BUGCHUCK SALVAGE
TIMBER SALE
ENVIRONMENT ASSESSMENT

MONTANA DEPARTMENT of NATURAL RESOURCES and CONSERVATION
SOUTHWESTERN LAND OFFICE
CLEARWATER UNIT

MARCH 2008

BUGCHUCK SALVAGE TIMBER SALE
ENVIRONMENTAL ASSESSMENT

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CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Bugchuck Salvage Timber Sale
Proposed Implementation Date:	Summer 2008 through Fall 2009
Proponent:	Clearwater Unit, Southwestern Land Office, Montana D.N.R.C.
Location:	Section 6 T.14N. R.14W., Section 30 T.15N. R.14W., Section 36 T.15N. R.15W., P.M.M
County:	Missoula County

I. TYPE AND PURPOSE OF ACTION

The Montana Department of Natural Resources and Conservation (DNRC) proposes to harvest an estimated 400 to 600 thousand board feet (MBF) of lodgepole pine from approximately 200 acres. Other species would not be targeted for harvest unless they occur in skid trails, landings, or adjacent to roads where they would need to be removed. New road construction is planned to access the sale area. Receipts generated by this proposal are estimated to yield between $30,000 and $80,000 for the State Industrial School and Common Schools Income. Proposed harvest treatments would salvage lodgepole pine, and decrease the spread the mountain pine bark beetle (*Dendroctonus ponderosae)*. Roads and landings used by this sale would be treated with herbicide to control noxious weeds. Fuels management of slash created by this project would also be a part of this project.

The objectives of the project are to:

1) Salvage dead and dying timber before it loses its economic value,

2) Reduce the susceptibility of residual trees to epidemic insect infestations,

3) Reduce potential fuel concentrations after harvest,

The lands involved in this project are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools & state colleges (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and Department of Natural Resources and Conservation (DNRC) are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 7 –1–202, MCA). In 2003, the DNRC adopted Administrative Rules for Forest Management ARM 36.11.401-36.11.450 (the "Rules"). This project is planned and developed in accordance with the Rules.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project.

This timber sale was scoped in the Missoulian (Missoula, MT.) during May and June of 2007. Notices were posted at the Clearwater Junction, MT., on the DNRC website, and the DNRC office in Clearwater. The normal scoping list was also used to elicit input from the public and other agencies (in Bugchuck Salvage sale file). Responses from the Montana Department of Fish, Wildlife, and Parks (DFWP), the WildWest Institute, and Stoltze Land and Lumber are included in Appendix D. Department of Natural Resources and Conservation specialists such as a wildlife biologist (Mike McGrath), hydrologist and soil scientist (Jeff Collins), and archeologist (Patrick Rennie) were also scoped and have provided important information for this Environmental Assessment.

Craig V. Nelson, Clearwater Unit Forest Management Supervisor, has written the E.A. and Steve Wallace, Unit Manager of Clearwater Unit will be the decision maker.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

The Blanchard Creek road is owned by Missoula County and they control weight limits and potential haul dates

3. ALTERNATIVES CONSIDERED:

No Action

The mountain pine bark beetle epidemic would likely continue, possibly infesting and killing the majority of lodgepole pine trees within the section. These beetles could also infest and kill ponderosa pine trees. No new road would be constructed and no existing road would be improved to meet Montana Best Management Practices guidelines. Substantial value would be lost by not salvaging the trees that have already been attacked by beetles, allowing the remaining live lodgepole pine and Douglas-fir on the section to succumb to bark beetle attack. Recreational use permits and grazing leases would continue.

Action
This action alternative would harvest an estimated 400 to 600 MBF of trees from approximately 200 acres. DNRC would salvage trees killed or infested by mountain pine beetle (*Dendroctonus ponderosae*) and all other lodgepole pine within the harvest units would be cut due to the high likelihood of beetle attack. Approximately 2.5 miles of new forest road would be constructed to access the proposed harvest areas and approximately 8 miles of road would be improved or maintained to meet Montana Best Management Practices. Following the proposed harvest the 0.25 miles of road would be closed and be allowed to revegetate naturally. Gates and road blockages would be used to restrict access into the roads from Plum Creek that provide entrance into section 36 south of Blanchard Creek. Other new construction is an extension of a DNRC road system that is currently gated. All logging slash would be piled in the forest using skidding equipment and would be burned away from road systems. Herbicide application would take place to help manage noxious weeds.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.

Geology is Belt series, argillites and quartzites bedrocks which are exposed along Woodchuck Canyon and Blanchard Creek. These fractured bedrock materials can be ripped where exposed and are good to excellent quality for roads. There are talus slopes in Woodchuck Canyon, but otherwise no especially unique geology or unstable slopes features are present.

Soils in the Blanchard Creek harvest units are mainly high rock content, well drained soils derived from bedrock residuum, cobbly outwash, and glacial tills. Dominant soils in proposed harvest units 1, 4, & 5 are Glaciercreek and Winfall deep cobbly gravelly loams and gravelly silt loams on 0-30 % slopes. These soils are well drained, with low to moderate erosion, compaction and displacement potential. Soils in unit 3 have similar suitability with deeper volcanic ash surface soils on moderate slopes of 8-30% that are subject to rutting if operated on when wet. Approximately 20 acres of units 1 and 2 on Mitten/Courville glacial tills that are cobbly silt loams with spotty volcanic ash surfaces have similar moderate potential for erosion, compaction and displacement with timber harvest operations. Localized areas of slopes over 45% have and an increased potential for displacement.

Previous harvest was over 50 years ago and all stands are fully stocked with only localized past impacts estimated at less than 5% of the area in main skid trails and landings. Only unit 3 has had no previous harvest effects. With no action, forest soils would continue to ameliorate, yet road segments with inadequate drainage or vegetative cover may continue to erode.

With the proposed action, planned harvest and ground skidding operations should have low risk of direct, in-direct and cumulative impacts based on implementing BMP's and mitigation measures. Ground based harvest would be limited to slopes less than 45% to prevent excessive disturbance. Mitigations (see appendix) include season of use limits to prevent rutting and compaction, skidding plans to limit area of impacts, retaining woody debris (Graham et.al 1994) for nutrients and prompt revegetation of disturbed sites on roads to control erosion and protect soil resources.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.

The proposed DNRC lodgepole salvage sale is located within the Blanchard Creek and Woodchuck Canyon drainages that are tributary to the Blackfoot River. Blanchard Creek is a Class 1 perennial stream with a drainage area of 17,494 acres, up to 85 acres is proposed for harvest on DNRC lands. Woodchuck Canyon drainage is an ephemeral drainage of 3,129 acres (136 acres proposed for harvest) with no direct delivery to streams or the Blackfoot River, due to the coarse rocky soils. A DNRC hydrologist completed a coarse filter screening for cumulative effects Per ARM 36.11.423 (1) (a-b) for this proposed timber sale, including past timber harvest projects (DSL 1987, DNRC 1999) and roads for cumulative effects assessments.

Blanchard Creek is a 13.1 mile long drainage that flows through DNRC Section 36, T15N, R15W and Section 31, T15N, R14W in the lower portion of the watershed. Blanchard Creek is a forested watershed with a range of 18-40 inches precipitation, mainly as snowfall. Main Blanchard Creek (below the confluence of the North and South Forks) is listed as impaired (Montana DEQ 2006 303(d) listing) for partially supporting aquatic life and cold water fisheries. The impaired reach is 2.3 miles in length. Probable causes of impairment are alteration of stream banks, sedimentation and low flow alterations. The probable sources are grazing in riparian areas, road adjacent to stream channel, and irrigation diversion of flow which can result in dewatering lower 1.1 miles. Existing cumulative effects include 1)grazing impacts along stream channels and 2)substantial timber harvest within the Blanchard Creek watershed that has lead to moderately high water yield increases. Stream channel conditions on the mainstem of Blanchard Creek are predominately fair to good, with some poor stream reaches in locations sensitive to grazing pressure.

A water quality restoration plan has been drafted for the Middle Blackfoot (including Blanchard Creek) by Montana DEQ that recommends BMP implementation for grazing, and forestry, with the goal to reduce pollution by a specified amount (Total Maximum Daily Load) so that the water resources can fully support all beneficial uses. DNRC installed fencing on the north Fork of Blanchard Creek in 1997 to reduce cattle access to the stream and shrub cover is on an improving trend. Plum Creek has also commenced riparian fencing to reduce livestock use near Blanchard Creek.

Segments of the existing roads within the watershed, including the Blanchard Creek county road and private access roads, require maintenance or repairs to meet BMPs for adequate road drainage. The main Blanchard Creek county road is located adjacent to the stream in Section 31 and segments of the road were reconstructed slightly upslope in the late 1990's to reduce effects of flooding, yet some sedimentation continues.

No Action
Under the No Action Alternative, no man made changes would occur within the project areas. Thus, there would be no change in effects over the existing condition to water yield or quality within the drainages mentioned above. Implementation of BMP's and restoration plans are expected to develop an improving trend for water quality.

Action
The proposed project would use existing roads, and construct new road on moderate grades. Approximately 1 ½ miles would be located within the Blanchard watershed and well away from Blanchard Creek with extensive vegetative buffer distance. The access routes would use the existing stream crossings of Blanchard Creek are not sediment sources or fish barriers. Roads would be graded and drainage repairs completed on access routes as needed to meet Best Management Practices to minimize the risk of additional sediment delivery from occurring during access and hauling of DNRC timber. The proposed project would improve existing road drainage, which would reduce sediment and improve water quality compared to no-action. All new roads and landings would be stabilized by slashing, installing drainage where needed and grass seeded to prevent erosion.

Proposed harvest units 1& 2 have boundaries that parallel Blanchard Creek and include Streamside Management Zones that meet of exceed the buffer distances required in the SMZ ARM for State Forest Land Management. No harvest is proposed within the first 50 feet of the Blanchard Creek SMZ. Selective harvest would occur within a few short segments of the Riparian Management Zone, which extends from 50 feet to 100 feet away from the stream. Consequently, a low risk of sedimentation, or effects to stream shading or potential large woody debris (LWD) recruitment is anticipated to this stream. Unit 3 is located on upper slopes of Woodchuck Canyon and includes a wetland swale and approximately 100 yards of discontinuous stream with no connectivity to any off-site, downslope water resources. Unit 3 would include one road crossing of a Class 3 SMZ that has low risk of erosion or off-site sedimentation. No surface water is located within or adjacent to proposed units 4 & 5. The proposed salvage harvest would retain Douglas-fir, western larch and Ponderosa pine, which is approximately 30% or more of the existing basal area as a clumpy distribution. Harvest of dead, dying and trees at high risk for mortality due to insect infestations is not expected to generate measurable levels of additional water yield than would be expected under no action. The proposed harvest is a very small (less than ½ %) area compared to the watershed.

Based on implementation of BMP's mitigation measures, the very small area of harvest compared to the watershed area, and improvements to existing road drainage there is low risk of direct, in-direct or cumulative effects to water quality or downstream beneficial uses with the proposed action.

6. AIR QUALITY:

What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.

The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while Impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006).

The project areas (Sections 6, 30, and 36) are located within Montana Airshed 3B which encompasses portions of Missoula and Powell Counties. Currently, this Airshed does not contain any impact zones. These sections are located approximately 3 miles west of Clearwater Junction and are bordered by either DNRC or industrial timberland (owned by Plum Creek Timber Company). Numerous residential properties are found to the east of this proposed sale along Highway 200 and Blanchard Creek Road. Two designated wilderness areas lie 15 to 25 miles north and northeast of the project area: the Scapegoat Wilderness Area and the Bob Marshall Wilderness Area. These wilderness areas each exceed 5,000 acres and as such, are considered Federal Class I Areas that ultimately receive protection under the Federal Clean Air Act of 1977.

No Action
Under the No Action Alternative, no slash piles would be burned within the project areas. Thus, there would be no effects to air quality within the local vicinity and throughout Airshed 3B.

Action
Under the Action Alternative, slash piles consisting of tree limbs and tops and other vegetative debris would be created throughout the project area during harvesting. These slash piles would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter into the local airshed, temporarily affecting local air quality. Over 70% of emissions emitted from prescribed burning is less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous. Within the typical column of biomass burning, the chemical toxics are: Formaldehyde, Acrolein, Acetaldehyde, 1,4 Butadiene, and Polycyclic Organic Matter.

Burning within the project area would be short in duration and would be conducted when conditions favored good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. Prior to burning a "Prescribed Fire Burn Plan" would be done for the area. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. Thus, direct and indirect effects to air quality due to slash pile burning associated with the proposed action would be minimal.

Burning that may occur on adjacent properties in combination with the proposed action could potentially increase cumulative effects to the local airshed and the Class I Areas. Plum Creek Timber Company participates as an Airshed Cooperator and operatea under the same Airshed Group guidelines as the DNRC. Thus, cumulative effects to air quality due to slash pile burning associated with the proposed action would also be expected to be minimal.

Harvesting and log hauling could create dust which may affect local air quality. Harvesting operations would be short in duration and could occur during the winter months that would minimize dust dispersal. Thus, direct, indirect, and cumulative effects to air quality due to harvesting and hauling associated with the proposed action would be minimal.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.

EXISTING CONDITION

RARE PLANTS AND WEEDS

Although the sensitive plant Howell's Gumweed (*Grindelia howellii*) occurs in the general area, no plants have been noticed within the project area. The Montana Natural Heritage Program (MNHP) was contacted, and the locations of species of concern were taken into account for this sale. This plant has been noted before on DNRC parcels within the Clearwater State Forest and has been successfully managed around. Noxious weeds such as knapweed occur along County and forest roads. Spot infestations of knapweed were treated along roadsides in June of 2006.

STANDARD VEGETATIVE COMMUNITY

The project area consists primarily of cover types of ponderosa pine, Douglas-fir/western larch, and lodgepole. All of these cover types have a component of lodgepole pine. Most of the project area is in the sawtimber size class and has low to high total stocking. Stands within the project area currently have a high susceptibility and risk of mountain pine beetle damage, based on the species, age, stand density, elevation, and existing mountain pine beetle presence. Lodgepole pine within the project area are dead, infested, or at risk, as are the ponderosa pine stands within the area.

At the larger scale, DNRC lands managed by the Clearwater Unit are approximately 85% forested, mostly in the ponderosa pine and western larch/Douglas-fir cover types. Compared to the desired future condition at this scale, Douglas-fir, subalpine fir, and mixed-conifer cover types are slightly over-represented while ponderosa pine and western larch/Douglas-fir are slightly under-represented. Overall, however, about 84% of these lands do have a cover type that matches the desired future condition. This area falls within climatic section 332B, which was historically about 79% forested. Within the climatic section, the historically dominant cover type was lodgepole pine, followed by Douglas-fir and ponderosa pine on lower slopes (Losensky, 1997).

Stand structure characterizes stand development, disturbance and how a stand may continue to develop. Stand structure is classified as single storied, two storied, or multi-storied if there are one, two, or three main canopy layers, respectively. Prior to the infestation by mountain pine beetle, the Bugchuck Project Area was dominated by single storied (southwest corner of section36), two storied (remainder of 36), and multi-storied stands (section31 and 6). The last structures mentioned are probably the result of past harvesting. Across the Clearwater Unit there is a more even distribution of the various stand structure types.

DNRC has adopted old-growth definitions based on Green et al. (1992). Most stands that are used to create units for this sale have ages that are between 40 and 149 years of age. Three stands that meet the age requirement for old growth specified by Green et al (1992), but they do not meet the trees per acre to requirement specified to qualify them as old growth. Therefore, no stands within the project area have met the definition of old growth based on Green et al. (1992).

The lodgepole pine that have been infested by mountain pine beetle have ages ranging between 40 years to 100 years. None of these stands have been affected by other diseases or insects. Several DNRC timber sales have been done in the Woodchuck area of section 6, and section 31 was owned by Champion International at one time. In all cases, the lodgepole stands developed as an understory component that was "logged over" or did not make a merchantable stem at that time. Within section 36, the occurrence of the lodgepole stands came as a result of wildfires that burned up the Blanchard Creek drainage and through Woodchuck canyon. These fires occurred in the early 1900's and are well displayed by the relic western larch that occur in the Blanchard Creek area in section 36 and the nearly completely burned snags and stumps within the southwest portion of the section. The area in the southwest corner of section 36 has not been harvested while the other areas have seen some harvest even if it was to remove larger western larch. The surrounding areas that also have lodgepole stands are or have been harvested on other ownerships within the Blanchard Creek and Woodchuck Canyon areas. Much of the harvest on Plum Creek ownership has removed other species as well.

No Action

No harvest would occur at this time. Compared to the existing condition, no immediate changes would be expected. Mountain pine beetle would likely continue to infest and kill lodgepole and ponderosa pine within the DRNC ownership and surrounding area. The increased fuel loading within these stands could become a concern as these trees die. With the existing rate of infestation, and the likelihood that dead trees will be blown down, openings would occur within the stands regardless of harvest. As the attack of these beetles is a natural event, it is conceivable that the sale area has experienced it in the past. Over time, some natural conifer regeneration would probably establish in areas with a seed source and favorable microclimate. Weed treatment could occur as funding allows.

Action
The silvicultural plan is to remove recently killed and green lodgepole pine. This would remove trees that are being, or have been attacked by the mountain pine beetle, and trees within an area that are highly susceptible to the beetle attack. These areas will be more open than they are currently. Changes to the vegetation would include an immediate reduction in numbers of live and dead lodgepole pine. Other species, including ponderosa pine, western larch, and Douglas-fir would be retained. The remaining trees would have increased growth as more resources would be available per tree. At the larger scale, the proposed harvest in combination with other current and potential salvage projects would reduce stand density on less than 1% of the area managed by the Clearwater Unit.

Fuel loading concerns within these stands would decrease. Reduction of the standing stems by the harvest of trees would reduce standing fuels. Piling of logging slash created by this project at the landing within the stand would reduce slash fuel concerns. This piling "consolidates" slash that would be at the harvest landing or still within the logging unit into smaller piles throughout the stand. This creates a situation where the DNRC is able to burn the fuel created, do it safely with fewer people, and it will create small openings that can support seedlings.

While regeneration is not a goal of the harvest prescription, some lodgepole pine, Douglas-fir, and western larch would likely become established through natural regeneration in openings and in the areas where logging slash is piled and burned. Planting of the proposed harvest units with seral species such as western larch and ponderosa pine would be planned and could happen within two years of harvest. These species are less likely to be affected by mountain pine beetle in the future.

To prevent introduction of new weeds, off-road equipment would be cleaned and inspected prior to entry into harvest areas. Newly disturbed roads and landing would be seeded to grass. Roadsides with existing weeds would be treated with herbicide. The proposed action would be expected to result in no measurable direct, indirect, and cumulative impacts on forest vegetation.

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8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.

The following species were considered but eliminated from detailed study due to lack of habitat present: Peregrine Falcon, Common Loon, Harlequin Duck, Townsend's Big-eared Bat, Coeur d'Alene Salamander, Northern Bog Lemming, Mountain Plover, and Columbian Sharp-tailed Grouse.

Bald Eagle—The proposed action and associated hauling route would be located >1.25 mile from the nearest active bald eagle nest, with topographic relief between the known nest site and project area. As a result, there would likely be low risk of direct, indirect, or cumulative effects to bald eagles as a result of the proposed action.

Fisher—The proposed action would salvage lodgepole pine within 221 acres of potential fisher habitat, primarily along Blanchard Creek. As per ARM 36.11.440 (1)(b), the proposed action would retain fisher habitat within 100 feet of Blanchard Creek, a class 1 stream, maintain 75% of the acreage in the sawtimber size class in moderate to well-stocked density (i.e., >40% crown cover), and retain large snags and coarse woody debris pursuant to ARM 36.11.406 through 36.11.414. Using pre-cruise collected data in the Stand Visualization System (SVS, as part of the MT Cruiser program), simulations of post-harvest crown cover indicate each harvest unit would likely have >36% crown cover post-harvest through a species-designated harvest of lodgepole pine. As a result, there would likely be low risk of direct, indirect, or cumulative effects to fisher as a result of the proposed action.

Flammulated Owl—The proposed action would harvest approximately 25% of the standing volume within all of the harvest units, through a species-designated harvest of lodgepole pine. Western Larch, ponderosa pine, and Douglas-fir would be retained post-harvest, and typically clumpily distributed throughout the harvest units. These distributions would be beneficial for flammulated owls because the proposed harvest would likely spur forest regeneration in the clearings, while retaining larger diameter snags and snag recruits for nesting. As a result, the proposed action would likely have low risk of direct, indirect, or cumulative effects to flammulated owls.

Pileated Woodpecker—The proposed action would remove only lodgepole pine from the proposed harvest units. Based upon the pre-cruise data, trees proposed for harvesting would be approximately 16 inches DBH and less, with other species remaining post-harvest with DBH ranging between seedlings and 27 inches. Additionally, post-harvest crown cover would likely range between 36 and 65%, based on post-harvest estimates from the Stand Visualization System (SVS, as part of the MT Cruiser program). With estimated post-harvest retention levels, there would likely be low risk of direct, indirect, or cumulative effects to pileated woodpeckers as a result of the proposed action.

Black-backed Woodpecker—Within an approximately 25 mile radius, approximately 83,000 acres of forest burned in 2007 on four large fires. Due to the abundance of newly burned habitat, and this species' affinity for burned areas, the proposed harvest of approximately 219 acres of bug-killed lodgepole pine would likely have low risk of direct, indirect, or cumulative effects to black-backed woodpeckers.

Big Game Winter Range—There is concern that the proposed harvest would negatively effect big game winter range for elk and white-tail deer. Currently, only two proposed harvest units (units 2 and 3) have a "satisfactory" (>70%) estimated (based on SVS simulations using pre-cruise data) crown cover, while the other three proposed harvest units have an estimated crown cover that provides "marginal quality" thermal cover (40% to 70% canopy cover). The proposed action, based upon pre-cruise data, would harvest approximately 25% of the standing volume of trees, and would have estimated post-harvest crown cover ranging between 36% and 65% in the proposed harvest units. Only one proposed harvest unit, unit 5, would have estimated post-harvest crown cover below 40%. Based upon the post-harvest tree retention levels, and the clumpy spatial distribution of those patches, there would likely be low to moderate risk of direct, indirect, and cumulative effects to big game winter range for white-tail deer and elk.

Fisheries-
Blanchard Creek is designated a high-value fisheries resource by MFWP. Westslope cutthroat trout, Rainbow trout, Brook trout, and likely Bull trout are year-round residents upstream of an irrigation diversion at river mile 1.1, which is within the project area.

With no action, no road construction or timber harvest would occur, yet current sediment sources would continue. The no-action alternative would not have any effects to stream shading, stream temperature, LWD recruitment, or other fish habitat features.

Under the action alternative there is a low risk of direct and indirect to fisheries in Blanchard Creek with the proposed timber harvest and road construction. As disclosed in the Hydrology Analysis, only existing crossings of Blanchard Creek would be used and the new access road would be constructed away from riparian areas and presents low risk of off-site erosion or sedimentation. The action alternative is designed to minimize impacts to water quality, fisheries, and maintain or improve stream conditions important to fish habitat. Streams would be protected by designating stream (SMZ), riparian (RMZ's) and wetland protection zones (WMZ's) as defined by ARM for State Forest Land Management rules to ensure adequate buffer function adjacent to the stream. No harvest would occur within the SMZ adjacent to Blanchard Creek which would not effect potential large woody recruitment to streams. Selective harvest would occur within a short segment of the Riparian Management Zone, which extends from 50 feet to 100 feet away from the stream.

Cumulative effects of sediment delivery from roads would be slightly reduced by restoring road drainage features as part of BMP implementation that would reduce sedimentation and maintain or improve fish habitat. No measurable change in stream shading or LWD would occur that could increase in stream water temperature or impacts to potential fish habitat are expected to occur as a result of the proposed action alternative.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.

Grizzly Bear and Gray Wolf—The proposed action would reduce standing volume within the affected area by approximately 25% and construct new road to access harvest unit 3. However, the proposed action would not increase open road density post-harvest. Because proposed harvest units 1 and 2 are visible from the main Blanchard Creek Rd., grizzly bears and wolves may be vulnerable due to reduced visual screening. However, within harvest unit 1, crown cover would likely be reduced from approximately 59% to approximately 41%, while retaining structural diversity among non-lodgepole pine tree species, and crown cover within harvest unit 2 would be reduced from an estimated 83% to an estimated 60%. Thus, there would likely be post-harvest visual screening cover for grizzly bears and wolves within these two proposed harvest units. As a result, there would likely be low risk of direct, indirect, or cumulative effects to grizzly bears and wolves as a result of the proposed action.

Canada Lynx—Current Stand Level Inventory data (release 28 September 2006) indicate that lynx habitat does not occur within the affected parcels. Because habitat does not currently exist within the affected parcels, there would likely be low risk of direct, indirect, or cumulative effects to lynx from the proposed action.

Fisheries

Bull trout and westslope cutthroat trout— Bull trout and westslope cutthroat trout are identified as Class-A Species of Concern in Montana. Bull trout are identified as a "threatened" species by the US Fish and Wildlife Service. Bull trout were not detected in a recent 2007 stream survey by MTFWP, but may still occur within the Blanchard drainage considering the watershed is within their historic range. The DNRC Forest Management Program has also identified bull trout and westslope cutthroat trout as Sensitive Species under ARM 36.11.436. A low risk of direct, indirect and cumulative impacts to westslope cutthroat trout or bull trout is expected to occur under the proposed action alternative (see Section 8 – Fisheries for more information regarding potential impact to fisheries).

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine effects to historical, archaeological or paleontological resources.

The Montana D.N.R.C. archeologist reported that there are not any cultural resources on file for this state parcel, and no further investigation was needed.

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.

Any change to the scenery in the area from these alternatives would be in addition to past timber harvests, road building, vegetation management (grazing, pre-commercial thinning, etc.) and future fire activity within the project area. This analysis includes all past and present effects.

No Action

If the no action alternative is selected, patches created by dead trees will exist. Potentially these openings will be more or less acreage given the insect outbreak timeline. The trees that would be killed by the beetle attack would lose all foliage, and eventually branches (over several years). Although the tree bole would still be in existence, this would not be very apparent in the distance, but would be more easily seen within the middleground viewshed. The color would be lighter than the current view after the attacked trees die. Thus, direct, indirect, and cumulative effects to aesthetics would be minimal.

Action

The proposed sale would be partially visible from Highway 200 in the Clearwater Junction area, and portions of this project are proposed that are adjacent to the Blanchard Creek County Road. Only portions of the harvest units would be visible from any of these locations, and in many instances, the openings created would be minimal. Large portions of the proposed harvest units would be blocked from view by

topography or by vegetation. The removal of bark beetle attacked trees could change the middleground view from Blanchard Creek Road and the background view from Highway 200 from the present condition. Proposed harvest stands within section 36 (portions are visible from both road systems) are comprised of lodgepole pine in many areas. These areas would then appear clear cut but would be broken by patches of residual timber. These areas harvested would be planted with a mix of western larch, ponderosa pine, and Douglas-fir. Over the long term, these areas would be noticed by the absence of tree crowns, occurrence of regeneration, and potential change in species present.

Through the proposed sale area, slash from the harvest would be noticeable yet temporary. Generally slash disappears from the site within five years, and is often covered by other vegetation within three years. Again, sites would be generally lighter in color than can be seen currently.

Harvest systems and activities would be ground-based and could be done during the winter while many people would not be traveling the Blanchard Creek road. Should some of the proposed units be harvested during the summer, the skidding equipment and the need for log trucks to haul the logs away from the landings, may cause temporary dust clouds that will quickly disperse and would only occur during harvest. Harvest activities would be quite audible, and, depending upon air conditions, equipment could be heard many miles from their location. The proposed harvest of this volume would most likely be done within several months and would occur during the general "work week". Direct, indirect, and cumulative effects to aesthetics due to harvesting and hauling associated with the proposed action would be minimal.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

There are no demands by this project on environmental resources of land, water, air, or energy.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

Clearwater River I, II, and III Timber Sale (EA 1999), Woodchuck Timber Sale (1995), Blanchard Woodchuck Timber Sale (1985), Woodchuck pre-commercial thin (planned for 2008).

IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

No risks to human health and safety are known as part of this project. Safety considerations and temporary risks would increase for the professional contractors working within the sale area, and possibly for public vehicle traffic on roads while log trucks are hauling.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

This proposed project would capitalize on timber resources that would otherwise be lost after being attacked by the mountain pine beetle. As part of MCA 77-5-207, the DNRC is required to consider long-term costs to all forest resources that could be controlled through salvage operations. It is also stated that the DNRC will not let the salvage operations take precedence over the timely sale and harvest of green timber. The salvage of material must be done prior to substantial loss of value or material. Given these requirements, the DNRC must ensure that harvest is economically feasible. This projected harvest volume is fairly minor (estimated at less than 20%) as compared to the board foot volume within this project given stand level inventory. This project would not decrease the opportunity to perform future harvest in the area. The grazing leases and recreational permits within these sections would not be affected by this proposed project.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.

A few short-term jobs in the local area may be created for the duration of the proposed action. Due to the relatively small size of the timber sale, there would be no measurable cumulative impact from this proposed action on employment.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

The proposed action has only indirect, limited implications for tax collections.

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services

Aside from contract administration, the impact on government services should be minimal due to the temporary nature of the proposed action.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

The DNRC operates under the State Forest Land Management Plan (SFLMP, DNRC 1996) and Administrative Rules for Forest Management (ARM 36.11.401 through 450, DNRC 2003). The SFLMP established the agency's philosophy for management of forested trust lands. The Administrative Rules provide specific guidance for implementing forest management projects.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.

Blanchard Creek flows through the project area. The Blanchard Creek County Road passes through section 36 of the salvage sale, and the sections are open for public recreation. The project area receives use by walk-in recreationists, fishermen, "mountain" bicyclists, and hunters. Recreation opportunities would continue under the proposed action. Fuel treatment would be done in such a manner to reduce fuel concentrations and decrease available fuels adjacent to the Blanchard Creek road. Slash would be piled away from landings by grappled machines ("skidder piling") away from roads on all units and would be burned by DNRC personnel in the future. This action is proposed to decrease the slash hazard on site, and still allow easier access to the sale area by foot.

There is not a wilderness within the Blanchard Creek or Woodchuck Canyon areas, and therefore, one would not be affected.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

The project has no measurable direct, indirect, or cumulative implications for density and distribution of population and housing.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

The proposed action has no measurable direct, indirect, or cumulative implications for social structures and mores.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

The proposed project has no measurable direct, indirect, or cumulative implications for cultural uniqueness and diversity.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.

No Action: Grazing on all of the sections would continue to provide annual revenue of $1,221.44. In addition, the current Special Use Recreational License for Section 31 would continue to generate annual revenue of $1,181.16 through the year 2009.

Action: Revenue from grazing and recreation would continue. The timber harvest would generate additional revenue for the Common Schools Trust and the State Industrial School. The estimated return to the trust for the proposed harvest would be $30,000 to $80,000 based on an estimated harvest of 400 thousand board feet and an overall stumpage value of $75.00 to $200.00 per thousand board feet (MBF). This is equivalent to $12.50 to $33.33 per ton. Recent past sales on the Clearwater Unit designed to salvage lodgepole pine (Confusion Salvage, Hidden Bugs Salvage, and Still Cool Bugs) have sold for sawlog stumpage prices (paid to the DNRC) of $42.57/ton, $35.93/ton,

and $22.60/ton respectively. These three sales used or will use standard logging equipment (skidder, feller bunchers, etc.) to harvest and yard the material to landings. These prices also show the general decrease in stumpage costs scene in the area recently. The proposed Bugchuck sale would involve more road construction and might decrease the stumpage paid to DNRC. Given that markets change and the cost of diesel fuel changes, and the softwood supply can change, it is believable that the money received by the Trust could vary from the estimate.

Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC doesn't track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. The most recent revenue-to-cost ratio of the Southwestern Land Office was 2.43. This means that, on average, for every $1.00 spent in costs, $2.43 in revenue was generated. 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.

The money collected for forest improvement projects would be around $3.79 per ton. This should return approximately $1,516.00 for forest improvement uses. Forest improvement projects include planting, thinning, burning, etc. on School Trust Land.

EA Checklist Prepared By:	**Name:** Craig V. Nelson	**Date:** March 17, 2008
	Title: Supervisory Forester, Clearwater State Forest, SWLO	

V. FINDING

25. ALTERNATIVE SELECTED:

The Action Alternative

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

This Environmental Analysis has been completed for the Bugchuck Salvage Sale. After a thorough review of the EA, project file, response to both scoping letters, Department policies, standards and guidelines, and the State Land Management Rules, I have taken the decision to choose the action alternative. I have found that this EA and project will:

Salvage dead and dying timber before it loses its economic value. This is explained in This is explained in EA part 3 *Alternatives Considered* , EA part 15 *Industrial, Commercial, and Agriculture Activities and Production*, EA part 24 *Other Appropriate Social and Economic Issues*, and is required by law in MCA 77-5-207 -Salvage timber program.

This project will reduce the susceptibility of residual trees to epidemic insect infestations and outbreaks. This is explained in EA part 7 *Vegetation Cover, Quantity, and Quality*. This project would also plant trees native to the area (western larch and ponderosa pine) after harvest to decrease similar concerns in the future.

Through treatment, this area will see decreased fuel levels and hazards. This project will help reduce fuels within the project area. This is explained in EA part 7 *Vegetation Cover, Quantity, and Quality* and EA part 20 *Access To and Quality of Recreational and Wilderness Activities.*

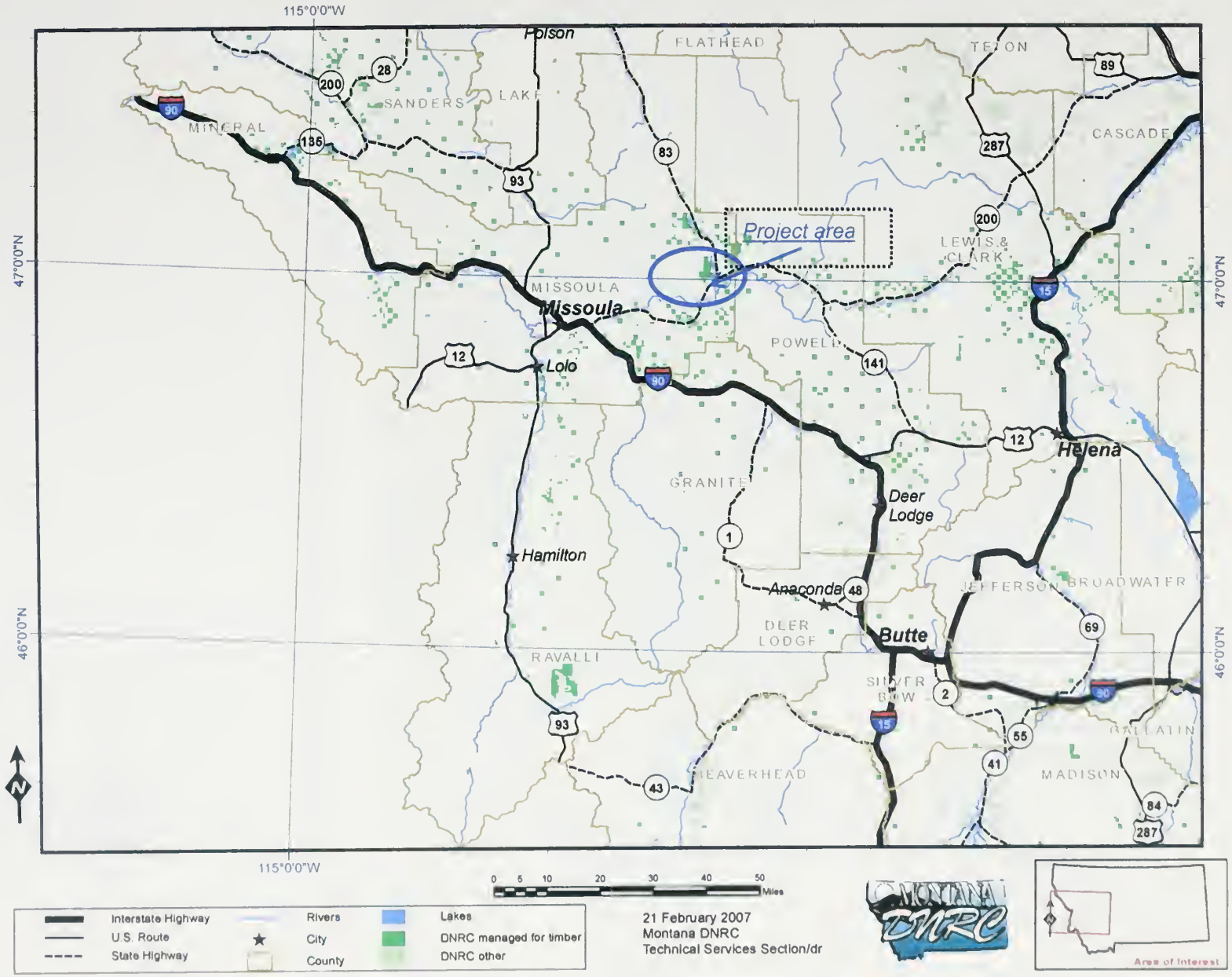
27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

☐	EIS	☐	More Detailed EA	X	No Further Analysis

EA Checklist Approved By:	**Name:** Stephen J. Wallace	
	Title: Unit Manager, Clearwater State Forest, SWLO	
Signature: Stephen J. Wallace		**Date:** 3/19/08

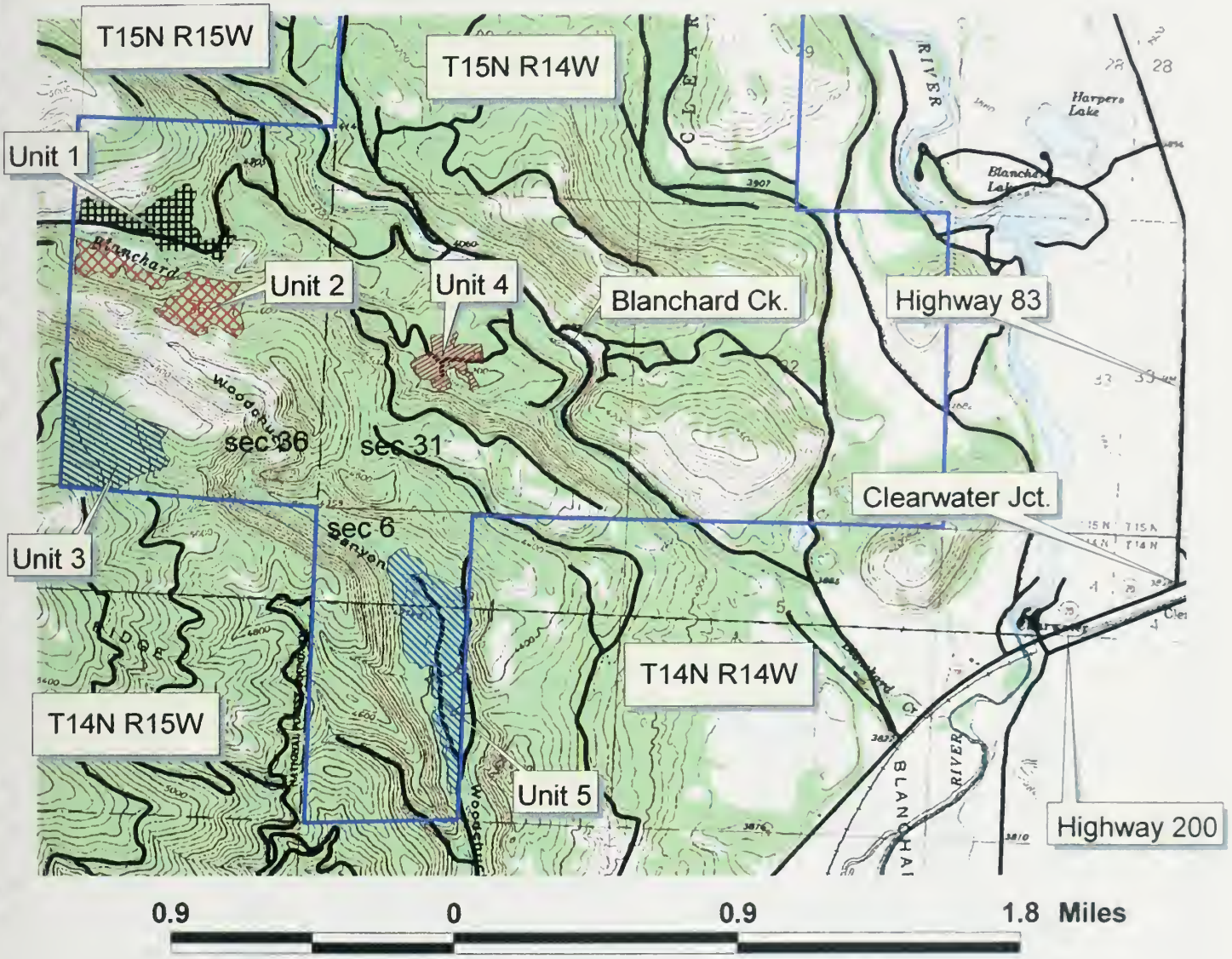
APPENDIX A
MAPS

PROPOSED BUGCHUCK SALVAGE SALE



Attachment A-1

BUGCHUCK SALVAGE
PROPOSED HARVEST UNITS



LEGEND

- proposed unit
- DNRC Ownership
- Roads

CVN 2-12-08

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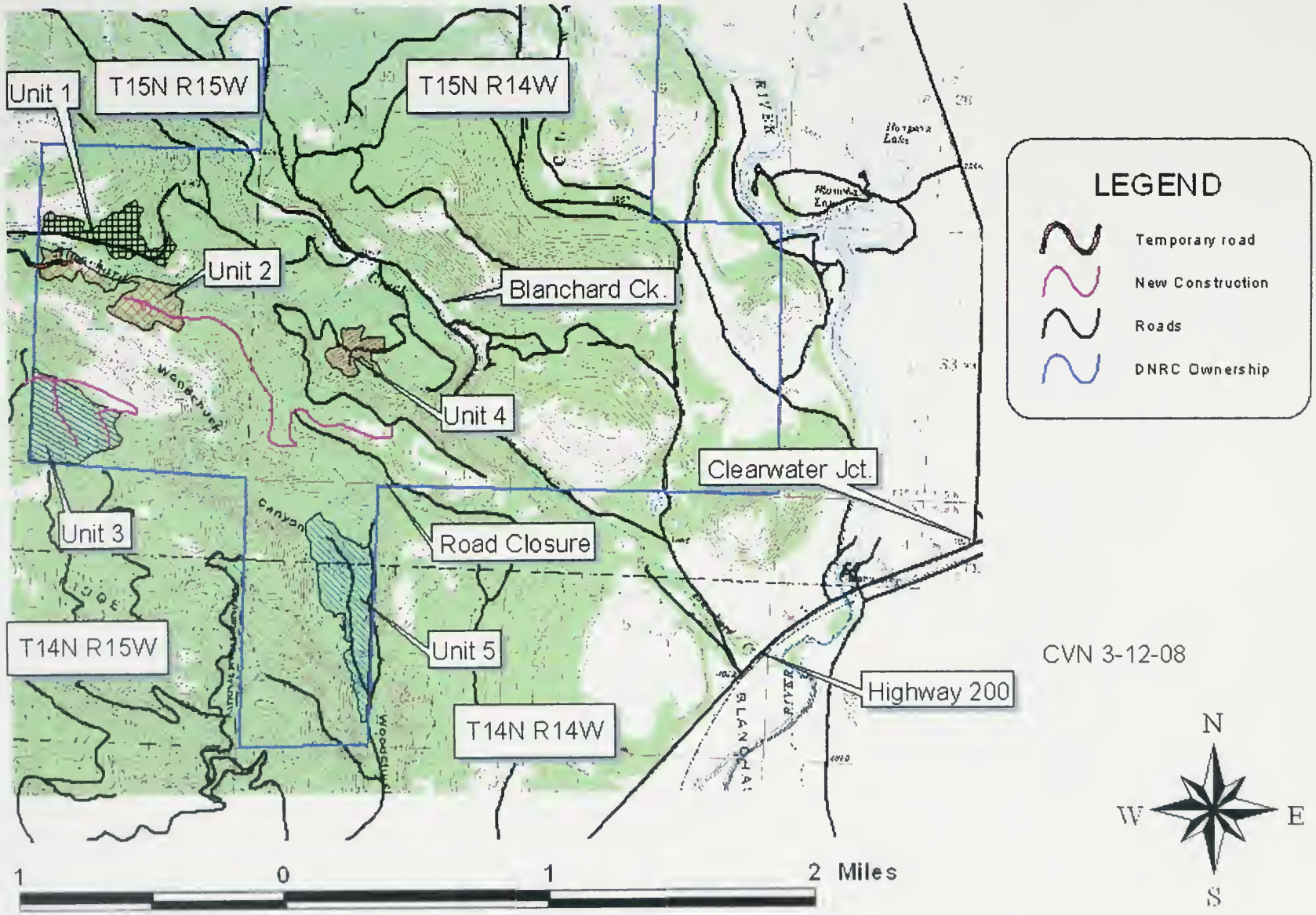
ATTACHMENT A-2

PROPOSED ROADS FOR BUGCHUCK



APPENDIX B
RECOMMENDED MITIGATION MEASURES FOR THE PROPOSED PROJECT

RECOMMENDED MITIGATION MEASURES FOR THE PROPOSED PROJECT:

* Implement Forestry BMP's and Forest Management Rules as the minimum standard for all operations with the proposed timber sale. The contractor and sale administrator should agree to a general skidding plan prior to equipment operations.

* New road segments would be constructed on suitable grades of preferably 8% or less. Install adequate road drainage such as drain-dips to control erosion concurrent with harvest activities and road construction and reconditioning.

* 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.

* Tractor skidding would be limited to slopes less than 45% in the NE corner of the parcel to protect growing sites. Short steep slopes may require a combination of mitigation measures based on site review, such as adverse skidding to ridge, winch line skidding, or packing the logs with harvester to more moderate slopes less than 45%.

* Down Woody Material: Retain 5-10 tons large woody debris and a large portion of fine litter following harvest where feasible for nutrient cycling. This may be accomplished removing limbs and tops prior to skidding or return skidding slash and distributing on skid trails and evenly within the harvest area.

* On this gentle ground, slash distributed on trails or temporary roads would be adequate to control erosion and prevent unauthorized use.

* Weed Management: All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on site. All newly disturbed soils on road cuts and fills will be promptly reseeded to site adapted grasses to reduce noxious weed encroachment and stabilize roads from erosion.

APPENDIX C
REFERENCES

References

Graham, R.T., A.E. Harvey, MF Jurgensen, TB Jain, JR Tonn, DS Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountain. USDA For. Serv. Int. Mtn. Res. Sta. INT-RP-477. 13pp.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-Growth Forest Types of the Northern Region. USDA Forest Service, Region 1. Missoula, MT.

Losensky, J. 1997. Historical vegetation of Montana. Contract #970900. Montana DNRC. Missoula, MT. 109pp.

Montana Natural Heritage Program (MNHP). 1998. Information on Plant and Animal Species of Special Concern. Report on file at DNRC Clearwater Unit. Greenough, MT. 35pp.

Montana Department of State Lands, Clearwater Unit, 1987, Clearwater River Timber Sale Environmental Assessment, Southwestern Land Office, Missoula, MT.

Montana Department of Natural Resources and Conservation (DNRC), Clearwater Unit, 1999, Clearwater River Timber Sale Environmental Assessment, Southwestern Land Office, Missoula, MT.

Montana Department of Natural Resources and Conservation (DNRC). 1996. State Forest Land Management Plan. Montana DNRC, Forest Management Bureau. Missoula, MT.

Montana Department of Natural Resources and Conservation (DNRC) 2004, Collins, Jeffrey, Compiled Soil Monitoring Report on Timber Harvest Projects 1988-2004., Montana Department of Natural Resources and Conservation, Trust Land Management Division, Forest Management Bureau, Missoula, MT.

Montana Department of Natural Resources and Conservation (DNRC) 2003. Montana Administrative Rules for Forest Management. Montana DNRC Trust Land Management Division, Forest Management Bureau. Missoula, MT. 87p.

MFISH (Montana Fisheries Information System). 2008. Montana Fish, Wildlife and Parks and Natural Resource Information System. Helena, MT.

MTDEQ (Montana Department of Environmental Quality). 2006. Montana 2006 303(d) Reports and assessments. Helena, MT.

NRIS, Montana Natural Resources Information System, Internet database search for water, water rights, soils, and fisheries, 2008. http://nris.state.mt.us/interactive.html

APPENDIX D

INITIAL PROPOSALS & COMMENTS FROM PUBLIC SCOPING

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

BRIAN SCHWEITZER, GOVERNOR

CLEARWATER STATE FOREST

STATE OF MONTANA

PHONE: (406) 244-5857
FAX: (406) 244-5950

48455 SPERRY GRADE ROAD
GREENOUGH, MT 59823-9635

May 22, 2007
Initial Proposal
Bugchuck Salvage Sale

The Montana Department of Natural Resources and Conservation, Clearwater Unit, is proposing a timber sale on State – owned portions of the following school trust lands:

Section 36 T.15N., R.15W. - *Common School*
Section 31 T.15N., R.14W. - *Common School*
and,
Section 6, T.14N., R.14W. - *State Industrial School*

The primary objective of this proposal is to salvage harvest lodgepole pine that has been, is currently, or will likely be, infested with the mountain pine beetle. Approximately 1.5 miles of road would be needed to access the unroaded portions of the proposed area. Harvest operations would be done in a manner consistent with the Montana D.N.R.C.'s mandate to produce revenue for the school trust. All actions taken would be in accordance with the Enabling Act, the Montana Environmental Policy Act, the State Forest Management Plan, and to contribute to the DNRC's sustained yield as mandated by State Statute 77-5-222, MCA. Recently beetle killed and beetle infested trees would be salvaged. Additionally, other live lodgepole trees within harvest units would be cut in order to reduce the potential spread of the beetle population. Dead trees that no longer can be turned into wood products would be left as wildlife trees. Other species (Douglas-fir, ponderosa pine, western larch, etc.) would be left provided they are not on newly constructed roads, skid trails or landing areas.

The area is known to provide habitat for White-tailed and Mule deer, Elk, Moose, Mountain Lion, Black and Grizzly Bears.

This proposed sale could harvest up to 1 million board feet of timber. The proposed action is projected to be implemented in late fall of 2007 and would likely be finished by 2009.

In preparation for this timber sale, resource and technical specialists (such as wildlife biologists, hydrologists, soil scientists, and archeologists) would be consulted.

The Montana D.N.R.C. invites comments and suggestions concerning this proposal from all interested parties. Please respond by June 27, 2007.

Route all responses to:

Craig V. Nelson
Department of Natural Resources and Conservation
Clearwater Unit
48455 Sperry Grade Road
Greenough, MT.
59823-9635

or: crnelson@mt.gov
or: (406) 244-5857

Montana Fish, Wildlife & Parks

Region 2 Office
3201 Spurgin Road
Missoula, MT 59804-3101
406-542-5500
Fax 406-542-5529
June 27, 2007

Craig Nelson
Department of Natural Resources & Conservation
Clearwater Unit
48455 Sperry Grade Rd.
Greenough, MT 59823

Reference: Bugchuck salvage timber sale--west of Clearwater Junction (Sec. 18, T.16N, R.15W, Missoula County)

Dear Mr. Nelson:

We have reviewed the Initial Proposal for this salvage harvest of an estimated 1 million board feet of beetle-killed or infested lodgepole pine in the lower Blanchard Creek and upper Woodchuck Canyon area, and our comments follow.

1. All proposed sale units lie within, or immediately adjacent to, FWP-mapped crucial elk winter range. To minimize disturbance to wintering ungulates we strongly recommend no logging or road-building activity take place between December 1 and May 1.

2. Corporate timber lands and State lands in the project area have been extensively harvested in recent years, and wildlife hiding and thermal cover has been dramatically reduced. We recommend maintaining the maximum green tree cover possible in order to help mitigate the effects of this sale within this heavily managed landscape.

3. We ask that newly constructed or improved roads associated with this sale be gated or decommissioned to maintain wildlife habitat security.

4. As you develop the plans for this project, please contact our Blackfoot wildlife biologist Jay Kolbe (677-0162; jkolbe@mt.gov) and/or our Blackfoot River fisheries biologist, Ron Pierce (542-5532; rpierce@mt.gov) for further information or consultation.

5. Timber harvesters should be made aware that bears are attracted to oil products and machinery lubricants, hoses and seats--in addition to any food products or scraps on site. We

recommend that contractors camping in the area during logging be required to store potential attractants such as food, garbage and/or pet food in bear-resistant containers. Please contact our bear specialist, Jamie Jonkel at 542-5508 or jajonkel@mt.gov, for further information on bear-resistant containers or buildings, as well as specific guidelines for logging crews and keeping clean camps and/or staging areas.

We thank you for providing the opportunity for FWP to comment on this subdivision. (Please contact Sharon Rose at 542-5540 or shrose@mt.gov if you wish to receive an electronic version of these comments.)

Sincerely,

/s/ Mack Long

Mack Long
Regional Supervisor

ML/sr

F. H. STOLTZE LAND & LUMBER CO.

Lumber Manufacturers
Box 1429 COLUMBIA FALLS, MONTANA 59912

June 25, 2007

Craig V. Nelson
Montana DNRC – Clearwater Unit
48455 Sperry Grade Road
Greenough, MT. 59823-9635

RE: Bugchuck Salvage Sale

Comments submitted via e-mail, please acknowledge receipt.

Ned,

I support this project as proposed and encourage the DNRC to move forward with it as quickly as possible due to the potential economic loss to the School Trust from bluing and degradation of the Lodgepole Pine.

I am in favor of building new road to access and manage school trust land.

Sincerely,

Chris Damrow
Forester
(406) 892-7005

WildWest Institute
P.O. Box 7998
Missoula, MT 59807
(406) 728-5733
(406) 728-5779 fax
info@wildwestinstitute.org

June 27, 2007

Craig Nelson
Dept. of Natural Resources and Conservation
Clearwater Unit
48455 Sperry Grade Road
Greenough, MT
59823-9635

Mr. Nelson:

The following are concerns and issues the WildWest Institute believes should be addressed in an environmental analysis for the logging proposed in the Bugchuck Salvage Sale.

Your May 22, 2007 letter states that "Due to potential for further value loss and resource damage, we are acting quickly on this project." Obviously, the DNRC only values timber among the wide variety of natural features.

The definition of "salvage" denotes saving something from going to waste. To consider trees killed or otherwise effected, directly or indirectly, by the natural processes of insects–processes that are vital in sustaining the ecosystem and its interlinked components–to be "wasted" if allowed to play out their functions is the antithesis to "ecosystem management." The entire notion of "salvage" as it pertains to forest management is a hoax–a scam to mislead the public into accepting ecosystem damage under the guise of "management." The reason why beetle logging is so controversial is that bureaucrats, in responding to artificially-created social expectations, are playing politics with our forests. Investing taxpayer dollars in logging projects instead of proposing a true restoration project to deal with the vast mismanagement written all over the roaded portion of this forest is a huge waste.

Our organizations would appreciate genuine ecosystem restoration activities, such as removing deteriorating stream crossings, obliterating excessive roads, and improving drainage on other roads.

As far as the logging, we don't believe that timber production is the best and highest use of school trust lands. Once again we have State land managers proposing to log public lands under the guise of generating funding for schools. Conventional "wisdom" has been that logging is the only way these lands can positively benefit our state and our school children. This notion is false. Witness the Sprunger-Whitney Nature Trail in the Swan Valley, a model for state land management. The trail will provide valuable educational resources that cannot be duplicated in the classroom, and will also help pass down the importance of our state's natural heritage to our children for generations to come. We would also refer you to economist Thomas Power's 1996 study of the State's forest management plan. Dr. Power's reinforces the point that the DNRC's fundamental assumption that logging is the way to manage trust lands is seriously flawed.

So we don't believe that logging habitat for rare and endangered species to be the highest and best use of the lands in this area. Nor do we believe that causing unwarranted sediment increases to degrade native fish habitat to be a wise choice for our future. We believe that the DNRC is squandering an opportunity to educate citizens of the State of Montana and beyond about the ecological interrelationships and interplay between old-growth forests, insects, lynx, bears, hydrology, native fish–essentially the processes of a fully functioning ecosystem. Creating and providing an outdoor classroom for citizens to learn about the ecosystems in which they live, however antithetical to the DNRC's rigid bureaucratic timber extraction paradigm, will absolutely contribute the most toward improving our dwindling chances of cultural survival.

We recommend that the DNRC analyze an alternative that is consistent with the Forest Restoration Principles and Criteria (DellaSala, et al., 2003). These principles have been developed and adapted by a number of conservation groups and forest practitioners across the nation.

Please include an alternative that would carry out only restoration activities and that wouldn't do more unnecessary damage. The DNRC should always include an alternative that removes or fixes all the roads having design flaws, are otherwise contributing to soil and watershed problems, or are not needed for foreseeable management activities. The citizens of our state need to know how much it will cost us to manage these watersheds correctly.

The precision, or amount of error, in the modeled or otherwise estimated effects analysis estimates for measures of just about all resource conditions must disclosed in the analysis. They are so often misrepresented as precise measurements when in fact they are estimates, based upon limited sampling or no sampling, that inherently has an amount of error. In regards to a scientific report, the DNRC must report confidence intervals, standard deviations or standard errors in association with its conclusions. The DNRC must meet these same standards of data and information quality.

We believe the proposed management activities would severely hinder the *processes* that naturally shaped the ecosystem and resulted in a range of natural structural conditions. Generally, past process regimes are better understood than past forest structure. How are you factoring in fire, insects, tree diseases, and other natural disturbances in specifying the conditions you assume to be representative of the natural, historic range?

Many adverse consequences to soil, ecological processes, wildlife, and other elements of the natural environment are associated with logging. (Ercelawn, 1999; Ercelawn, 2000.) For example: "Salvage or thinning operations that remove dead or decayed trees or coarse woody debris on the ground will reduce the availability of forest structures used by fishers and lynx." (Bull et al., 2001.)

The analysis must address the recent proliferation of recreational motorized access (ATVs, motorcycles, snowmobiles) and the potential to increase that use in the project area.

The DNRC so often makes a case for logging as a way to reduce insect and disease damage to timber stands. As far as we are aware, the DNRC has no empirical evidence to indicate its "treatments" for "forest health" decrease, rather than increase, the incidence of insects and diseases in the forest. "Forest health" discussions are unscientific and biased toward logging as a "solution."

Please consider the large body of research that indicates logging, roads, and other human caused disturbance promote the spread of tree diseases and insect infestation.

For example, multiple studies have shown that annosus root disease (Heterobasidion annosum, formerly named Fomes annosus), a fungal root pathogen that is often fatal or damaging for pine, fir, and hemlock in western forests, has increased in western forests as a result of logging (Smith 1989). And researchers have noted that the incidence of annosus root

disease in true fir and ponderosa pine stands increased with the number of logging entries (Goheen and Goheen 1989). Large stumps served as infection foci for the stands, although significant mortality was not obvious until 10 to 15 years after logging (Id.).

The proportion of western hemlock trees infected by annosus root disease increased after precommercial thinning, due to infection of stumps and logging equipment wounds (Edmonds et al. 1989, Chavez, et al. 1980).

Armillaria, a primary, aggressive root pathogen of pines, true firs, and Douglas-fir in western interior forests, spreads into healthy stands from the stumps and roots of cut trees (Wargo and Shaw 1985). The fungus colonizes stumps and roots of cut trees, then spreads to adjacent healthy trees. Roots of large trees in particular can support the fungus for many years because they are moist and large enough for the fungus to survive, and disease centers can expand to several hectares in size, with greater than 25% of the trees affected in a stand (Id.). Roth et al. (1980) also noted that Armillaria was present in stumps of old-growth ponderosa pine logged up to 35 years earlier, with the oldest stumps having the highest rate of infection.

Filip (1979) observed that mortality of saplings was significantly correlated to the number of Douglas-fir stumps infected with Armillaria mellea and laminated root rot (Phellinus weirii). McDonald, et al. (1987) concluded the pathogenic fungus Armillaria had a threefold higher occurrence on disturbed plots compared to pristine plots at high productivity sites in the Northern Rockies. Those authors also reviewed past studies on Armillaria, noting a clear link between management and the severity of Armillaria-caused disease.

Morrison and Mallett (1996) observed that infection and mortality from the root disease Armillaria ostoyae was several times higher in forest stands with logging disturbance than in undisturbed stands, and that adjacent residual trees as well as new regeneration became infected when their roots came into contact with roots from infected stumps.

Precommercial thinning and soil disturbance led to an increased risk of infection and mortality by black-stain root disease (Leptographium wageneri) in Douglas-fir, with the majority of infection centers being close to roads and skid trails (Hansen et al. 1988). Also another Black-stain root disease (Verticicladiella wageneri) occurred at a greater frequency in Douglas-fir trees close to roads than in trees located 25 m or more from roads (Hansen 1978). Witcosky et al. (1986) also noted that precommercially thinned stands attracted a greater number of black-stain root disease insect vectors.

Complex interactions involve mechanical damage from logging, infestation by root diseases, and attacks by insects. Aho et al. (1987) saw that mechanical wounding of grand fir and white fir by logging equipment activated dormant decay fungi, including the Indian paint fungus (Echinodontium tinctorium).

Trees stressed by logging, and therefore more susceptible to root diseases are, in turn, more susceptible to attack by insects. Goheen and Hansen (1993) reviewed the association between pathogenic fungi and bark beetles in coniferous forests, noting that root disease fungi predispose some conifer species to bark beetle attack and/or help maintain endemic populations of bark beetles.

Goheen and Hansen (1993) observed that live trees infected with Laminated root rot (Phellinus weirii) have a greater likelihood of attack by Douglas-fir beetles (Dendroctonus pseudotsugae). Also, Douglas-fir trees weakened by Black-stain root disease (Leptographium wagenari ver. pseudotsugae) are attacked and killed by a variety of bark beetle species, including the Douglas-fir bark beetle (D. pseudotsugae) and the Douglas-fir engraver (Scolytus unispinosis) (Id.).

The root disease Leptographium wageneri var. ponderosum predisposes ponderosa pine to several bark beetle species, including the mountain pine beetle (D. ponderosae) and the western pine beetle (D. brevicomis) (Goheen and Hansen 1993).

A variety of root diseases, including black-stain, Armillaria, and brown cubical butt rot (Pheeolus schweinitzii), predispose lodgepole pine to attack by mountain pine beetles in the interior west. The diseases are also believed to provide stressed host trees that help maintain endemic populations of mountain pine beetle or trigger population increases at the start of an outbreak (Goheen and Hansen 1993).

Grand and white fir trees in interior mixed-conifer forests have been found to have a high likelihood of attack by the fir engraver (Scolytus ventralis) when they are infected by root diseases, such as laminated root rot, Armillaria, and annosus (Goheen and Hansen 1993).

More western pine beetles (Dendroctonus brevifomis) and mountain pine beetles (D. ponderosae) were captured on trees infected by black-stain root disease (Ceratocystis wageneri) than on uninfected trees (Goheen et al. 1985). The two species of beetle were more frequently attracted to wounds on trees that were also diseased than to uninfected trees. They also noted that the red turpentine beetle (Dendroctonus valens) attacked trees at wounds, with attack rates seven-to-eight times higher on trees infected with black-stain root disease than uninfected trees. Spondylis upiformis attacked only wounded trees, not unwounded trees (Id.).

Any contentions that potential insects and tree diseases in the project area would be something to be concerned about ecologically runs counter to more enlightened thinking on such matters. For example, Harvey et al. 1994 state:

> Although usually viewed as pests at the tree and stand scale, insects and disease organisms perform functions on a broader scale.
>
> ...Pests are a part of even the healthiest eastside ecosystems. Pest roles--such as the removal of poorly adapted individuals, accelerated decomposition, and reduced stand density--may be critical to rapid ecosystem adjustment
>
> ...In some areas of the eastside and Blue Mountain forests, at least, the ecosystem has been altered, setting the stage for high pest activity (Gast and others, 1991). This increased activity does not mean that the ecosystem is broken or dying; rather, it is demonstrating functionality, as programmed during its developmental (evolutionary) history. (Emphasis added.)

Please disclose how much forest--including old growth, by type, has been clearcut, salvaged, intermediate cut, thinned, etc. in the analysis area. This will help make a cumulative effects discussion of vegetative conditions of real value.

The cumulative effects analysis must be a meaningful analysis of how all activities have affected or will affect wildlife, fish, water quality, soils, or any resource. It is important that the results of past project-level and programmatic plan-level monitoring be incorporated into project-level analysis. In order for a cumulative effects analysis to be sufficient, the following must be included in the analysis:

- A list of all past projects (completed or ongoing) implemented.
- An integrated discussion of those projects' impacts on the resources potentially effected by the proposed action.
- The results of all monitoring done in the project areas as committed to in the MEPA documents of those past projects.
- A description of any monitoring, specified in those past project MEPA documents for those past projects, which has yet to be gathered and/or reported.
- A discussion of how all those projects did, or did not, meet objectives and the needs for which the projects were designed.

The DNRC has failed to evaluate or define a landscape program for old-growth habitat, and in effect, thus plan for the long-term viability of old-growth associated wildlife, prior to extensive logging of old-growth habitat. As a result, the cumulative impacts of existing levels of old growth and distribution in the analysis area are never evaluated. Yet existing and planned landscape distribution of old growth will be key to many associated species, including the pine marten, pileated woodpecker, northern goshawk, fisher, boreal owl, great grey owl, flammulated owl, and black-backed

woodpecker since they require large blocks of high quality old growth. Logging of small fragmented old growth will possibly limit recovery of landscape distributions of old growth to required densities for some or all of these species.

Please perform a cumulative effects analysis for wildlife species. Please include a discussion of the connection between the major individual management actions carried out in the past, and the environmental harms or benefits.

The DNRC must complete an adequate assessment of logging impacts on sensitive wildlife associated with old growth. The analysis must demonstrate that landscape densities and quality of old growth are currently adequate for these species.

Judey (1978) discusses in detail how the protection of old-growth forests greatly sustains the many uses of our national forests, as mandated by federal laws. As interest in intrinsic and ecosystem values of old-growth forests on State lands grows, as plainly evidenced in recent years, these values will be best met by preserving and protecting all old growth values Judey identified.

What specific criteria for old growth have been used to identify old growth stands in the project and analysis area? We would like to know these criteria for average number of large trees per acre, the minimum diameter of these large trees, the minimum age of large trees, the average basal area for the stand, the average snags per acre over 9 inches dbh, the average number of trees over 9 inches dbh with broken tops, and the average percent of trees greater than 9 inches dbh showing decay.

Have all stands been evaluated according to the above criteria? If not, how has old growth been identified?

How do your criteria for old growth compare to those defined by Region 1 of the Forest Service for old growth? Specifically, what Old Growth Type Codes defined by Region 1 (Green, et al., 1992) occur in the project area?

The analysis must demonstrate that the proposed activities would be in compliance with all of the State Programmatic Plan old-growth and wildlife standards. Please discuss the connection between the areas designated for old-growth management and old-growth wildlife species. The existing amounts, block sizes, connectivity, spatial relationships, and integrity free from edge effects and fragmentation are all related to old-growth wildlife species' habitat needs, and thus viability.

As far as we're aware, the state has never specified the amount and distribution of habitat necessary to maintain viable populations of these species. Nor has it gathered any data on population trends of these species.

USDA Forest Service (2004a) discusses the value of small patches of old-growth habitat and cites scientific studies and lists many adverse impacts from fragmentation of old growth habitat:

> Harvesting or burning adjacent to old growth can remove the edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996).
>
> ...Harvest or burning in stands immediately adjacent to old growth mostly has negative effects on old growth, but may have some positive effects. Harvesting or burning adjacent to old growth can remove the edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996).
>
> ... The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep.). Roads that are open to the public expose many important wildlife habitat features in old growth and other forested stands to loss through firewood gathering and increased fire risk.
>
> Effects of disturbance also vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many later-seral/structural stage patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998).

The DNRC must maintain enough old-growth habitat for decades to come. How much old-growth forest existed before logging, and what is the normal historical range? Please provide information on how much has been logged or lost due to road building, wildland fire, or simple forest succession. Include a discussion on the impacts of this cumulative loss of old growth on wildlife species, and on how much effective old growth is expected to be lost in the future due to these effects.

Lesica (1995) stated that maintaining 10% of forest landscapes as old growth may result in extirpation of some wildlife species. This is based on his estimate that 20-50% of low and many mid-elevation forests were in old growth condition prior to European settlement.

USDA Forest Service, 2004a at page 3-199 states:

> Across the Interior Columbia River Basin (Quigley, et al. 1996), old forests have declined by 27 to 60 percent over that past 100 years and large residual trees and snags have decreased by 20 percent. Fire exclusion and timber harvest have altered the structure and composition of forests throughout the Basin, resulting in a 60 percent increase in susceptibility to insects, disease, and stand-replacing fires. These changes have contributed to declining habitat conditions for numerous species of wildlife associated with old growth forests.

In a scientific document prepared as a part of ICBEMP, Witmer, Martin, & Sayler (1998) make recommendations which reinforce our sentiments about population dynamics, population viability analysis, and monitoring. From the Abstract:

> Forest carnivores in the Pacific Northwest include 11 medium- to large-sized mammalian species of canids, felids, mustelids, and ursids. These carnivores have widely differing status in the region, with some harvested in regulated furbearer seasons, some taken for depredations, and some protected because of rarity. Most large carnivores have declined in numbers or range from human encroachment, loss or modification of forest habitat, accidental deaths (e.g., mortality from vehicles), illegal kills, and our inability to adequately monitor and protect populations. Efforts to reverse these trends include new approaches to reduce conflicts with humans, research to better define habitat needs, formation of expert carnivore working groups, and use of Geographic Information System models to predict specific impacts of habitat modifications. Long-term preservation of large carnivores in the region is problematic unless we reduce forest fragmentation and conflicts with humans and improve our ability to quantitatively integrate population dynamics with landscape level habitat requirements. (Emphasis added.)

The issue of providing for the larger landscape needs of far-ranging forest carnivores (including the grizzly bear, gray wolf, wolverine, fisher, pine marten, lynx, goshawk, etc.) reveals the need to utilize the principles of Conservation Biology on a landscape level. Core areas of relatively undisturbed habitats need to be maintained. Linkages with other core areas need to be established, providing sufficient habitat components so the linkages, or corridors, are functional for genetic interchange purposes. Both core areas and linkages should be the focus of the watershed rehabilitation and recovery discussed above (such as road removal). Buffer zones around core areas should also be recognized in their contribution to habitat needs for these wildlife species.

State-of-the-art conservation biology principles require an increasing focus on the landscape-scale concept and design of large biological reserves accompanied by buffer zones and habitat connectors as the most effective (and perhaps only) way to preserve wildlife diversity and viability (Noss, 1993).

Cumulative effects on old-growth habitat and on old-growth associated species include increased fragmentation, reduced older forest patch sizes, increased high-contrast edge, reduced availability of interior habitat, and decreased forested connectivity. Forest fragmentation is a major ongoing concern. It is documented that edge effects occur 10-30 meters into a forest tract (Wilcove et al., 1986). The size of blocks of interior mature and old-growth forest that existed historically before management (including fire suppression) was initiated must be compared to the present condition. Please disclose the degree to which edge effects on old growth species' habitat exist, and how much total edge effect would be increased, by the proposed logging. Such effects would reduce the ability to provide for the habitat needs of old-growth associated species for decades to come following implementation of the project and other activities in the watershed.

Mills (1994) points out the necessity of considering habitat fragmentation and current landscape pattern, caused by past logging and road building, for wildlife movements and therefore viability. Mills points out that the FS's use of the term "viable" refers to habitat characteristics, not population dynamics. Mills goes on to explain the range of parameters that must be used to make a scientifically sound assessment of the viability of wildlife species. Population dynamics refers to persistence of a population over time--which is key to making predictions about population viability. Population dynamics include assessing population size, population growth rate, and linkages to other populations and must be included in a scientifically sound Population Viability Analysis (hereafter "PVA"). Ruggiero, et. al. (1994) also point out that a sound PVA must utilize measures of population dynamics. Also, temporal considerations of the impacts on wildlife population viability must be considered (id.) but this has never been done by the DNRC. It is also of paramount importance to monitor population trends in order to validate assumptions used about long-term species persistence i.e., population viability (Mercot and Murphy, 1992; Lacy and Clark, 1993).

USDA Forest Service (2004a) states:

> Forested connections between old growth patches _(widths) are important because effective corridors should be wide enough to "contain a band of habitat unscathed by edge effects" relevant to species that rarely venture out of their preferred habitats (Lidicker and Koenig 1996 and Exhibit Q-17). (Page 3-201.)
>
> Timber harvest patterns across the Interior Columbia River basin of eastern Washington and Oregon, Idaho, and western Montana have caused an increase in fragmentation of forested lands and a loss of connectivity within and between blocks of habitat. This has isolated some wildlife habitats and reduced the ability of some wildlife populations to move across the landscape, resulting in long-term loss of genetic interchange (Lesica 1996, U.S. Forest Service and Bureau of Land Management 1996 and 1997). (Page 3-216.)

USDA Forest Service (2004a) discusses the fragmentation affects on old-growth habitat:

> Harvest or burning in stands immediately adjacent to old growth mostly has negative effects on old growth, but may have some positive effects. Harvesting or burning adjacent to old growth can remove the edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996). On the other hand, adjacent management can accelerate regeneration and sometimes increase the diversity of future buffering canopy.
>
> The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep.). Roads that are open to the public expose many important wildlife habitat features in old growth and other forested stands to loss through firewood gathering and increased fire risk.
>
> Effects of disturbance also vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many later-seral/structural stage patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998). Harvest or underburning of some late and mid seral/structural stage stands could accelerate the eventual creation of old growth in some areas (Camp, et al. 1996). The benefit of this approach depends on the degree of risk from natural disturbances if left untreated.
>
> Effects on old growth habitat and old growth associated species relate directly to _ "Landscape dynamics--Connectivity", and _ "Landscape dynamics--Seral/structural stage patch size and shapes." (Pages 3-196 to 3-197.)

Harrison and Voller, 1998 state, "connectivity should be maintained at the landscape level." They adopt a definition of landscape connectivity as "the degree to which the landscape facilitates or impedes movement among resource patches." Also:

> Connectivity objectives should be set for each landscape unit. _Connectivity objectives need to account for all habitat disturbances within the landscape unit. The objectives must consider the duration and extent to which different disturbances will alienate habitats. _ In all cases, the objectives must acknowledge that the mechanisms used to maintain connectivity will be required for decades or centuries.

(Id., internal citations omitted.) Harrison and Voller, 1998 further discuss these mechanisms:

> Linkages are mechanisms by which the principles of connectivity can be achieved. Although the definitions of linkages vary, all imply that there are connections or movement among habitat patches. Corridor is another term commonly used to refer to a tool for maintaining connectivity. _the successful functioning of a corridor or linkage should be judged in terms of the connectivity among subpopulations and the maintenance of potential metapopulation processes. (Internal citations omitted.)

Harris, 1984 discusses connectivity and effective interior habitat of old-growth patches:

> Three factors that determine the effective size of an old-growth habitat island are (1) actual size; (2) distance from a similar old-growth island; and (3) degree of habitat difference of the intervening matrix. _(I)n order to achieve the same effective island size a stand of old-growth habitat that is surrounded by clearcut and regeneration stands should be perhaps ten times as large as an old-growth habitat island surrounded by a buffer zone of mature timber.

Harris, 1984 discusses habitat effectiveness of fragmented old growth:

> (A) 200-acre (80 ha) circular old-growth stand would consist of nearly 75% buffer area and only 25% equilibrium area. _A circular stand would need to be about 7,000 acres (2,850 ha) in order to reduce the 600-foot buffer strip to 10% of the total area. It is important to note, however, that the surrounding buffer stand does not have to be old growth, but only tall enough and dense enough to prevent wind and light from entering below the canopy of the old-growth stand.

Harris, 1984 believes that "biotic diversity will be maintained on public forest lands only if conservation planning is integrated with development planning; and site-specific protection areas must be designed so they function as an integrated landscape system." Also:

> Because of our lack of knowledge about intricate old-growth ecosystem relations (see Franklin et al. 1981), and the notion that oceanic island never achieve the same level of richness as continental shelf islands, a major commitment must be made to set aside representative old-growth ecosystems. This is further justified because of the lack of sufficient acreage in the 100- to 200-year age class to serve as replacement islands in the immediate future. _(A) way to moderate both the demands for and the stresses placed upon the old-growth ecosystem, and to enhance each island's effective area is to surround each with a long-rotation management area.

The number, species, and size of snags and green tree replacements to be retained in logging units is also an issue for old-growth wildlife species' viability. Harris (1999) and ICBEMP DSEIS Appendix 12 present scientific information on this topic.

The high density of snags and defective trees within old growth (Green et al. 1992) would be substantially eliminated with the planned logging. Please disclose how many old logging units in the project area are deficient in snags, another vital and necessary component of old-growth habitat.

Please disclose the risk of resulting chronic watershed impacts of continuing sub-standard roads. Even if all roads were to be brought up to BMP standards, maintenance will be needed in following years, with uncertain funding to achieve it.

Please include a cumulative effects analysis of soil compacted and/or negatively impacted from past roading and logging and an analysis of how these negative soil impacts effect productivity sustained timber yields and therefore long-term obligations to the school trust.

Please disclose how past management has impacted soil productivity in the project area, including the various kinds and levels of soil damage in the various disturbed sites from past logging activities in the watershed. In representing its management as "sustained yield" the DNRC must learn how timber management has, and will, effect timber production in the second, third, and later rotations on school trust land. The DNRC must not be spending the school trust's "capital" while somehow expecting the "interest" (timber yields) to remain constant.

The DNRC is avoiding the entire issue of maintaining soil productivity. The Forest Service's Northern Region (FSM 2500-99-1) defines "Soil Function" thus:

> Primary soil functions are: (1) the sustenance of biological activity, diversity, and productivity, (2) soil hydrologic function, (3) filtering, buffering, immobilizing, and detoxifying organic and inorganic materials, and (4) storing and cycling nutrients and other materials.

Grier and others (1989), adopt as a measure of soil productivity: "the total amount of plant material produced by a forest per unit area per year." (P. 1.) And "Soil Quality" is defined as "The capacity of a specific soil to function within its surroundings, support plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation." (USFS Northern Region FSM 2500-99-1.)

The scientific adequacy of the DNRC's methodology for maintaining soil productivity has never been demonstrated. This includes BMPS and all the mitigation measures proposed. They've never been validated as to protecting the productivity of the land. And BMP monitoring does not even attempt to measure post-project soil productivity, since the audits are not scientifically designed to do so.

Grier et al. (1989), cite a study finding "a 43-percent reduction in seedling height growth in the Pacific Northwest on primary skid trails relative to uncompacted areas" for example. And in another report, Adams and Froehlich (1981) state:

> Measurements of reduced tree and seedling growth on compacted soils show that significant impacts can and do occur. Seedling height growth has been most often studied, with reported growth reductions on compacted soils from throughout the U.S. ranging from about 5 to 50 per cent.

Alexander and Poff (1985) reviewed literature and found that as much as 10% to 40% of a logged area can be disturbed by skyline logging. They state:

> There are many more data on ground disturbance in logging, but these are enough to indicate the wide diversity of results obtained with different equipment operators, and logging techniques in timber stands of different composition in different types of terrain with different soils. Added to all these variables are different methods of investigating and reporting disturbance.

A big problem is the DNRC's failure to deal forthrightly with the noxious weed problem. The long-term costs are never adequately disclosed or analyzed. The school trust is expected to continuously foot the bill for noxious weed treatments–the need for which increases yearly as the DNRC continues the large-scale propagation of weeds, and fails to monitor the effectiveness of its noxious weed treatments.

Please include a cumulative impacts analysis for all of the above resource concerns. Is this timber sale occurring in an area without past impacts from logging and road building. MEPA requires an evaluation of cumulative (defined as: the collective impacts on the human environment of the proposed action when considered in conjunction with other past and present actions related to the proposed action by location or generic type) and secondary (defined as: a further impact to the human environment that may be stimulated or induced by or otherwise result from a direct impact of the action) impacts on the physical environment.

The economics analysis must include an itemized disclosure of costs vs. benefits. In other words, you should give consideration to, and adequately document, who benefits by these projects and who "pays" for them. We ask that all costs and benefits be itemized in the analysis, so the pubic can see these figures.

Net public benefit is determined by numerous inputs and outputs, some of which are quantifiable and others which are more qualitative. Economic analysis can provide a useful basis for evaluation only if the economic evaluation is comprehensive and documents all costs and benefits related to the proposed action. We would like the analysis to:

(1) Insure that the economic analyses are meaningful, by including in the analyses both direct and induced costs;
(2) Adequately assess all current, in-place benefits;
(3) Include impacts to hunter opportunity and other forms of recreation (how will the proposed project impact the quality of backcountry hiking, for example?);
(4) Quantify all induced losses to outfitters and guides who may currently derive economic benefits from the areas;
(5) Consider all costs related to the projects, including the costs of preparing the analyses, all specialist support and consultation, costs associated with travel management and administration, road construction and engineering expenses, weed control, reforestation and planting, stand exams, timber stand improvement, and all other costs.

It is our intention that you include in the project record and review all of the literature and other incorporated documents we've cited herein. **Please contact us if you have problems locating copies of any of them.** Thank you for your attention to these concerns. Please keep each organization on your list to receive further mailings on the proposal.

Sincerely,

/s/

John Meyer

Literature cited

Aho, P. E., G. M. Filip and F. F. Lombard. 1987. Decay fungi and wounding in advance grand and white fir regeneration. Forest Science 33: 347-355.

Alexander, E.B., and R. Poff. 1985. Soil disturbance and compaction in wildland management. USDA Forest Service, Pacific Southwest Region, Earth Resources Monogr 8. 157 p

Bréis, S. and C. Camire. 1997. Soil compaction induced by careful logging in the claybelt region of northwestern Quebec (Canada). Can. J. Soil Sci. 78:197-206.

Bull, E., K.B. Aubrey, and B.C. Weles, 2001. Effects of Disturbance on Forest Carnivores of Conservation Concern in Eastern Oregon and Washington. Northwest Science. Vol 75, Special Issue, 2001.

Center for Biological Diversity, 2004. Petition To The Northern And Intermountain Regions Of The U.S. Forest Service To Amend National Forest Plans To Protect The Northern Goshawk. Center for Biological Diversity, Alliance for the Wild Rockies, Biodiversity Conservation Alliance, Friends of the Clearwater, Idaho Conservation League, Wyoming Wilderness Association.

Chevez, T. D., R. L. Edmonds and C. H. Driver. 1980. Young-growth western hemlock stand infection by Heterobasidion annosum 11 years after precommercial thinning. Canadian Journal of Forest Research 10: 389-394.

DellaSala, Dominick A., Anne Martin, Randi Spivak, Todd Schulke, Bryan Bird, Marnie Criley, Chris van Daalen, Jake Kreilick, Rick Brown, and Greg Aplet, 2003. A Citizen's Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria. Ecological Restoration, Vol. 21, No. 1, 2003 ISSN 1522-4740

Edmonds, R. L., D. C. Shaw, T. Hsieng and C. H. Driver. 1989. Impact of precommercial thinning on development of Heterobasidion annosum in western hemlock. pp. 85-94 in Proceedings of the Symposium on Research and Management of Annosus Root Disease (Heterobasidion annosum) in Western North America. W. J. Otrosina and R. F. Scharpf, tech. coord. GTR-PSW-116. USDA Forest Service. Pacific Southwest Forest and Range Experiment Station.

Ercelawn, A. 1999. End of the Road -- The Adverse Ecological Impacts of Roads and Logging: A Compilation of Independently Reviewed Research. 130 pp. Natural Resources Defense Council. New York. Available online at: http://www.nrdc.org/land/forests/roads/eotrinx.asp

Ercelawn, A. 2000. Wildlife Species and Their Habitat: The Adverse Impacts of Logging -- A Supplement to End of the Road. 41 pp. Natural Resources Defense Council. New York. Available online at: http://www.nrdc.org/land/forests/eotrsupp.asp

Espinosa, F. A., Jr., J. Rhodes, and D. McCullough. 1997. The Failure of Existing Plans to Protect Salmon Habitat in the Clearwater National Forest in Idaho. Journal of Environmental Management 49, 205-230p.

Filip, G. M. 1979. Root disease in Douglas-fir plantations is associated with infected stumps. Plant Disease Reporter 63: 580-583

Goheen, D. J. and E. M. Hansen. 1993. Effects of pathogens and bark beetles on forests. pp. 175-196 in Beetle-Pathogen Interactions in Conifer Forests. T.D. Schowalter and G.M. Filip, eds. Academic Press. San Diego.

Goheen, D. J., F. W. Cobb Jr., D. L. Wood and D. L. Rowney. 1985. Visitation frequencies of some insect species on Ceratocystis wageneri infected and apperently healthy ponderosa pines. Canadian Entomologist 117: 1535-1543.

Goheen, E. M. and D. J. Goheen. 1989. Losses caused by annosus root disease in Pacific Northwest forests. pp. 66-69 in Proceedings of the Symposium on Research and Management of Annosus Root Disease (Heterobasidion annosum) in Western North America. W. J. Otrosina and R. F. Scharpf, tech. coord. GTR-PSW-116. USDA Forest Service. Pacific Southwest Forest and Range Experiment Station.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Neumann, 1992. Old-growth forest types of the northern region. Northern Region, R-1 SES 4/92. Missoula, MT.

Grier, C. C., K. M. Lee, N. M. Nadkarni, G. O. Klock, & P. J. Edgerton, 1989 Productivity of Forests of the United States and its Relation to Soil and Site Factors and Management Practices: A Literature Review. USDA Forest Service General Technical Report PNW-GTR-222, March 1989.

Hansen, E. M. 1978. Incidence of Verticicladiella wageneril and Phellinus weirii in Douglas-fir adjacent to and away from roads in western Oregon. Plant Disease Reporter 62: 179-181.

Hansen, E. M., D. J. Goheen, P. F. Hessburg, J. J. Witcosky and T. D. Schowalter. 1988. Biology and management of black-stain root disease in Douglas-fir. pp. 63-80 in Leptographium Root Diseases on Conifers. T.C. Harrington and F.W. Cobb, Jr. eds. APS Press. St. Paul, Minnesota.

Harris, Larry D. 1984. The Fragmented Forest : Island Biogeography Theory and the Preservation of Biotic Diversity. Chicago Press, Chicago, Ill. 211pp.

Harris, Richard B. 1999. Abundance and characteristics of snags in western Montana forests. Gen. Tech. Rep.. RMRS-GTR-31. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 19 pp.

Harrison S and Voller J. 1998. Connectivity. Voller J and Harrison S, eds. Conservation Biology Principles for Forested Landscapes. Ch3:76-97. Vancouver: UBC Press.

Hayward, G. D., and R. E. Escano. 1989. Goshawk nest-site characteristics in western Montana and northern Idaho. Condor: v. 91, no. 2, pp. 476-479.

Hayward, Gregory D., and Jon Verner, 1994. Flammulated, Boreal, and Great Grey Owls in the United States: A Technical Conservation Assessment. USDA Forest Service General Technical Report RM-253.

ICBEMP DSEIS Appx 12. Requirements For Snag And Downed Wood. Interior Columbia Basin Supplemental Draft Environmental Impact Statement, Vol. 2, Appendix 12. Interior Columbia Basin Ecosystem Management Project, United States Department of Agriculture Forest Service, United States Department of the Interior Bureau of Land Management. March 2000.

Iverson, George C., G.D. Hayward, K. Titus, E. DeGayner, R.E. Lowell, D.C. Crocker-Bedford, P.F. Schempf, and J. Lindell, 1996. Conservation Assessment for the Northern Goshawk in Southeast Alaska. USDA Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-387.

Johnsen, S., 1996. Identification of Potential Fisher Habitat on the Kootenai National Forest. July 11, 1996.

Judey, Glenn Patrick, 1978. Old Growth Forests: A Necessary Element of Multiple Use And Sustained Yield National Forest Management. Environmental Law, Vol. 8, pp 497-522.

Lacy, Robert C., and Tim W. Clark. 1993. Simulation Modeling of American Marten (Martes Americana) Populations: Vulnerability to Extinction. Great Basin Naturalist; v. 53, no. 3, pp. 282-292

Lesica, Peter, 1996. Using Fire History Models to Estimate Proportions of Old Growth Forest in Northwest Montana, USA. Biological Conservation 77, p. 33-39.

Lindenmayer, David B., Clark, T.W., Lacy, R. C., and Thomas, V. C., 1993. Population Viability Analysis as a Tool in Wildlife Conservation Policy: With Reference to Australia. Environmental Management Vol. 17, No. 6, pp. 745-758.

Marcot, Bruce G. & D. D. Murphy, 1992. Population viability analysis and management. In Szaro, R., ed. Biodiversity in Managed Landscapes: Theory and Practice. Proceedings of Conference on Biodiversity in Managed Landscapes: Theory and Practice, 13-17 July, 1992, Sacramento, CA.

McClelland B. Riley, Sidney S. Frissell, William C. Fischer, and Curtis H. Halvorson, 1979. Habitat Management For Hole-Nesting Birds in Forests Of Western Larch And Douglas-fir. Journal of Forestry, August 1979 pp. 480-483

McDonald, G. I., N. E. Martin and A. E. Harvey. 1987. Armillaria in the Northern Rockies: Pathogenicity and Host Susceptibility on Pristine and Disturbed Sites. USDA Forest Service. Research Note INT-371. 5 p.

Mills, L. Scott, 1994. Declaration in Support of Plaintiff's Motion for Summary Judgment and Permanent Injunction. Civil No. CV 94-108-M-CCL.

Morrison, D. and K. Mallett. 1996. Silvicultural management of armillaria root disease in western Canadian forests. Canadian Journal of Plant Pathology 18: 194-199.

Noss, Reed F.,1993. The Wildlands Project Land Conservation Strategy. Wild Earth Journal, Special Issue: 10-26

Rhodes, Jon, 2002. Bitterroot National Forest Burned Area Recovery Project Post-fire salvage logging field review: 8/20-22/2002. Jon Rhodes, Hydrologist, Center for Biological Diversity

Roth, L. F., L. Rolph and S. Cooley. 1980. Identifying infected ponderosa pine stumps to reduce costs of controlling Armillaria root rot. Journal of Forestry 78: 145-15

Ruggiero, L.F., G. D. Hayward, & J. R. Squires, 1994. Viability Analysis in Biological Evaluations: Concepts of Population Viability Analysis, Biological Population, and Ecological Scale. Conservation Biology, Vol. 8, No. 2, June 1994, pp. 364-372

Smith, R. S., Jr. 1989. History of Heterobasidion annosum in Western United States. pp. 10-16 in Proceedings of the Symposium on Research and Management of Annosus Root Disease (Heterobasidion annosum) in Western North America. W. J. Otrosina and R. F. Scharpf, tech. coord. GTR-PSW-116. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station.

USDA Forest Service, 2000b. Expert interview summary for the Black Hills National Forest Land and Resource Management Plan Amendment. USDA Forest Service. Black Hills National Forest, Custer, SD.

USDA Forest Service, 2000c. Forest Plan Monitoring and Evaluation Report for 1998. Idaho Panhandle National Forests.

USDA Forest Service, 2000d. Northern Region Snag Management Protocol. January 2000

USDA Forest Service, 2004a. Logan Creek Ecosystem Restoration Project Final Environmental Impact Statement. Flathead National Forest.

USGS, Biological Resources Division. 1997. Report of a Workshop to Develop a North American Raptor Monitoring Strategy; August 1996. Raptor Research and Technical Assistance Center; Boise, Idaho.

Wargo, P. M. and C. G. Shaw, III. 1985. Armillaria root rot: the puzzle is being solved. Plant Disease 69: 826-832.

Watson, James W., D. W. Hays, and D. J. Hays. 1999. Efficacy of Northern Goshawk Broadcast Surveys in Washington State. Journal of Wildlife Management; v. 63, no. 1, pp. 98-106.

Weaver, J.L, B. Baxter, and G. Amato. 1997. Lynx Survey and Habitat Assessment. Kootenai National Forest, Montana. Year 1 Progress Report. Wildlife Conservation Society, 185th St. and Southern Boulevard, Bronx, NY 10460.

Wilcove, David S., Charles H. McLellan, Andrew P. Dobson. 1986. Habitat fragmentation in the Temperate zone in Conservation Biology, The Science of Scarcity and Diversity, Michael Soule, ed. Sinauer Associates, Inc., Sunderland, Massachusetts.

Williamson, J.R. and W.A. Neilsen. 2000. The influence of forest site and rate and extent of soil compaction and profile disturbance of skid trails during ground-based harvesting. Can. J. For. Res. 30:119

Witcosky, J. J., T. D. Schowalter and E. M. Hansen. 1986. Hylastes nigrinus (Coleoptera: Scolytidae), Pissodes fasciatus, and Steremnius carinatus (Coleoptera: Curculionidae) as vectors of black-stain root disease of Douglas-fir. Environmental Entomology 15: 109

APPENDIX E

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