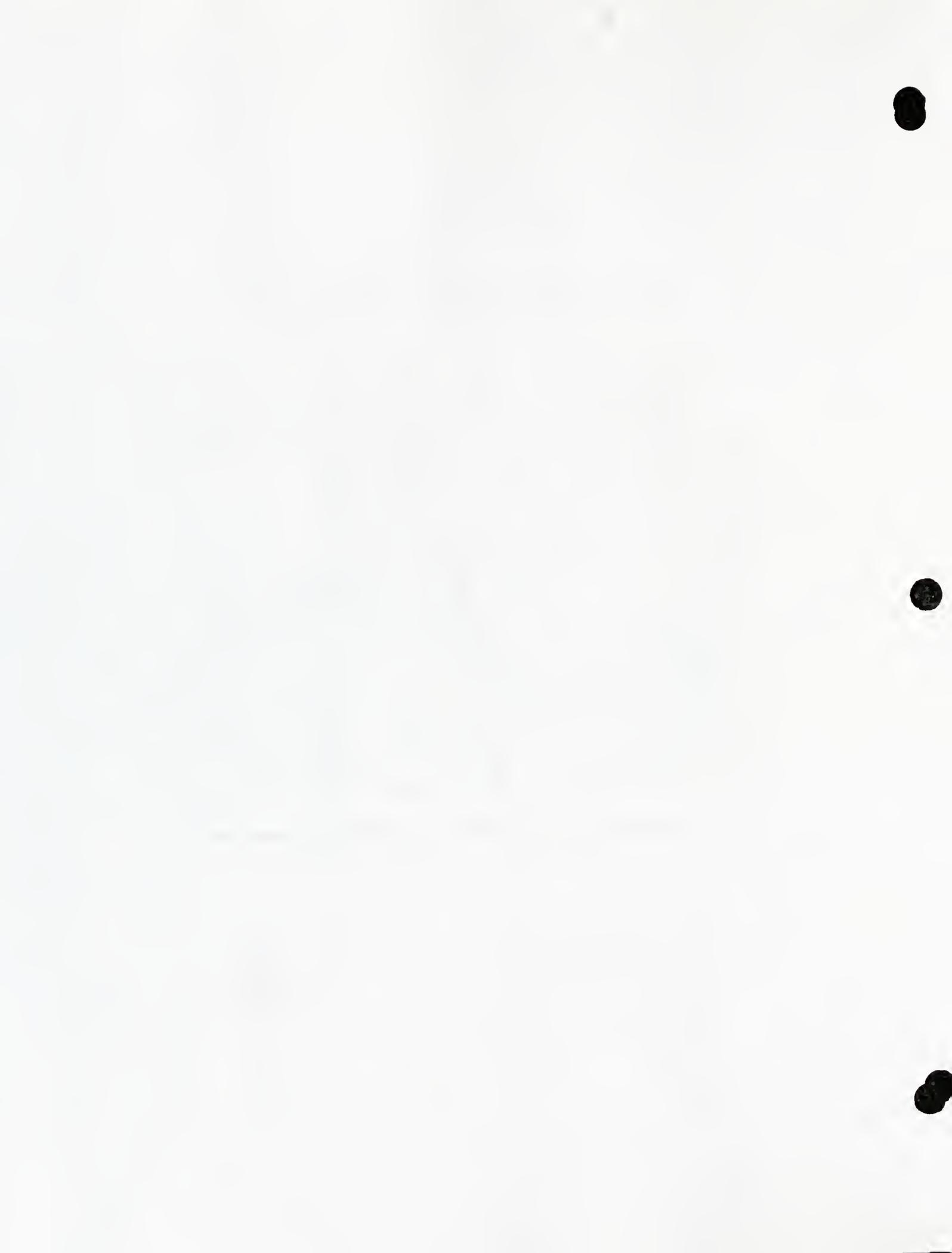


Vicinity Map



- Streams**
I. Water
P. Water
- Roads**
Highway/County
Open, Unedited Open
- Ownership**
Forest Service (FS)
Private
State of Montana (DNRC)





Revised January 24, 2003

TO: PAUL MOORE, Forester, Hamilton Unit
 MARK LEWING, Unit Manager, Hamilton Unit
 GARY FRANK, Supervisor, Resource Management Section

FROM: JEFF COLLINS, Soil Scientist

RE: SWEENEY TIMBER SALE, Soils, Geology, Weeds Report
 Section 8 parcel and Section 16, T10, R20

Attached are soil maps, interpretations and a discussion of the existing conditions and effects for the Sweeney project area.

Soil concerns and potential issues to be considered:

* Equipment operations during timber harvest on wet sites or sensitive soils can result in soil rutting, displacement and erosion.

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

* Adequate road drainage, proper construction and reconstruction according to BMP's and maintenance needs on existing roads.

* Noxious weed spread and encroachment on native plant communities associated with ground disturbance, road construction/ reconstruction, and traffic by trucks and recreationist.

EXISTING ENVIRONMENT Geology & Soils

1.) Geology

The Sweeney project area is located on moderate to steep slopes with soils weathering from mainly granitics on the upper slopes and ridges, with highly weathered granitic/tertiary age valley fill deposits forming the midslopes and footslopes of the Bitterroot Mountains below Sweeney Peak. The granitics consist mainly of micaceous granodiorites, which are weak and brittle when weathered and break down into coarse sands that are easily eroded. The tertiary deposits are a mixture of granitics and sandy clays.

There are no especially unique or unusual geologic features in the sale area. Most material is common excavation. Some minor areas of shallow bedrock occur on ridges in the Woodrock map unit and on the steeper slopes along the western edge of the section, which can hinder road and skid trail location. No suitable gravel sources were noted in the sale area. Where gravel is needed for culvert crossings, it should be supplied by the contractor from a suitable source. There is a local gravel pit on lower Sweeney Creek road.

2.) Soils

Soils maps and information were taken from the 1951 Ravalli county soil survey and revised based on field review. Predominant soils in Section 16 are Bass, Blodgett, and Como cobbly and stony sandy loams weathering from granitics (refer to attached table). These soils vary mainly by slope, terrain position, and stone content. Many of the old map units have minor variations in slope (5-15%) so they were grouped with soils of similar interpretation.

Topsoils are typically 3-8 inch coarse sandy loams over moderately deep gravelly and cobbly loamy sands. Duff layer are thin ¼-1 inch and sparse on southerly aspects and slightly deeper on north and east aspects. These soils are excessively well drained and droughty, which can stress seedlings, mainly on south aspects, and road cutslopes can be difficult to revegetate. Erosion hazard is high on bare granitic soils and increases with slope. Compaction hazard is low and less of a concern than rutting when soils are wet. Soils are slightly acidic with moderate productivity from the weathered granitics. These soils have a long season of use. Primary concern for soil productivity is maintaining the shallow topsoils, by minimizing displacement, controlling erosion and retaining a portion of woody debris for long term nutrient cycling. On the eastern half of the Sweeney section, there are some footslope draws and drainages separated by broad convex ridges. Soils are shallow on the ridges and deeper in the draws supporting more productive timber stands.

Charlos soils (map unit Cg & Ch) occur on footslopes of 10-35%, and alluvial fan/bench slope positions. Field review noted that these productive soils are more extensive than initially mapped. Charlos have loamy surfaces over deep sandy clay loams which can be seen on the access road in the S1/2 of the section and in the irrigation ditch in the NW ¼ of the section. The gritty clay rich subsoils have low rock contents and reddish brown color that indicates these deeply weathered soils. Soil bearing strength is low if operated on when wet, which can make roads impassable and difficult to maintain road drainage on native material roads if hauled on when wet. These soils are mainly well drained and tend remain wet/moist later in the year than the granitic soils and will support tree growth for a longer period of the growing season. The risk of soil compaction is higher than the other granitic soils and erosion hazard is moderate to high. There is adequate dry period for skidding and hauling.

Como stony and very stony coarse sandy loams (C3a & C3g) occur on the incised draws in the E ½ of the section on short steep slopes and narrow alluvial deposits adjacent to the creeks, which widen into broad alluvial fans on the toeslopes of the Bitterroot valley. These alluvial deposits are somewhat poorly drained and seasonally wet supporting willow and aspen. Conditions range from poorly drained saturated soils during spring and early summer, to well drained droughty surface conditions by mid to late summer. The complex terrain and narrow nature of some wet areas are not possible to map at this scale and require site specific review for design of mitigation measures. All SMZ's widths should be located based on a high erosion hazard.

Existing Road and Harvest effects Main access is from the east via the Sweeney Creek Road. This is a system road that provides yearly access to the Sweeney Peak trailhead and secondary road/trails are used by ATV's. Periodic maintenance is required due to some steep road grades.

There are extensive roads and trails within section 16, some constructed for timber access and others are unauthorized trails used by ATV's and 4x4's. Portions of existing roads on State show rutting and erosion mainly on short steep road pitches. Most roads are shallow excavations due to moderate slopes, and some are at steep grades and have inadequate drainage. Reconstruction will require some widening of road and curves to minimum safety needs.

Past harvest (1950's) was thinning and selection harvest that appeared to use dispersed skidding, and only main trails are still evident. Old skid trails that were located down draws on many sites and have mostly revegetated.

ENVIRONMENTAL EFFECTS ON SOILS

The No-action alternative would have little direct effect on soil resources. Existing roads with inadequate drainage and uncontrolled use would continue to erode without maintenance. Existing skid trails from past harvest would continue to ameliorate with time. Forest health would continue to decline on overstocked areas, due to increasing competition for limited soil nutrients and moisture.

Harvest Effects of action alternatives

Primary soil concerns are potential rutting, compaction or displacement associated with harvest operations and site preparation. Potential site impacts are difficulty with regeneration, reduced site productivity and increased runoff and erosion. Susceptibility to impact varies with soil type, harvest method, type of equipment and season of use. Most sensitive soils are wet sites and steep slopes, which will be avoided or protected. Proposed tractor harvest units will implement season of use and skidding restrictions to limit soil impacts. Impacts to soils would be minimized and soil productivity maintained if BMP's, and recommended mitigation measures are implemented to control or reduce the area and degree of soil impacts. Forest health would improve on thinned areas, due to reduced competition for limited soil nutrients and moisture.

Cumulative effects to soil productivity

Cumulative effects would occur from repeated entries into the harvest area. Past harvest and recreational use has left numerous trails, which access most proposed ground skidding units in the Sweeney section. Most of the old skid trails are mainly revegetated but some of the trails and roads used by recreation traffic are poorly vegetated, have inadequate drainage and are eroding.

Action alternative would incorporate skid trail planning that would identify which main trails to use, and what additional trails are needed. Trails and old roads that do not comply with BMP's (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed to stabilize the site and improve conditions. Skidding and slash disposal mitigation measures will limit the area impacted and therefore presents low risk of cumulative effects. Future stand entries in uneven aged stands would use existing trails and landings.

Road Access & Effects of action alternatives:

On the selected route, existing road conditions and drainage will be inventoried for site specific improvements to provide for access and control erosion with all action alternatives. Road condition and drainage will be improved by, spot grading, turnpiking short reaches across potholes, installing drainage in the road, and limiting season of use. Considerable improvement to the road

systems will be made by designating roads to remain open, installing drainage, and reconstructing segments of road. Roads in draw bottoms and poor locations will be closed off with drainage features installed, and reseeded with site adapted grasses where needed. Existing road closures can include earth berms, fencing and trampling slash on the road surfaces to prevent traffic. Road closures may not be completely effective due to the moderate slopes and open forest stands, but will be a considerable improvement over the existing conditions. Road drainage improvements to existing roads will allow seasonal access to the area and reduce erosion.

RECOMMENDED GENERAL HARVEST DESIGN MITIGATION MEASURES: TO CONSIDER IN ALTERNATIVES

- Limit equipment operations to periods when soils are relatively dry (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- The logger and sale administrator should agree to a general skidding plan prior to equipment operations. Tractor skidding should be limited to slopes less than 40%. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes.
- Slash Disposal- Limit disturbance and scarification to 30-40% of harvest units only as needed to meet silvicultural needs. No tractor piling on slopes over 35%. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.
- Retain approximately 5-10 tons of coarse woody debris greater than 3" diameter on site following harvest. The objective is to retain the majority of fine litter as feasible during harvest operations, for nutrient cycling. Along roads and property boundaries slash would be trampled and reduced levels to address fire hazard concerns. On commercial thin units where whole tree harvesting is used implement one of the following mitigations for nutrient cycling: 1) use in woods processing equipment that leaves slash on site, 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses.
- All new roads and reconstruction sites should be promptly revegetated with site adapted grass seed mix.
- Close any unneeded roads to reduce the amount of road maintenance needed and limit weed spread.

Existing Noxious Weeds.

Noxious weeds, mainly knapweed (*Centaurea maculosa*), and to a lesser extent sulphur cinquefoil (*Potentilla recta*) and a patch of dalmatian toadflax (*Linaria genistifolia*), occur within the project area mainly along roads and in some open sites. Knapweed is well established in the

more open forest stands. A spot of leafy spurge also occurs within the section. The section has two grazing license's and weed management treatments of herbicide control have been used.

Effects of Alternatives The Montana County Noxious Weed Act (MCA 7-22-2101-2153) requires State agencies to submit plans to manage noxious weeds where they occur through integrated management measures of prevention, revegetation and control. For this project DNRC completed a weed map of the project area to assess management options for weed control. Under the no-action alternative, the grazing leaser's would continue weed management associated with their use. Noxious weeds would continue to spread along road edges and out into susceptible habitats.

Under the Action alternative, ground disturbing activities of road construction and timber harvest have the potential to spread noxious weeds into susceptible habitats, such as open grassland areas. Our weed management objectives would tolerate existing knapweed and attempt to reduce densities by treating roadside edges with herbicides and revegetating disturbed soils. Where winter harvest is used the spread of weeds should be less. Erosion should be reduced along road edges by the improved grass cover which will provide competition with weeds. We expect that over the short term, knapweed would increase in vigor where shade is reduced. As the forest canopy grows and fills in, knapweed should decrease in vigor. The limited area of toadflax would be treated with a containment strategy. Where herbicides are used, DNRC would require the licensed applicator to avoid spraying near surface waters and maintain a buffer near creeks and ditches. DNRC assumes there would be no detrimental effects to soils, water quality or fisheries based on application according to label instructions by a licensed applicator. The following prevention and control measures will be implemented to limit the possible introduction of noxious weeds into the project area and improve treatment of existing noxious weeds.

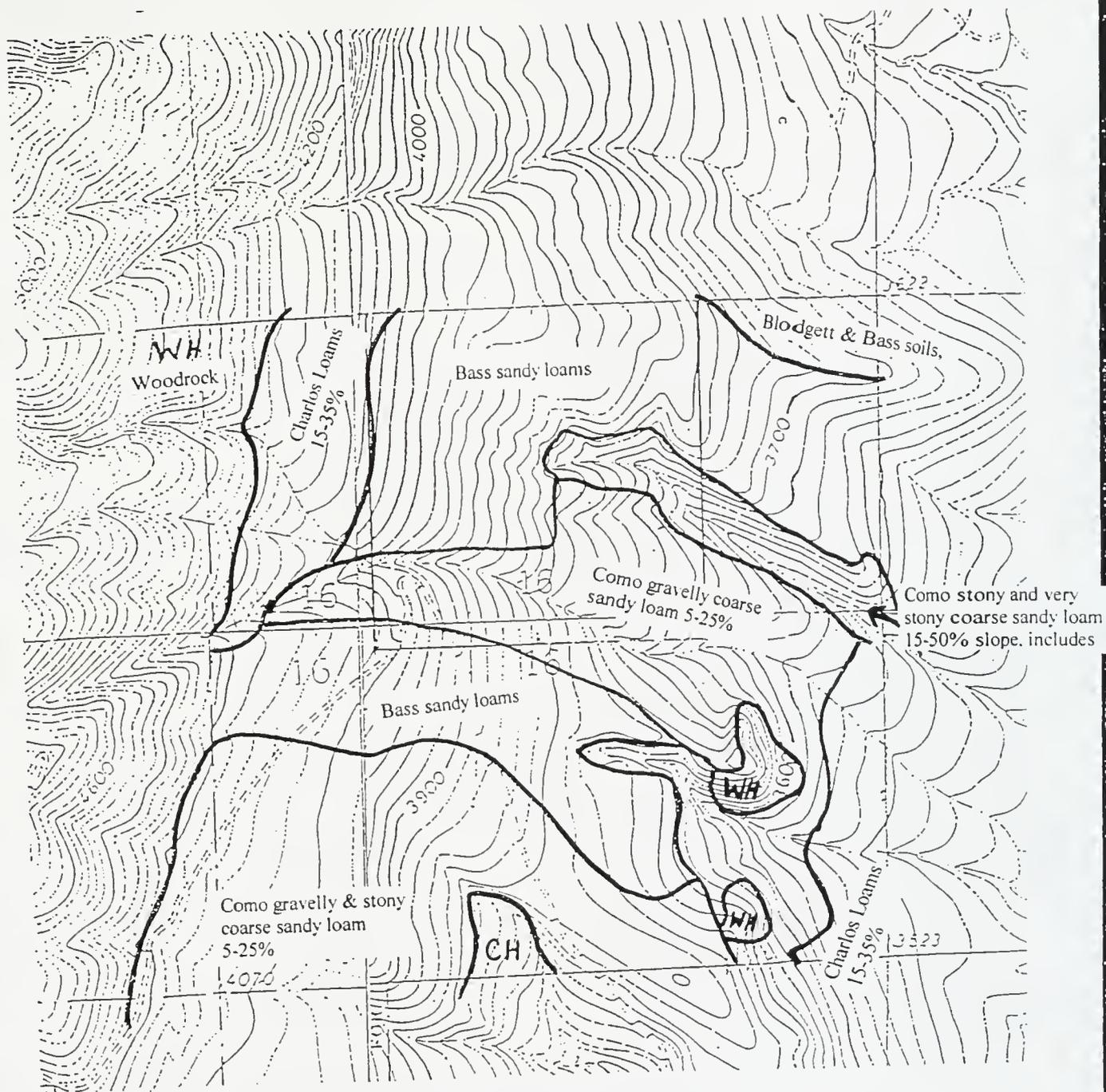
- * All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to reduce the spread of existing weeds and prevent introduction of new noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on site.
- * All newly disturbed soils on road cuts and fills will be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.
- * Weed treatment measures would include herbicide treatment of noxious weeds, mainly along roads. Any herbicide treatments will be implemented by a certified applicator according to herbicide label directions in accordance with applicable laws and rules of Ravalli County Weed Board.

SWEENEY PROJECT AREA Sweeney Creek section

<u>Map Units</u>	<u>Name</u>	<u>Parent Material</u>	<u>Topsoil</u>	<u>Subsoil</u>	<u>Permeability</u>	<u>Erosion Hazard</u>	<u>Displacement Hazard</u>	<u>Compaction</u>	<u>Road Bearing Capacity</u>
Be, Bf, Bh, & Bk	Bass sandy loams	Strongly weathered, compacted, granitic, bouldery alluvium.	Coarse sandy loam 0-7"	Cobbly coarse sandy loam 7-48"	Rapid	Moderate to high	Moderate to high	Low	Good
Bx & By	Blodgett cobbly & gravelly coarse sandy loams 5-15%	Weathered granitic outwash (gravel & cobble)	Coarse sandy loam 0-8"	Gravelly coarse loamy sand 8-12"	Rapid	Moderate to high	Moderate to high	Low	Good
B2b & B2e	Blodgett & Bass soils, undifferentiated, 15-35%	Weathered granitic outwash (gravel & cobble)	Coarse sandy loam 0-8"	Cobbly coarse sandy loam - gravelly coarse loamy sand 8-48"	Rapid	High to severe	High	Low	Fair
Ch, Cg	Charles Loams 15-35%	Weathered granitic Alluvium & Tertiary Deposits	Coarse sandy loam 0-8"	Cobbly coarse sandy loam - gravelly coarse loamy sand 8-48"	Rapid	High to severe	High	Low	Fair
<u>Map Units</u>	Como gravelly & stony coarse sandy loam 5-25%	Weathered granitic & gneissic gravel and cobblestone	Light gravelly coarse sandy loam 0-12"	Gravelly loamy sand 12-36"	Rapid	Moderate to high	Moderate to high	Low	Good
C2p, C2r, & C2s	Como stony and very stony coarse sandy loam, 15-50% slope, includes Draws and riparian	Weathered granitic & gneissic gravel & cobblestone	Stony coarse sandy loam 0-12"	Gravelly loamy sand 12-36"	Rapid	Moderate to severe	Moderate to high	Low	Fair
C3f & C3g	Woodrock association >25%	Weathered granitics	Shallow surface	Moderately deep stony	Rapid, droughty	Moderate to severe	High	Low	Fair, stony

SWEENEY SOILS

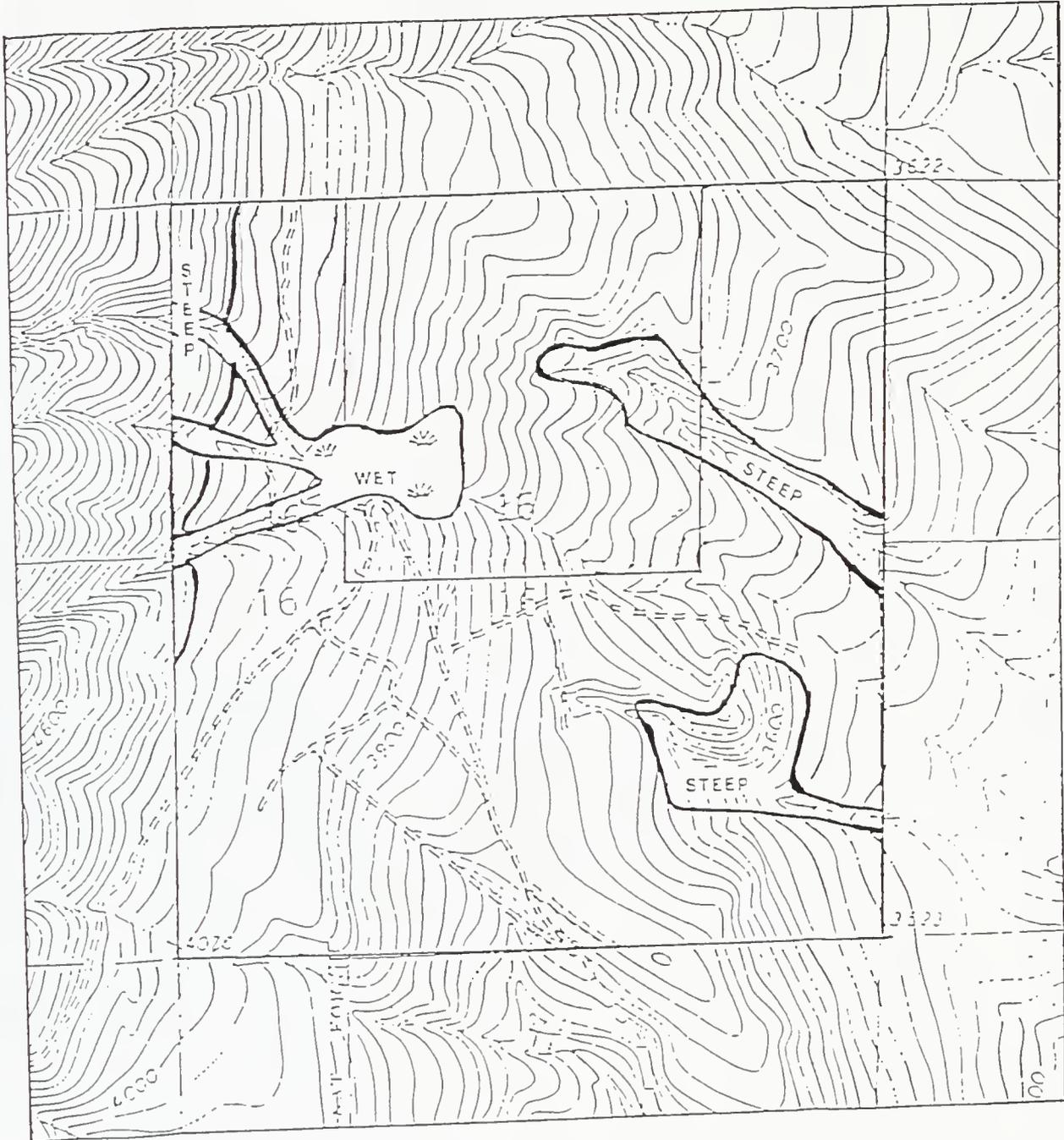
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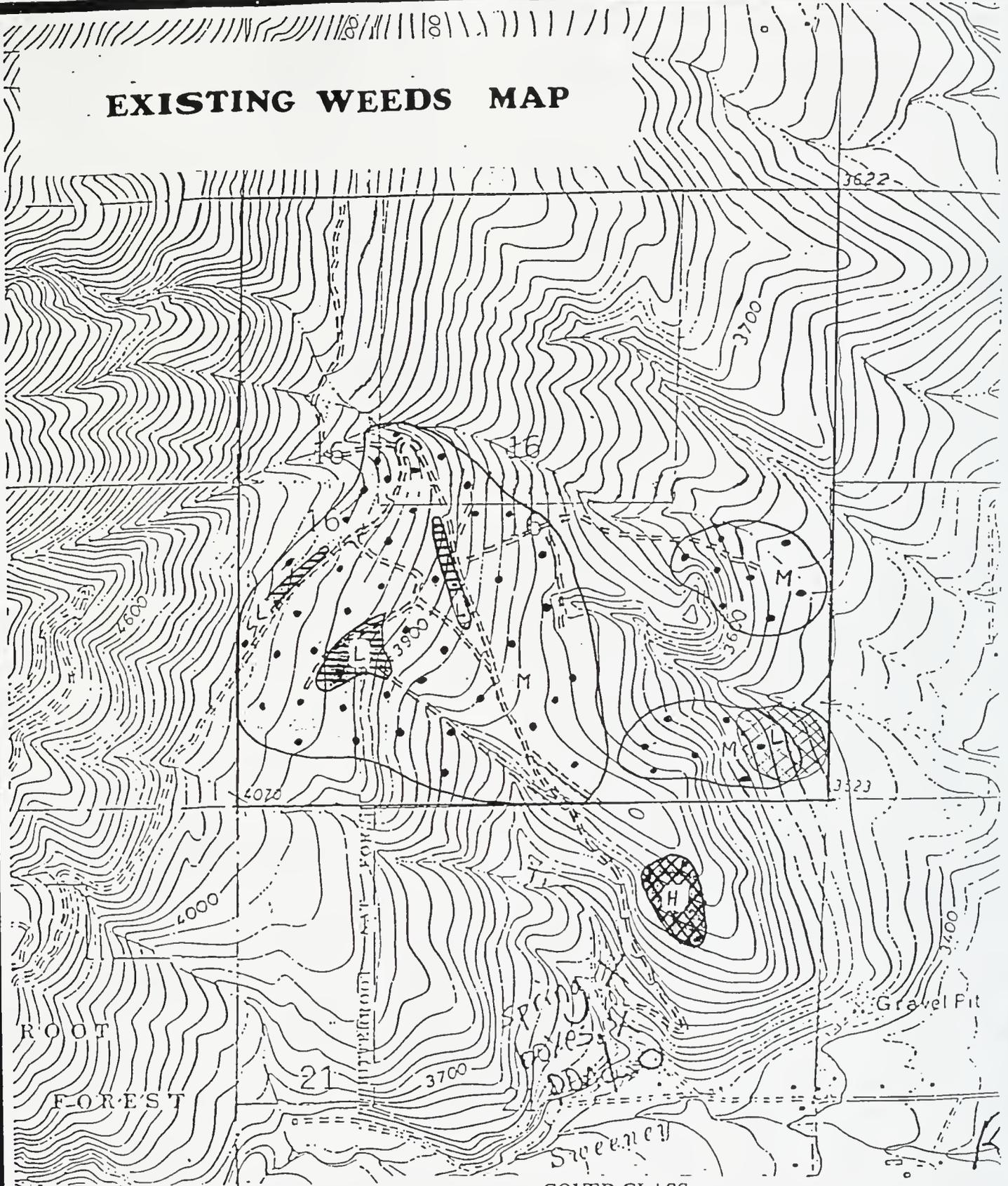
SWEENEY

OPERATIONAL LIMITATIONS

Sec. 16 T 10N R 20 W



EXISTING WEEDS MAP



COVER CLASS



Spotted knapweed

T = (Trace; rare): less than 1% cover



Sulfur cinquefoil

L = (Low; occasional plants): between 1 and 5% cover



Dalmatian toadflax

M = (Moderate; scattered plants): between 6 and 25% cover

II = (High; fairly dense): between 26 and 100% cover



**Draft Watershed/Fisheries Material
Sweeney Timber Sale EA**

Modified by G.Frank 3/5/03

AFFECTED ENVIRONMENT

Watersheds

The proposed timber sale is located within a single parcel of state owned land that is located on the western flank of the Bitterroot valley just south of Florence, Montana. The parcel is drained by an unnamed face drainage, Child's Creek, and an ephemeral draw within the Sweeney Creek watershed. Roads accessing the proposed harvest areas are located in these same watersheds. A short description of each watershed within the affected environment follows. More detailed stream inventories and channel descriptions are available in the hydrology project file.

Face Drainage

Approximately 303 acres of Section 16 are drained by several small, unnamed and discontinuous streams and ephemeral draws which dissect the lower mountain slopes and foothills on the west side of the Bitterroot Valley. Isolated segments of these drainage features contain spring fed perennial and/or intermittent stream channels. However, all surface discharge is intercepted by a series of irrigation ditches either located on the State section or immediately downstream on adjacent private land.

Sweeney Creek

Approximately 105 acres in the Southwest ¼ of the State section is located in the Sweeney Creek watershed. Sweeney Creek is a large third order perennial stream that drains a watershed area of approximately 16 square miles. Most of the watershed area consists of rugged, high elevation, mountainous terrain that is located within the Selway-Bitterroot Wilderness Area. The proposed harvest area is actually drained by an ephemeral draw that contains a short limited segment of intermittent stream channel in its upper reaches. All stream segments within this draw are discontinuous. There is neither a discernable stream channel nor evidence of concentrated surface runoff in the lower reaches where the draw leaves the State section.

Child's Creek

Approximately 209 acres in the north 1/2 of the State parcel are drained by Child's Creek and an unnamed intermittent / ephemeral tributary to Child's Creek. Child's Creek is a second order intermittent tributary to One Horse Creek. The confluence of the two streams is located at the Highway 93 crossing of One Horse Creek. Child's Creek drains a watershed area of approximately 584 acres. The mainstem stream channel is perennial on the State section. However, flows from this channel are largely if not entirely diverted into several irrigation ditches located on the State section and downstream on adjacent private land. Direct surface delivery to Lost Horse Creek is probably limited to peak runoff during spring snowmelt

Other Water Resources

There are two irrigation ditches, the Schreckendgust Ditch and the Lunceford-Schreckendgust Ditch, which flow across the Northeast $\frac{1}{4}$ of the State parcel. Both of these ditches carry water that is diverted from One Horse Creek approximately $\frac{3}{4}$ miles north of the State parcel. A portion of the flow from the Schreckendgust Ditch is diverted at into a lateral ditch at a headgate, which is also located in the Northeast $\frac{1}{4}$ of the State parcel. The lateral ditch traverses the eastern edge of the State section and exits it at the Southeast corner. All of these ditches are used to flood irrigate pastures located immediately adjacent to the State ownership.

A small portion of the State parcel is located in the One Horse Creek watershed. However, no activities are planned for this part of the parcel, so it was not included as a watershed analysis area.

Regulatory Framework

The Bitterroot River drainage, including the Sweeney Creek, Child's Creek and the unnamed face drainage are classified B-1 in the Montana Surface Water Quality Standards. The B-1 classification is for multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold water fisheries, associated aquatic life and wildlife, and agricultural and industrial uses. Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentration of sediment, which will harm or prove detrimental to fish or wildlife. Naturally occurring includes conditions or materials present from runoff on developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities.

None of streams located within the project area have been identified as water quality limited water bodies on Montana's 1996 or 2002 303(d) list.

The Montana Streamside Management Zone (SMZ) Law (MCA 77-5-302) and rules regulate forest practices that occur adjacent to streams, lakes and other bodies of water. The law prohibits or restricts timber harvest and associated activities within a width of SMZ that varies from 50-100 feet of either side of a stream, depending on the steepness of slopes and the class of stream.

The Montana Stream Protection Act (MCA 87-5-501) regulates activities conducted by government agencies that may affect the bed or banks of any stream in Montana. The law provides a mechanism to require implementation of BMPs in association with stream bank and channel modifications carried out by governmental entities. Agencies are required to notify the Department of Fish, Wildlife and Parks (DFWP) of any construction projects that might damage or modify the natural existing shape and form of any stream.

Cold Water Fisheries

Fisheries surveys were completed in Sweeney Creek in 1995 by the Bitterroot National Forest. Both day-time and night-time snorkeling observations were made on a 1000 meter reach of Sweeney Creek starting at the Forest Boundary in 20 T10N R20W. These surveys found both bull trout and westslope cutthroat trout present. A few brook trout were also noted during these surveys. This westslope cutthroat population is considered to have a high potential for genetic purity.

Fish population surveys have not been completed for Child's Creek. However, westslope cutthroat trout were observed in Child's Creek by a DNRC hydrologist while completing stream surveys within the project area.

Bull trout are currently listed as a threatened species under the Federal Endanger Species Act (ESA). As of date, the U.S. Fish and Wildlife Service has not finalized the draft bull trout recovery plan. However, the Montana Bull Trout Restoration Team has developed guidelines that are contained in the State's Bull Trout Restoration Plan. Additional guidance is contained in the DNRC forest management administrative rules and the State Forest Land Management Plan.

Westslope cutthroat trout are recognized as a Class A species by the State of Montana. Class A species are defined as having limited numbers and/or limited habitats both in Montana and elsewhere in North America; elimination from Montana would be a significant loss to the gene pool of the species or subspecies. DNRC has entered into a statewide conservation agreement for westslope cutthroat trout. A Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana was finalized by MDFWP and signed by DNRC and other cooperators in May of 1999. This agreement was a collaborative effort developed by the Westslope Cutthroat Steering Committee that is represented by numerous state and federal resource agencies, conservation and industry organizations, sportsmen and private landowners. Under the MOU, DNRC has agreed to protect all genetically pure and slightly introgressed (less than 10% introgressed) WCT populations. Protection includes maintaining or developing high quality habitat to prevent extirpation.

Cumulative Watershed Effects - Existing Conditions

Agriculture, irrigation diversions, flood irrigation return flows, grazing, subdivision, off-road vehicle use, road construction and use, timber harvests and fire suppression have all occurred within the affected watersheds over the past 100 years. A course filter approach was used to screen the affected watersheds to determine existing conditions and to evaluate the potential for cumulative watershed impacts due to increases in water yield and sediment yield. Recent aerial photography was utilized to estimate the percentage of drainage area forested and the extent of the existing timber harvest within each watershed analysis area. The analysis also included field evaluations conducted to: 1) Determine existing stream

channel condition, 2) determine existing road conditions, 3) identify potential source of sediment, and 4) verify harvest information obtained from air photos. The results of that analysis are summarized in the following table:

Table 1. - Coarse Filter for Potential Cumulative Watershed Effects

Watershed	Watershed Size	Flow Regime	Cold-Water Fisheries	Level of Existing Harvest	Level of Existing Roads
Sweeney	16 square miles	Perennial	Yes BT and WCT	Light Mostly Wilderness	Low
Child's Creek	584 acres	Perennial Largely diverted	Yes WCT	Moderate	Low
Unnamed Face Drainage	1164 acres	Intermittent Discontinuous	None	Light	Low

The results of the coarse filter analysis indicate low risk for of detrimental increases in water yield, and magnitude and duration of peak flows due existing timber harvest and road construction activities in Sweeney Creek, Child's Creek and the Unnamed Face drainage.

A majority of the Sweeney Creek watershed lies within the Selway-Bitterroot Wilderness Area. This portion of the watershed is undeveloped with no roads or recent timber harvest. The remainder of the watershed is largely non-forested agricultural and subdivided housing land use. A Forest-wide Sensitivity Analysis completed by the Bitterroot National Forest concluded that Sweeney Creek watershed was in relatively good condition due to low road densities, small percentage of timber harvest and few other impacts. The watershed was determined to be thresholds for cumulative watershed effects (USFS, 1993).

Both Child's Creek and the unnamed face drainage's are located in watersheds that receive relatively low amounts of precipitation and subsequently produce relatively low amounts of runoff per unit land area. Forested areas in these two watersheds primarily consist of relatively dry Douglas-fir and ponderosa pine cover types. These cover types were subject to frequent low intensity wildfire events prior to settlement and development. Decades of fire suppression have resulted in higher stand stocking levels (density of trees), higher overall basal area and an increase in the total amount of forested area due to range encroachment. Detailed stream surveys were conducted on all stream channels and ephemeral draws draining the proposed sale area. These field inventories of stream channel conditions determined that there was no evidence of channel instability due to increases in the magnitude or duration of peak flows.

All of the watersheds within the affected environment are low risk for cumulative watershed impacts due to water yield increases. Risks of cumulative impacts to water quality and downstream beneficial uses are limited to those impacts associated with localized sources of sediment delivery within the project area and downstream on private land. Channel instability

due to extensive livestock grazing on private land downstream of the State is evident. Detailed sediment source inventories were completed for State's ownership in these watersheds. The results of these surveys are discussed in the section addressing water quality.

Water Quality

Existing impacts to water quality within the project area are primarily associated with accelerated sediment delivery to streams and ephemeral drainage features. Detailed sediment sources surveys were completed for the State's ownership by a DNRC hydrologist and soil scientist. The purpose of these surveys was to identify and inventory all existing and potential sources of erosion and sediment delivery to streams on the State ownership.

Access to the proposed harvest area is provided by an existing County, State and Forest Service road system located on both private and state land. All existing roads on the State's ownership as well as those proposed for access and timber hauling were inventoried during the sediment source survey. Many of these existing roads are in poor condition and do not fully comply with Best Management Practices (BMPs). These roads are substandard due to their location, sustained steep grades, lack of adequate surface drainage features and lack of general road maintenance. Direct delivery of sediment is occurring at several locations on existing roads located within the State section. One segment of lower standard road located in the northwest $\frac{1}{4}$ of the section contains several unimproved stream crossing. Water has been diverted down the road surface at several of these crossings, which has resulted in moderately severe road surface erosion, small gully erosion and subsequent sediment delivery to several forks of the unnamed face drainage.

Downstream of the State ownership Child's Creek is severely impacted by current grazing management, diversions and private access roads. For the most part the stream channel is stable on state land. One short reach (approximately 100 feet in length) located immediately upstream of the east property line has unstable stream banks due to concentrated livestock use and trampling. In the past, the water leaking from the irrigation ditch which traverses the eastern border of the State parcel has cause several small mass failures and gully erosion with direct sediment delivery to Child's Creek.

The existing roads, and the unstable reaches of irrigation ditch will continue as a chronic source of sediment delivery and pose potential risk to downstream water quality unless improvements, mitigation and remedial action measures are implemented. Site-specific improvements and mitigation measures designed to address existing risk to water quality are discussed in Chapter 4 (the section on effects of the proposed action alternative).

Chapter 4 – Watershed and Fisheries Effects

This section addressed the anticipated effects of the proposed activities on water and fisheries resources within the affected watersheds. The primary concerns related to these resources are potential impacts to water quality and aquatic habitat and the effects of these impacts on downstream populations of Bull trout and westslope cutthroat trout and other beneficial uses

such as domestic, irrigation and livestock water uses. In order to address these issues the potential direct, indirect and cumulative effects of the proposed action alternative on sediment delivery and water yield were analyzed.

The following table summarizes the road and harvest activities proposed for each watershed analysis area:

Table 2. Summary of Proposed Activities by Watershed Analysis Area

Watershed	Proposed Harvest (Acres)	Road Relocate (miles)	Existing Road Abandon (miles)	Existing Road Improved (miles)
Sweeney Creek	98	0	1.22	0.42
Child's Creek	40	0	0	0.15
Unnamed Face	172	0.35	0.64	1.5

Water Quality

The primary risks to water quality that are associated with the proposed timber sale are roads, especially roads located along or crossing streams. Risk of erosion and sediment delivery are highest when roads are located in areas with inadequate buffering between streams and other drainage features, on erosive soils, or on steep and/or unstable slopes. A lack of periodic maintenance and adequate surface drainage features, and use during wet periods or conditions may also contribute to higher risk.

All existing roads and proposed road locations within and accessing the timber sale area have been reviewed and inventoried by a DNRC hydrologist and soil scientist. The existing roads and proposed road locations were evaluated to determine both existing and potential risk of erosion and sources of sediment delivery to streams. Many of the existing roads within the proposed sale area do not fully comply with minimum BMPs. Several segments of existing road are eroding and were determined to be contributing direct sediment delivery to streams or at risk of contributing to direct delivery.

Under the proposed action alternative, approximately 2.6 miles of existing road will be improved to a standard that fully complies with BMPs. Another 1.8 miles of existing road would be permanently closed and abandoned under the proposed action. Many of these roads are no longer needed or are the result of unauthorized ATV use. Many of the segments of road to be abandoned

are eroding or pose high erosion risk. Also under the proposed action alternative, 0.35 miles of existing road will be relocated to a location that also poses a lower risk to water quality and is more suitable for timber sale activities.

Some short-term increases in sediment delivery to the unnamed face drainage may occur during and/or shortly after the installation of several new culverts intended to replace unimproved stream crossings. Application of BMPs, site specific design and mitigation measures are expected to reduce erosion and potential sediment delivery to an acceptable level as defined under the Montana Water Quality Standards. Acceptable levels are defined as those conditions occurring where all reasonable land, soil, and water conservation practices have been applied.

Presently, water is intercepted at several unimproved stream crossings and diverted down the existing road surface. Considerable amount of road surface erosion and sediment delivery to the stream is occurring. The proposed road relocation and culvert installations are designed to address these problems and reduce long-term erosion and sediment delivery concerns. These road segments will continue to be a chronic source of sediment delivery to the unnamed stream unless the relocation and crossing improvements are implemented.

The proposed road improvements, road abandonment and road relocation activities are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features within the proposed projected area. The anticipated impact of these activities would be improved water quality, improved protection of cold water fisheries and other downstream beneficial uses when compared to the current existing conditions.

All proposed harvest stands have also been reviewed and evaluated in the field by a DNRC hydrologist and soil scientist. Selection of appropriate operating seasons, limiting equipment operations to suitable slopes or designated trails and appropriate ground conditions, and implementation of appropriate BMPs and mitigation measures will be used to reduce the risk and severity of soil erosion and potential sediment delivery to streams and ephemeral drainage features. In addition, streamside management zones and equipment restriction zones will be designed to effectively buffer streams and other ephemeral drainage features from harvest activities.

There is no means of direct sediment delivery from the proposed harvest area to Sweeney Creek. The portion of the state parcel located in the Sweeney Creek watershed is drained by an ephemeral draw that does not contain a discernable stream channel in the lower segments. The draw bottom is well vegetated with brush, grasses and forb species. Any concentrated ephemeral discharge flowing continuously down the draw is intercepted by one of several irrigation ditches that bisect the draw bottom down slope of the state ownership. Equipment restriction zones will be utilized to limit erosion risk within all ephemeral draw bottoms.

No impacts to water quality, cold-water fisheries or other downstream beneficial uses are expected to result from the proposed harvest activities.

Cumulative Watershed Effects

Cumulative watershed effects are off-site, downstream changes in hydrology, sediment production, transport and storage in response to a combination of multiple land management activities. A coarse filter approach was used to determine the potential hydrologic effects of the proposed actions when combined with past or other ongoing activities.

The risk of detrimental levels of water yield increase (increased magnitude or duration of peak flows) due to timber harvest is low for all potentially affected watershed under the proposed action alternative. This conclusion is based on the natural and existing levels of forest canopy cover, low annual basin precipitation in the Unnamed face drainage and Child's Creek, and the partial canopy removal prescriptions included in the proposed action.

As noted in the Existing condition section, a majority of the Sweeney Creek watershed lies within the Selway-Bitterroot Wilderness Area. This area is undeveloped with no timber harvest or road building activities. Forest canopy cover is likely to be much higher than would have been expected during pre-European settlement due to wilderness wildfire suppression and forest range encroachment at lower elevation foot slopes and edge of Bitterroot Valley bottom.

Both the Child Creek and Unnamed Face drain areas that are relatively low elevation with only 20-25 inches of annual precipitation and consequently relatively low levels of runoff. These watersheds have only had light to moderate levels of harvest activity over the last several decades. Therefore, overall forest stocking levels and canopy cover are still higher over much of the drainage area due to fire suppression and range encroachment than would be expected pre-settlement conditions. The proposed prescription would remove approximately 40-45 % of the basal area from those stands treated. The amount of residual forest canopy remaining following harvest would have a compensating effect, which limits the potential for additional offsite water delivery. The remaining forest stands will likely utilize most of the soil moisture available onsite during the growing season and still provide a large degree of canopy area for interception of rainfall and snowfall.

No increases in sediment yield are expected to result from implementation of the proposed action alternative. The activities proposed under the action alternative would reduce the total amount of road on the State parcel to 2.6 miles. Approximately 1.8 miles of existing road would be permanently closed and abandoned. Another .35 miles of road would be relocated out of the SMZ. The remaining 2.6 mile of existing road will be improved to meet minimum BMPs and to reduce erosion and sedimentation risk. Implementation of the proposed action is expected to reduce long-term sediment yields and erosion risk from waters draining the State parcel.

Cold Water Fisheries

Only minor amount of timber harvests is proposed within Streamside Management Zones of fish bearing streams. The SMZ harvest would be limited to 7 acres of selective harvest (thinning) of

a stand located adjacent to Childs Creek. The light harvest would only occur in the outermost portion of the SMZ. No tree would be harvest immediately adjacent (within 25') to the stream. Therefore no substantial reduction in the levels of potential large woody debris recruitment, stream shading and no increases in stream water temperatures are expected under the proposed action. SMZ widths will comply with the Montana Streamside Management Zone Law and the State Forest Land Management Plan.

The proposed road improvements, road abandonment and road relocation activities are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features within the proposed projected area (see Water Quality section). The anticipated impact of these activities would be improved water quality and improved protection of cold water fisheries habitat in Child's Creek.

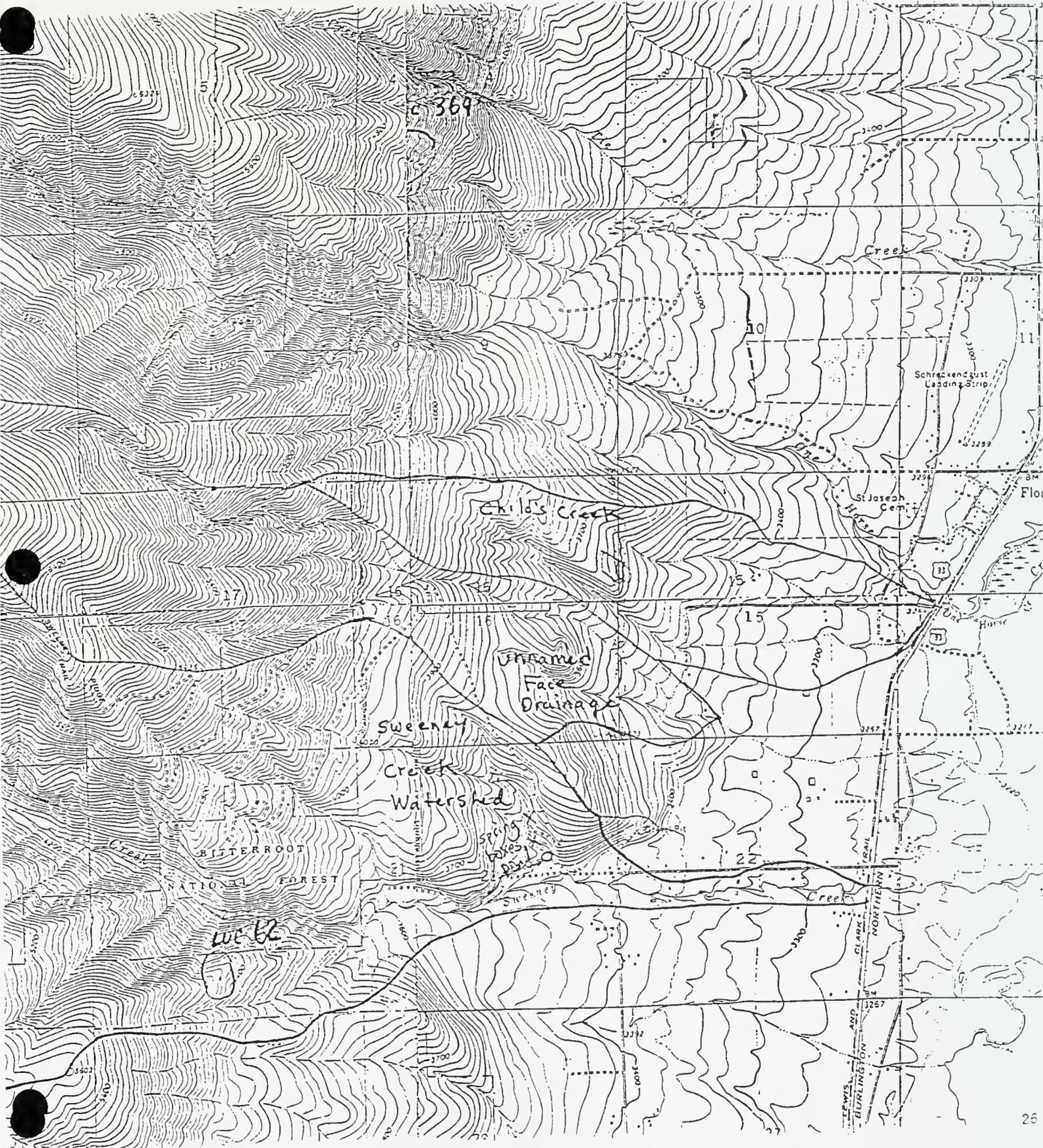
Populations of Bull Trout with in the Sweeney Creek drainage will not be affected by the proposed action. That portion of the State ownership lying within the Sweeney Creek watershed is actually drained by a discontinuous ephemeral draw. The draw contains isolated segments of intermittent stream channel. However, these segments are not fish bearing and discontinuous. There is no direct delivery of concentrated surface runoff from the proposed project area to Sweeney Creek.

References

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Watershed Analysis Area Map





19 November 2002

CHECKLIST ENVIRONMENTAL ASSESSMENT
For
Endangered, Threatened, Sensitive, and Big Game Species
Sweeney Timber Sale

Threatened and Endangered Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur L = Low Potential for Effects
<p>Bald Eagle (<i>Haliaeetus leucocephalus</i>), Federally threatened.</p> <p>Habitat: Nest in ≥ 20 inch dbh trees within 1 mile of fish-bearing rivers and lakes.</p>	<p>[N] Bald eagle nests are located 2.85 miles to the east and 4 miles to the southeast of the project area, along the Bitterroot River. Because the project area is outside of each nesting pair's projected 4 km (2.49 mile) home range, no direct, indirect, or cumulative effects are likely to occur. Should nesting occur within 4 km of the project area, a DNRC biologist will be consulted for mitigations.</p>
<p>Lynx (<i>Felis lynx</i>), Federally threatened.</p> <p>Habitat: Mosaics of dense lodgepole pine or Douglas-fir saplings with late successional forest for denning above 5,000 feet in elevation.</p>	<p>[N] The proposed action would affect approximately 310 acres that occur between 3500 and 4400 feet elevation, with ponderosa pine and Douglas-fir/snowberry and pinegrass habitat types. As such, these habitat conditions are currently outside of the range documented for lynx in Montana and are in close proximity to private residences (Ruediger et al. 2000). Thus, because of the lack of lynx habitat and proximity of residences, and associated human use, no direct, indirect, or cumulative effects are likely to occur for lynx.</p>
<p>Gray Wolf (<i>Canis lupus</i>), Federally endangered.</p> <p>Habitat: Abundant big game populations with security from human activity.</p>	<p>[L] The nearest known wolf pack has been documented to use an area 8 miles to the northwest of the project area, in an area west of the Bitterroot Mountain divide. Wolves could use the area, due to the presence of deer and elk in the area, but with mitigations in place (i.e., suspending operations and restricting road use within a 1-mile radius of a known wolf den), there would be low potential for direct, indirect, or cumulative effects from either alternative. Other mitigations would include a DNRC wildlife biologist confirming current wolf status in the vicinity with the U. S. Fish and Wildlife Service prior to commencing activities in the area.</p>
<p>Grizzly Bear (<i>Ursus arctos</i>), Federally threatened.</p> <p>Habitat: Riparian vegetation along with security cover from human activity.</p>	<p>[N] The Bitterroot Grizzly Bear Ecosystem Recovery Zone extends to the western edge of the project area, however, this Ecosystem is currently not believed to be occupied by grizzly bears (USFWS 2000). In September 2002, a grizzly bear was sighted in the Burnt Fork drainage near Stevensville, approximately 13 miles southeast from the project area. Due to the proximity of big game winter range and riparian zones, the project area might serve as grizzly bear habitat. However, due to the proximity of the town of Florence and adjacent residences with unnatural bear attractants, providing grizzly bear habitat adjacent to human habitations would be</p>

	<p>detrimental to grizzly bears. Grizzly bears found in close proximity to human dwellings are often trapped and relocated because they are attracted to household garbage, bird feeders, pet food, etc., and become problem animals.</p> <p>Environmental Consequences, No Action: No change from the current situation would be expected should this alternative be selected.</p> <p>Environmental Consequences, Action: Under the proposed action, on approximately 310 acres, the relative density of ponderosa pine and proportion of Douglas-fir would be decreased, and 1.8 miles of road would be abandoned through ripping up the roadbed and seeding or depositing slash on the surface. As a result, there would be a short-term reduction in visual screening cover due to the reduced tree densities. However, due to the proximity of the aforementioned residences, the proposed action would aid in deterring use of the area by grizzly bears. At this time it is unlikely that grizzly bears occur within the analysis area and consequently, no direct, indirect, or cumulative effects to grizzly bears are expected.</p>
<p>DNRC Sensitive Species</p>	<p>[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur L = Low Potential for Effects</p>
<p>Peregrine Falcon (<i>Falco peregrinus</i>)</p> <p>Habitat: Nest and perch on ledges and cliff faces; forage along aquatic habitats.</p>	<p>[L] A peregrine falcon nest was discovered in 2001 on a cliff face approximately 0.75 miles southwest of the project area (Montana Natural Heritage Program database, June 2002). Peregrines typically forage in habitats such as marshes and croplands, which are known to occur to the south and east of the project area.</p> <p>Environmental Consequences, No Action: No change from the current situation would be expected should this alternative be selected.</p> <p>Environmental Consequences, Action: The proposed action would consist of timber harvest activities on 310 acres of forestland and would occur as close as 0.75 miles to a peregrine falcon nest, between December 1 and February 28. Associated log-hauling routes would be located approximately 1.2 miles from the nest, and would run in directions away from the eyrie. With peregrine breeding displays beginning as early as February (Johnsgard 1990), there is a slight possibility for harvest activities 0.75 miles distant from the nest to disturb this important aspect of the breeding cycle. Disturbance from the proposed action is likely to be lessened by topographic features surrounding the nest (i.e., the nest is situated on a cliff that faces away from the project area) and distance. Additionally, with mitigations in place, there is low potential for negative direct, indirect, or cumulative effects from the proposed action on peregrine falcons.</p> <p>Mitigation for the Action Alternative: Harvest operations would occur between December 1 and February 28. Those operations occurring closest to the known nest, (0.75 miles or closer) would be executed prior to mid February to avoid potential disturbance during the breeding display portion of the nesting period.</p>

Flammulated Owl (*Otus flammeolus*)

Habitat: Cavity nests in ponderosa pine and Douglas fir forests with a well-developed shrub layer.

[L] Flammulated owls are a cavity nesting owl that inhabits mid- to late-successional ponderosa pine forests. It subsists primarily on insects that are fostered by a well-developed shrub layer. There are 602 acres of potential flammulated owl habitat within the project area, consisting of ponderosa pine dominated stands with Douglas-fir constituting 20 - 40% of stand composition. Of these acres, 310 are proposed for a treatment that would reduce the proportion of Douglas-fir and relative density of ponderosa pine in the affected stands. Snags are in densities < 1 per acre and downed wood averages < 10 tons per acre.

Environmental Consequences, No Action: With continued encroachment of Douglas fir the quality of Flammulated Owl habitat would continue to decline.

Environmental Consequences, Action: The proposed action of treating 310 acres to reduce the proportion of Douglas-fir and relative density of ponderosa pine in the affected stands would likely serve to produce conditions more conducive to nesting by flammulated owls. Through a reduction in the proportion of Douglas-fir and relative density of ponderosa pine, the remaining trees would be released from competitive stressors, allowing them to grow faster in both diameter and height. Soil scarification that would result from associated harvest activities would also facilitate advanced ponderosa pine regeneration and colonization of the site by shrub species. Thus, the proposed action would likely create suitable flammulated owl habitat in the long-term, and is likely to have low potential for negative direct, indirect, or cumulative effects on this species.

Mitigation for the Action Alternative: Retain snags > 15 inches dbh and snag recruits (i.e., live ponderosa pine > 15 inches dbh) for densities of at least 1 - 2 per acre for future nesting and roosting structures.

Boreal Owl (*Aegolius funereus*)

Habitat: Mature to late-successional spruce/fir forests above 5,200 feet in elevation.

[N] Boreal owls prefer mature spruce/fir forests dominated by Engelmann spruce, and tend to reside at elevations greater than 5,200 feet. In these forest types, subalpine fir, Douglas-fir, western larch and lodgepole pine can also be well-represented (Hayward et al. 1987). The project area resides between 3,500 and 4,400 feet elevation, with ponderosa pine and Douglas-fir/snowberry and pinegrass habitat types. Thus, the units involved in this project do not provide conditions normally considered suitable for boreal owls. No direct, indirect, or cumulative effects to boreal owls are expected to result from either alternative.

Black-backed Woodpecker (*Picoides arcticus*)

Habitat: Mature burned or beetle-infested forest.

[L] Black-backed woodpeckers are generally associated with habitats that have recently burned or areas with extensive and severe outbreaks of wood-boring insects. When bug infestations are extensive, the habitat is similar to recently burned areas, because many dead and dying trees provide readily available food. As a result, black-backed woodpeckers often occupy bug-infested areas. The project and analysis areas do not have either extensive burned or bug-killed habitats. However, small patches of bug-killed trees occur in the project area. Entire stands are not dead or dying now, although that could occur in the future. Based on limited habitat availability, there is likely no current resident population of black-backed woodpeckers in the

	<p>project or analysis areas. However, individual birds may occur in both areas. Thus, there is low potential for direct, indirect, or cumulative effects effects to occur for black-backed woodpeckers as a result of either alternative considered.</p>
<p>Pileated Woodpecker (<i>Dryocopus pileatus</i>)</p> <p>Habitat: Mature stands of ponderosa pine and western larch with large snags and abundant downed logs.</p>	<p>[L] Pileated woodpeckers are typically associated with mature stands of ponderosa pine and western larch in western Montana. Pileated woodpeckers have been known to nest ins snags as small as 15 inches dbh in Montana (McClelland 1979), but typically nest and roost in snags > 18 inches dbh. Average stand diameter within the project area is 14.95 inches, with the 14.6 inches being the average stand diameter within the proposed action area, and 16 inches in the remainder of the project area. Snags are currently in densities <1 per acre, along with downed woody debris < 10 tons per acre. These levels of dead wood present in the project area are likely due to the proximity of residences, the town of Florence, and associated human use. Thus, the project area is currently deficient in nesting, roosting, and foraging structures for pileated woodpeckers.</p> <p>Environmental Consequences, No Action: No change from the current situation would be expected should this alternative be selected.</p> <p>Environmental Consequences, Action: Through a reduction in the proportion of Douglas-fir in stand composition and the relative density of ponderosa pine, and the abandonment of 1.8 miles of road, the proposed action would leave more vigorous ponderosa pine stands that would increase diameter and height growth more rapidly than if stocking levels remained unchanged and reduce the ability of woodcutters to access dead and downed wood. The resulting growth changes in the affected stands would likely facilitate an accelerated path for creation of structures that are desirable to pileated woodpeckers. While increased stocking levels may lend stands to being more vulnerable to insect infestations, which would provide ample foraging opportunities, the proposed action would likely create potential nesting and roosting structures in the long-term. Within a 1-mile radius of the project area there are currently 1,445 acres of lodgepole pine, Douglas-fir, and ponderosa pine on USFS and DNRC lands for potential foraging opportunities. Thus, the proposed action has low potential for direct, indirect, or cumulative effects, and may create nesting and roosting habitat in the long term.</p> <p>Mitigation for the Action Alternative: Retain snags > 15 inches dbh and snag recruits (i.e., live ponderosa pine > 15 inches dbh) for densities of at least 1 - 2 per acre for future nesting and roosting structures.</p>
<p>Fisher (<i>Martes pennanti</i>)</p> <p>Habitat: Mature to late-successional forests and riparian areas under 6,000 feet elevation.</p>	<p>[N] High-quality fisher habitat consists of late-successional spruce-fir forests with dense canopies in close proximity to riparian areas. The predominant forest types present in the project area are dry ponderosa pine and Douglas-fir forest types. Elevations for preferred fisher habitat are usually less than 6,000 feet (project area: 3,500 - 4,400 feet elevation). Intermittent riparian areas occur in the project and analysis areas. However, they are narrow, intermittent, and have few large logs on the ground. Thus,</p>

	these areas have limited habitat value to fisher and there is low potential for direct, indirect, or cumulative effects to this species from either alternative..
Coeur d'Alene Salamander (<i>Plethodon idahoensis</i>) Habitat: Waterfall spray zones, talus near cascading streams.	[N] No preferred habitat occurs in the project or analysis areas. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.
Northern Bog Lemming (<i>Synaptomys borealis</i>) Habitat: Sphagnum meadows, bogs or fens with thick moss mats.	[N] No preferred habitat occurs in the project or analysis areas. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.
Other Sensitive Species Considered	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur L = Low Potential for Effects
Common Loon (<i>Gavia immer</i>) Habitat: Cold mountain lakes, nest in emergent vegetation.	[N] No preferred habitat occurs in the project or analysis areas. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.
Harlequin Duck (<i>Histrionicus histrionicus</i>) Habitat: Whitewater streams with boulder and cobble substrates.	[N] No preferred habitat occurs in the project or analysis areas. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.
Ferruginous Hawk (<i>Buteo regalis</i>) Habitat: Prairies and badlands.	[N] No preferred habitat occurs in the project or analysis areas. The nearest confirmed nesting record for this species is 39.5 miles northwest of the project area (Montana Natural Heritage Database, June 2002). Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.
Columbian Sharp-tailed Grouse (<i>Tympanuchus phasianellus columbianus</i>) Habitat: Grassland, shrubland, riparian, agriculture.	[N] The only confirmed locations of this species in Western Montana are near Eureka and Ovando. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.
Mountain Plover (<i>Charadrius montanus</i>)	[N] No preferred habitat occurs in the project or analysis areas. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.

<p>Habitat: Short-grass prairie, alkaline flats, and prairie dog towns.</p>	
<p>Townsend's Big-eared Bat (<i>Corynorhinus townsendii</i>) Habitat: Caves, caverns, old mines.</p>	<p>[N] No preferred habitat occurs in the project or analysis areas. Thus, there is no potential for direct, indirect, or cumulative effects to this species from either alternative.</p>

Big Game Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur L = Low Potential for Effects
<p>Elk (<i>Cervus elaphus</i>)</p> <p>Habitat: Mosaics of grassland away from human disturbance and mature forest with canopy closure > 50%.</p>	<p>[L] Elk require security and winter range habitat during the fall and winter months. For security, elk require pole to mature forest \geq 250 acres in size, \geq 0.5 miles from any open road (Hillis et al. 1991). Currently, the project area has 4.2 miles of existing road and private residences reside within and adjacent to the section. Consequently, security cover does not exist within the project area. Within a 1-mile radius of the project area, there are 24.3 miles of road, leaving the only security cover in section 8 of T10N R20W. For winter range, elk require at least 20 acres of forest with canopy closure > 50%, with the base canopy > 20 feet high, intermixed with open grassland areas, preferably away from human disturbance (e.g., roads, houses, etc.). Currently, open grasslands exist in the adjoining sections 8, 9, and 17, and approximately 1,200 acres of desired winter range forest conditions exist within the project area and an additional 1-mile radius. Of those acres, approximately 310 acres are proposed for treatment. Because of the road density and residences within and adjacent to the project area, benefits to elk from the cover and forage availability within the project area may be negated if stressors from human disturbance sources are high.</p> <p>Environmental Consequences, No Action: No change from the current situation would be expected should this alternative be selected.</p> <p>Environmental Consequences, Action: 310 acres of 1,200 acres (26%) of winter range habitat (within a 1-mile radius analysis area) are proposed for treatment which would reduce the proportion of Douglas-fir and the relative density of ponderosa pine in the affected stands. The proposed treatment would likely reduce canopy closure below 50% and remove Douglas-fir which would reduce snow interception and wind blockage in the project area. As a result, the affected stands would likely no longer serve as thermal cover on the winter range. However, with private residences occurring both within and adjacent to the project area, elk would likely have low to moderate levels of human disturbance stressors. Thus, changes to winter range habitat within the project area would likely disperse animals to areas where there would be lower levels of human disturbance. Because there are 4.2 miles of existing road within the project area, elk security habitat is not present at this scale. Thus, there is low potential for direct, indirect, or cumulative effects to elk</p> <p>Mitigation for the Action Alternative: Abandon 1.8 miles of road within the project area to decrease elk vulnerability and harassment while on winter range.</p>
<p>White-tailed Deer (<i>Odocoileus virginianus</i>)</p> <p>Habitat: Wintering habitat requires mature forest with canopy closure > 70%, with</p>	<p>[L] White-tailed deer require thermal cover habitat during the winter months. For thermal cover, white-tailed deer require at least 40 acres of forest with canopy closure > 70%, with the base canopy > 20 feet high, intermixed with open grassland areas, preferably away from human disturbance (e.g., roads, houses, etc.). Currently, open grasslands exist in the adjoining sections 8, 9, and 17, and approximately 1,200 acres of desired</p>

base canopies > 20 feet high,
away from human
disturbances.

winter range forest conditions exist within the project area and an additional 1-mile radius. Of those acres, approximately 310 acres are proposed for treatment. Because of the road density and residences within and adjacent to the project area, benefits to white-tailed deer from the cover and forage availability within the project area may be negated if stressors from human disturbance sources are high.

Environmental Consequences, No Action: No change from the current situation would be expected should this alternative be selected.

Environmental Consequences, Action: 310 acres of 1,200 acres (26%) of thermal cover habitat (within a 1-mile radius analysis area) are proposed for treatment which would reduce the proportion of Douglas-fir and the relative density of ponderosa pine in the affected stands. The proposed treatment would likely reduce canopy closure below 70% and remove Douglas-fir which would reduce snow interception and wind blockage in the project area. As a result, the affected stands would likely no longer serve as thermal cover. However, with private residences occurring both within and adjacent to the project area, white-tailed deer would likely have low to moderate levels of human disturbance stressors. Thus, changes to winter range habitat within the project area would likely disperse animals to areas where there would be lower levels of human disturbance. Thus, there is low potential for direct, indirect, or cumulative effects to mule deer

Mitigation for the Action Alternative: Abandon 1.8 miles of road within the project area to decrease white-tailed deer vulnerability and harassment while on winter range.

Mule Deer (*Odocoileus hemimonus*)

Habitat: Mosaics of grassland away from human disturbance and mature forest with canopy closure > 50%.

[L] Mule deer require security and winter range habitat during the fall and winter months. For security, mule deer require pole to mature forest ≥ 250 acres in size, ≥ 0.5 miles from any open road (Hillis et al. 1991). Currently, the project area has 4.2 miles of existing road and private residences reside within and adjacent to the section. Consequently, security cover does not exist within the project area. Within a 1-mile radius of the project area, there are 24.3 miles of road, leaving the only security cover in section 8 of T10N R20W. For winter range, mule deer require at least 20 acres of forest with canopy closure > 50%, with the base canopy > 20 feet high, intermixed with open grassland areas, preferably away from human disturbance (e.g., roads, houses, etc.). Currently, open grasslands exist in the adjoining sections 8, 9, and 17, and approximately 1,200 acres of desired winter range forest conditions exist within the project area and an additional 1-mile radius. Of those acres, approximately 310 acres are proposed for treatment. Because of the road density and residences within and adjacent to the project area, benefits to mule deer from the cover and forage availability within the project area may be negated if stressors from human disturbance sources are high.

Environmental Consequences, No Action: No change from the current situation would be expected should this alternative be selected.

Environmental Consequences, Action: 310 acres of 1,200 acres (26%) of winter range habitat (within a 1-mile radius analysis area) are proposed for treatment which would reduce the proportion of Douglas-fir and the relative density of ponderosa pine in the affected stands. The proposed treatment would likely reduce canopy closure below 50% and remove Douglas-fir which would reduce snow interception and wind blockage in the project area. As a result, the affected stands would likely no longer serve as thermal cover on the winter range. However, with private residences occurring both within and adjacent to the project area, mule deer would likely have low to moderate levels of human disturbance stressors. Thus, changes to winter range habitat within the project area would likely disperse animals to areas where there would be lower levels of human disturbance. Because there are 4.2 miles of existing road within the project area, mule deer security habitat is not present at this scale. Thus, there is low potential for direct, indirect, or cumulative effects to mule deer

Mitigation for the Action Alternative: Abandon 1.8 miles of road within the project area to decrease mule deer vulnerability and harassment while on winter range.

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TO: Paul Moore, Management Forester, Hamilton Unit
 CC: Brian Long
 FROM: Will Wood
 SUBJECT Economic Analysis for Proposed Sweeney Timber Sale
 DATE: May 31, 2000 (update Dec. 10, 2002)

This is the economic analysis for the proposed Sweeney Timber Sale.

- a) Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.
- b) The estimated stumpage for this proposed timber sale (Action Alternative) was based on using the current Transaction Evidence. This includes \$15,000 in development costs related to relocation of an old road, bring existing roads up to BMP's and state do weed spraying. The estimated stumpage price (\$/MBF) for the lower end of the range equaling approximately \$197 and \$207 at the upper end of the range.
- c) The estimated gross revenue to the trust for an alternative is calculated by multiplying the estimated alternative stumpage price by the estimate range of the alternative volume. The state also collects money for Forest Improvement. The estimated total collected FI equals the FI fee rate multiplied by the estimated alternative volume. The following table displays the estimated range of gross revenue to the state by alternative from this proposed sale, estimated range of collected FI fees and the estimated post treatment cost for jackpot and broadcast burning of 200 acres at \$45 per acre.

Table 1.0 Estimated Gross Revenue to the Trust and Total Collected FI Fee by Alternative from the Proposed Timber Sale and the Estimated Cost for Jackpot and Broadcast burning.

	Action Alternative		
	No Action	Low	High
Est. Total Volume (MBF)	0	700	1,400
Est. Gross Revenue to the Trust	0	\$137,886	\$289,898
Est. Total Collected FI fee	0	\$24,430	\$48,860
Jackpot/Broadcast Burn (\$45/Acre)	0	\$9,000	\$9,000

- d) The costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. We don't keep track of project-level costs for individual timber sales. The following table displays the revenue-to-cost ratios for the state and Southwestern Land Office. The revenue-to-cost ratios are a measure of economic efficiency. A ratio value less than 1.0 means that the costs are higher than revenues (losing money). A ratio greater than 1.0 means revenues are higher than costs (making money). A ratio equaling 1.0 means that cost equal revenues.

Table 2.0 Revenue-to-Cost Ratios statewide and for the Southwestern Land Office

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
SWLO	2.08	1.83	1.23	2.36	2.69	2.57
State	1.89	1.72	1.36	2.78	1.62	1.75

- e) The other revenue that is whole dependent on this section is from two grazing license's which returned a total of \$469 in fiscal year 2000 and the Bitterroot Valley Public TV for an additional \$800 annually.

Subject:**Date:** Thu, 15 Jun 2000 09:09:04 -0600**From:** "Rennie, Patrick" <prennie@state.mt.us>**To:** 'Hamilton Unit' <dnrchamilton@cybernet1.com>**TO:** Paul Moore, Management Forester, DNRC-Hamilton Unit**FROM:** Patrick Rennie, DNRC Archaeologist**SUBJECT:** Sweeney Creek Timber sale (T10N R20W Section 16): Ravalli County.

I have conducted a search of the relevant topographic maps, the DNRC's sites/site leads database, and I consulted with the Montana State Historic Preservation Office concerning the above referenced project area. Because of moderately steep terrain and a lack of identified cultural resource sites in the project area, I am not recommending any additional archaeological investigative work in order for the proposed timber sale to proceed.



**SWEENEY CREEK TIMBER SALE
STAND PRESCRIPTION**

Sale Name: Sweeney Creek Timber Sale

Units: 1, 2, 3, & 4

Location: Section 16, T10N, R20W

Acres: 310

Elevation: 3,580 – 4,300 Ft.

Slope: 0-40%

Aspect(s): E, NE, SW

Habitat type: Douglas-fir/ninebark (PSME/PHMA) - draws and N aspects; Douglas-fir/snowberry (PSME/SYAL) - W and E aspects; Douglas-fir/pine grass – ponderosa pine (PSME/CARU-PIPO) - benches and flats; ponderosa pine/Idaho fescue- (PIPO/FEID) - SW aspects.

Soils: Bass, Blodgett and Como cobbly and stony sandy loams weathering from granitics.

History of Timber Management Activities:

Section 16, T10N, R20W was land granted to the State of Montana on November 8, 1889. Bitterroot National Forest, "Fire History Map" indicates the majority of this section burned in 1910. No recorded State management activities occurred until 1961. The following management activities have since occurred:

1. Personal firewood permits.
2. Twenty-five acre pre-commercial thinning completed in 1991.
3. Five acre pre-commercial thinning completed in 1985.
4. Timber trespass, June 1976, July 1982.
5. Thirty acre pre-commercial thinning completed in approximately 1971.
6. Commercial Christmas tree permit (10 bales), 1961.

Unit Descriptions/ Prescriptions:

Unit 1:

This unit is located in the E1/2, NE1/4, W1/2 on gentle to steep sloping ground with an east aspect. For the most part soils are well drained, however, a few boggy areas occur, along with two intermittent and one perennial stream passing through this unit. The overstory is comprised of mature ponderosa pine and Douglas-fir (75 to 85 years old). Small amounts of western larch also occur in the overstory. The average diameter for this unit is 16" and volume/acre is 4 MBF to 11 MBF. This seral ponderosa pine type forest has been without fire for periods exceeding normal historic intervals. This prescription would target the removal of Douglas-fir. Approximately 40% to 45% of the basal area would be removed to a stocking of 50-70 sq. ft. BA. The objective is to return the area to historic stocking levels, maintaining an uneven age appearance and reducing potential for stand replacement fires

within the urban interface. Slash treatment method in this unit would be lop & scatter and pile burning (jackpot).

Unit 2:

This unit is located in the SW1/4 on gentle sloping ground with an east aspect. The soils are well drained. The overstory is comprised of 90% ponderosa pine and 10% Douglas-fir (70-80 years old). The average diameter for this unit is 15" and the volume/acre is 10 MBF to 11 MBF. This prescription would reduce the stocking density to 50-70 sq. ft. of basal area. The objective is to return the area to historic stocking levels, maintaining an uneven age appearance and reducing potential for stand replacement fires within the urban interface. Slash treatment in this unit would be lop & scatter, pile burning, and possible Jackpot burning.

The following chart depicts Pre-Harvest Stocking and Projected Post Harvest Stocking.

DBH (in.)	Pre-Harvest Stocking		Projected Post-Harvest Stocking	
	TPA	BA (ft ² ac.)	TPA	BA (ft ² /ac.)
8-9.9"	31	12.5	10	3.5
10-13.9"	48	34.8	20	13.2
14-17.9"	30	38.0	15	22.3
18-21.9"	6	11.8	5	11.9
Sub Total:	115	97.1	50	50.9
22"+	.9	2.3	.9	2.3
Total:	115.9	99.4	50.9	53.2

Unit 3:

This unit is the same as unit 2 regarding stand prescription. It is located in the SE1/4 & SE1/4 NE1/4 on moderately sloping ground with an east aspect. The soils are well drained, however, the unit is bordered by Childs Creek on the north, and crossed by two irrigation ditches. The overstory is comprised of 90% ponderosa pine and 10% Douglas-fir (60 to 80 years old). The average diameter for this unit is 12.5" and the volume/acre is 10 MBF to 11 MBF. This prescription would reduce the stocking density to 50-70 sq. ft. of basal area. The objective is to return the area to historic stocking levels, maintaining an uneven age appearance and reducing potential for stand replacement fires within the urban interface. Slash treatment in this unit would be pile burning and possible Jackpot burning.

Unit 4:

This unit is located in the SE1/4 NE1/4 on steep sloping ground with a southwest aspect. The soils are well drained, but have a high susceptibility for erosion. An irrigation ditch runs along the top of this unit and is bordered by Childs Creek to the south. The overstory is comprised of 60% ponderosa pine and 40% Douglas-fir (90 years old). The average diameter for this unit is 18" and the volume/acre is 25 MBF. The objective here is to do a light sanitation salvage cutting for the purpose of reducing the spread of biotic pests. Approximately 16 MBF/acre to 20 MBF/acre will remain on the site and will help minimize the risk of erosion. Slash would be lopped and scattered.

