DeBorgia-Deer Project
Environmental Assessment

Missoula Unit
Southwest Land Office
Montana Department of Natural Resources and Conservation
March 2015

DeBorgia-Deer Project Environmental Assessment

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Environmental Assessment

Project Name: DeBorgia-Deer Project
Proposed Implementation Date: June 2015
Proponent: Missoula Unit, Southwest Land Office, Montana DNRC
County: Missoula
Duration: 2015-2020

Type and Purpose of Action

Description of Proposed Action:

The Missoula Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing forest management activities on 866 acres known as the DeBorgia-Deer project. The project area is located approximately 13 miles northwest of St. Regis, MT (refer to vicinity map Attachment **A-1** and project map **A-2**) and includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	**Sec 35, 36 T19N R30W Sec 31 T19N R29W**	**934**	**688**
Public Buildings	**Section 19, 30 T19NR29W**	**360**	**178**
MSU 2nd Grant			
MSU Morrill			
Eastern College-MSU/Western College-U of M			
Montana Tech			
University of Montana			
School for the Deaf and Blind			
Pine Hills School			
Veterans Home			
Public Land Trust			
Acquired Land			
Total Lands		**1294**	**866**

The proposal includes timber harvest on approximately 866 acres removing an estimated 7.0 MMBF. In addition to timber harvest, the following table outlines all proposed activities under this EA:

Action	Quantity
Proposed Harvest Activities	
Seed Tree	158 acres
Selection	438 acres
Clearcut	115 acres
Permits	155 acres*
Total Treatment Acres	**866 acres**
Proposed Forest Improvement Treatment	
Planting	**500 acres**
Proposed Road Activities-DNRC Ownership	
New permanent road construction	7 miles
Road maintenance	9miles

** Three Timber Permits would take place under the DeBorgia-Deer EA if the Action Alternative were selected*

Objectives of the project include:

- Bring stands closer to historic conditions that existed prior to fire suppression
- Emulate stand replacement disturbance regimes within Lodgepole Pine stands via clear-cut harvesting.
- Harvest areas that contain high amounts of root rot, bark beetle activity and plant with favorable stock.
- Restore historic Western white pine species by planting Blister rust resistant Western white pine (F2 stock) species in areas impacted by Mountain Pine Beetle (MPB) and plant western larch and ponderosa pine in root rot infected areas to convert stands to a resistant species.
- Generate revenue for the Common Schools and Public Buildings Trusts.
- Reduce stand density and fuel loads to promote sustainability and growth.
- Improve access and BMP compliance with new construction and road maintenance activities.

The lands involved in this proposed project are held in trust by the State of Montana. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the 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 the beneficiary institutions (Section 77-1-202, MCA).

The DNRC would manage lands involved in this project in accordance with:

- The State Forest Land Management Plan (DNRC 1996),
- Administrative Rules for Forest Management (ARM 36.11.401 through 471),
- The Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) (DNRC 2010)
- All other applicable state and federal laws.

Project Development

SCOPING:

- DATE:
  - June 2013
- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: http://dnrc.mt.gov/PublicInterest/Notices/Default.asp
  - 40 individuals, organizations and agencies were scoped.
  - A notice was placed in the Missoulian and the Valley Press/Mineral Independent Newspaper, September of 2011.
- COMMENTS RECEIVED:
  - A letter from the Salish and Kootenai Tribe reminding DNRC that cultural resources important to their Nation are imbedded throughout the region. They further requested to be notified if any new or additional information arose through the course of the project so that they could actively participate in the management of their cultural resources.
  - An email from Roger Hinther, stating his interest in the proposed activities.
  - A letter from the Mineral County Board of Commissioners stating that they have no specific issues or concerns and encourage and support the project.
  - A letter from Montana FWP regarding the proposed activities and their potential effects of harvesting in a Primary Big game winter/spring range and possible disturbance, displacement , security, and road building, illegal use of motorized vehicles and snowmobile use.

These requests and/or concerns, as well as internal issues and concerns would be incorporated into project planning and design and would be implemented in associated contracts.

INTERDISCIPLINARY TEAM (ID):

- Project Leader: Bill Burdick
- Archeologist: Patrick Rennie
- Wildlife Biologist: Garrett Schairer
- Hydrologist & Soil Scientist: Jeff Collins
- Decision Maker: Amy Helena

OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED: *(Conservation Easements, Army Corps of Engineers, road use permits, etc.)*

- **United States Fish & Wildlife Service-** DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three

fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at www.dnrc.mt.gov/HCP

- **Montana Department of Environmental Quality (DEQ)-** DNRC is classified as a major open burner by DEQ and is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

  A Short-term Exemption from Montana's Surface Water Quality Standards (318 Authorization) may also be required from DEQ if activities such as replacing a bridge on a stream would introduce sediment above natural levels into streams.

- **Montana/Idaho Airshed Group-** 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). As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit.

- **Montana Department of Fish, Wildlife and Parks (DFWP) -** A Stream Protection Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries.

- **United State Forest Service (USFS) -** DNRC and USFS are entering into a Cost Share easement in the Lolo National Forest West-End area. This easement would affect the proposed access to the project area.

ALTERNATIVES CONSIDERED:

No-Action: Under the No-Action Alternative the following stand conditions would persist:

- Root rot would continue to cause mortality across all age classes of Douglas-Fir, ponderosa pine and western larch.

- Mountain Pine Beetle would affect Western White pine, Lodgepole pine, and Ponderosa Pine, increasing mortality rates as these stands reach climax age classes.

- A combination of insects, disease and overcrowding could result in a reduction of stand productivity and tree vigor in the project area.

- No planting would take place to convert root rot infected stands to more resistant species.

- Douglas-fir and grand fir would continue to out-compete seral species causing an overall reduction in historically represented dominant species in the area.

- White Pine Blister Rust would continue to be prolific among the existing generation of western white pine.

- Increased fuel loading both on the ground and as ladder fuels would increase the likelihood of crown fires and mortality across all age classes.

- No revenue would be generated for the Common Schools or Public Buildings Trust in the project area.

Action Alternative:

- DNRC would harvest approximately *7.0 MMBF from approximately 866 acres*. Implementation of this alternative would consist of three separate timber sales and up to three timber permits. The first being the Lincoln Silver Dogwood timber sale, followed by two smaller timber sales and up to 3 timber permits within the project area. Slash would be piled and burned postharvest.

- Planting activities would take place post-harvest to improve growth, vigor and genetics in the stands.

- New road construction and road maintenance activities would also take place to improve access and bring existing roads up to BMP standards.

Impacts on the Physical Environment

VEGETATION:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to vegetation:

- Timber harvesting and road building may introduce or spread noxious weeds in the project area.

- Tree mortality is currently above 30% among Lodgepole pine, western white pine and ponderosa pine with the presence of Mountain Pine Beetle and root rot. The proposed actions would minimize the mortality rate.

- Shade tolerant species would be removed and no longer continue to out-compete seral species, this proposed treatment would return stands to their historic cover type and species distribution.

- Stand productivity and tree vigor would begin to proliferate once treated, resulting in gained revenue to the associated trusts and a decrease in fire hazard.

Issues dismissed from further review

- Wildlife winter range and snowmobile trails.

This issue has been dismissed from further study because the designated winter range is not within the project area. Snowmobile recreation is dismissed because the proposed project area is not near a snowmobile trail.

- There is concern that the proposed project could negatively impact populations of threatened, endangered, or sensitive plant species.

This issue has been dismissed from further study because no rare plants have been identified within the project area through field surveys or a search of the Montana Natural Heritage Program. Therefore no direct, indirect, or cumulative impacts to rare plants would be expected under either alternative.

Recommended Mitigation Measures for Vegetation & Noxious Weeds- The analysis and levels of effects to vegetation resources are based on implementation of the following mitigation-measures.

- Favor western larch as a leave tree to limit the effects of root rot in the project area.
- Prescribe a selection harvest in order to emulate the range of natural disturbance historically present on the landscape.
- Plant F2 Rust Resistance Western White Pine stock and western larch in root rot areas.
- All road maintenance and harvest equipment would be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment would be subject to inspection by the Forest Officer prior to moving on site.
- All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.
- Weed treatment measures would include roadside and spot herbicide treatment of noxious weeds. Where herbicide treatments are required by the Forest Officer, herbicide must be applied under the supervision of a licensed applicator following label directions in accordance with Department of Agriculture regulations, applicable laws and rules and regulations of the Mineral County Weed Board.
- DNRC would monitor the project roads and areas to evaluate weed control measures implemented and to determine if any new noxious weeds become established.

Recommended Mitigations and Adjustments of Harvest Treatments for the Benefit of Other Resources

- *Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- No harvest in Class one or Class two SMZs.

- Retain RMZ's based on site index.

FOR COMPLETE VEGETATION ANALYSIS SEE ATTACHMENT B

WILDLIFE: ***(terrestrial & avian including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):***

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to wildlife:

- Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

- Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

- Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.

- Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles.

- Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

- Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

- Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

- Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

- Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range.

- Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Recommended Mitigation Measures for Wildlife- The analysis and levels of effects to wildlife are based on implementation of the following mitigation measures.

- A DNRC biologist would be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for

managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.

- Motorized public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs would be used during active periods and a physical closure (gate, barriers, equipment, etc.) would be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris *would* be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Contractors and purchasers conducting contract operations *would* be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants would be stored in a bear-resistant manner.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir, in units in lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.

FOR COMPLETE WILDLIFE ANALYSIS SEE ATTACHMENT C.

SOILS:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to soils:

- There is a concern that forest management activities may result in increased erosion and reduced soil productivity where excessive disturbance from compaction, displacement, or loss of nutrients occurs, depending on the extent and degree of harvest related soil effects.

Recommended Mitigation Measures for Soils- The analysis and levels of effects to soils resources are based on implementation of the following mitigation measures:

- DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented across the area.

- Limit harvest equipment and hauling 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.

- On tractor harvest units the logger and sale administrator would agree to a general skidding plan prior to equipment operations to limit trails to 15% or less of the harvest unit. Feller-bunchers may work on slopes up to 45% as long as displacement and turning is minimized to prevent excessive disturbance. Slopes over 45% would be cable harvested to reduce soil impacts and improve harvest efficiency.

- Whole tree skidding can reduce slash hazard, but also remove a portion of nutrients from growing sites. Target fine slash and woody debris levels are to retain 5-15 tons/acre well distributed on site while meeting the requirements of the slash law. On sites with lower basal area, retain large woody debris as feasible since it may not be possible to retain 5 tons/acre and the emphasis would be on providing additional CWD in the future. Slash may be placed on main skid trails to protect soils and reduce erosion potential.

- Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

- Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation. If cut-slope or fill-slope slumps occurred on new roads they would be stabilized to control erosion as part of the harvest project.

- New road construction, including drainage features should be completed prior to freezing conditions. Road cutslopes are to be constructed at relatively stable angles as noted in contract.

FOR COMPLETE SOIL RESOURCES ANALYSIS SEE ATTACHMENT D.

WATER RESOURCES:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to water resources:

- Water Quality - There is a concern that the proposed action may cause impacts to water quality and quantity from timber management, road construction and road use.

- Cumulative Watershed Effects- There is a concern that the proposed timber harvest may cause or contribute to cumulative watershed impacts as a result of potential increased runoff and sedimentation.

FISHERIES RESOURCES *(including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to fisheries resources:

- Cold Water Fisheries- There is a concern the proposed forest management actions may have effects to fisheries due to sedimentation.

Issues and Concerns dismissed from further analysis

- There is concern impacts to Riparian Large Woody Debris and Stream Shading may occur as a result of the proposed project.

This issue was dismissed from further analysis because DNRC would *designate Riparian Management Zone (RMZs) width of 100 feet buffer along Class 1 streams based on stand potential tree height, and no harvest* would *occur in SMZ's or the wider RMZ width adjacent to Class 1 fisheries streams and rivers. Consequently, there is not expected to be any detrimental effect on large woody debris or stream shading, which may also affect stream temperatures, and these concerns would be dismissed from further analysis.*

Recommended Mitigation Measures for Water Resources & Fisheries- The analysis and levels of effects to water resources and fisheries resources are based on implementation of the following mitigation measures.

- * DNRC would implement all applicable Best Management Practices (BMP's), Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented on the applicable parcels.

- DNRC would locate, clearly mark and maintain suitable water resource protection boundaries including Streamside Management Zones (SMZ's) and Wetland Management Zones (WMZ's) adjacent to streams and wetlands consistent with State Forest Land Management Rules.

- Mitigations to reduce soil impacts and control erosion on skid trails and cable corridors would be implemented to protect water quality including limiting harvest and hauling 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.

- Existing and new roads would be maintained concurrently in association with the harvest and road use activities. Road improvements would include surface blading, rock armor culvert inlets, and installation of road drainage features to prevent surface erosion and sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

- All culvert replacements would be completed in accordance with all BMP's and FWP 124 stream permit requirements. Site specific erosion control measures, including slash filters, would be implemented during culvert replacements and perennial flows would be diverted from the culvert during construction.

- New road construction, including drainage features would be completed in the summer or fall prior to freeze-up or periods of expected high rainfall.

- All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce erosion/sediment from roads.

FOR COMPLETE WATER RESOURCES & FISHERIES ANALYSIS SEE ATTACHMENT E.

AESTHETICS

Any change to the scenery in the area could be seen from the local town of DeBorgia and the I-90 corridor. This analysis includes all past and present effects.

Existing Conditions

Depending on access point, portions of the project area are approximately 3 miles behind a seasonally locked Forest Service gate and approximately 1 mile through private property and can be observed from local forest and county roads and portions of I-90 and frontage roads.

The project area is surrounded by Forest Service forest lands, industrial timber ground and small private landowners that have treated the forest with even age management over several entries over the past 20 years. This past management has resulted in well vegetated young stands 5-30 feet tall across the landscape. The project area consists of stands 15-115 feet tall. This contrast is evident when observing the project area and surrounding sections.

-VISUAL QUALITY

No Action Alternative:

No harvesting or planting would take place. The section would continue to have “hard edges” and a square appearance.

Action Alternative:

Direct, Secondary, and Cumulative Effects

The proposed activities would soften the edges along the section lines, which would allow the section to blend in more with the surrounding area.

Harvest units would be more open and slash from the harvest would be noticeable yet temporary.

The proposed Action Alternative would not be expected to have any direct, indirect, or cumulative effect based on the following:

- The proposed treatments would reduce the stocking along the section lines, which would soften the edge and blend the section in better with the surrounding landscape.

HISTORICAL AND ARCHEOLOGICAL SITES:

A DNRC archaeologist has reviewed the proposed project location. The area was inspected in 2004 by the Forest Service as part of a Land Exchange. No cultural resources were identified.

No Action Alternative:

The no Action Alternative would have no direct, indirect, or cumulative effects to these sites.

Action Alternative:

Under the proposed Action Alternative if any historical or archaeological sites are discovered during the course of the project, they would be protected and a DNRC archaeologist would be notified immediately.

Therefore, the proposed Action Alternative would not be expected to have any direct, indirect, or cumulative effect on historical or archaeological resources.

DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, AND ENERGY:

There would be no measurable direct, secondary, and cumulative impacts related to environmental resources of land, water, air, and energy due to the relatively small size of the timber sale project.

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

- Fisheries Biological Assessment & Evaluation, United States Forest Service, Lolo National Forest, Region 1, Montana. September, 2014, assess effects of DNRC Cost share Easement in the west part of the Lolo National Forest area.

Impacts on the Human Population

HUMAN HEALTH AND SAFETY:

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 area is located within Montana Airshed 2, which encompasses Mineral County. Currently, this Airshed does contain impact zones; however the project area does not lie within the impact zone.

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to air quality:

- Smoke would be produced during pile burning.

- Dust would be produced during harvesting and hauling activities.

Recommended Mitigation Measures for Air Quality- The analysis and levels of effects to air quality are based on implementation of the following mitigation measures:

- Only burn on days approved by the Montana/Idaho Airshed group and DEQ.

- Dust abatement may be used as necessary.

- Slower speed limits may be included in contracts as necessary to reduce dust.

-SLASH BURNING

No Action Alternative:
No slash would be burned within the project areas. Thus, there would be no effects to air quality as a result of the proposed activities within the local vicinity and throughout Airshed 2.

Action Alternative:

Direct and Secondary Effects
Slash consisting of tree limbs and tops and other vegetative debris would be piled throughout the project area during harvesting. Slash 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 are less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous.

Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.

Thus, direct and secondary effects to air quality due to slash burning associated with the proposed action would be minimal.

Cumulative Effects
Cumulative effects to air quality would not exceed the levels defined by the State of Montana Cooperative Smoke Management Plan (1988) and managed by the Montana/Idaho Airshed Group. Prescribed burning by other nearby airshed cooperators (for example the U.S. Forest Service) would have potential to affect air quality. All cooperators currently operate under the same Airshed Group guidelines. The State, as a member, would burn only on approved days. This should decrease the likelihood of additive cumulative effects. Thus, cumulative effects to air quality due to slash burning associated with the proposed action would also be expected to be minimal.

-DUST

No Action Alternative:
No increased dust would be produced as a result of the proposed timber sale. Current levels of dust would be produced in the area.

Action Alternative:

Direct, Secondary, and Cumulative Effects
Harvesting operations would be short in duration. Dust may be created from log hauling on portions of native surface roads during summer and fall months. Contract clauses may provide

for the use of dust abatement or require trucks to reduce speed if necessary to reduce dust near any affected residences.

Thus, direct, secondary, and cumulative effects to air quality due to harvesting and hauling associated with the proposed action would be minimal.

RECREATION ***(including access to and quality of recreational and wilderness activities):***
The area is used for hiking, hunting, cross-country skiing, snowmobiling and general recreating. Currently, roads through the area are closed seasonally to motorized use and used only for administrative purposes when closed. There would be no change in road closure status and the selection of either alternative would not affect the ability of people to recreate on this parcel.

There would be no change from existing conditions. Therefore, there would be no measurable direct, secondary, or cumulative impacts on recreation from this proposed action.

Would the No-Action or Action Alternatives result in potential impacts to:	Impact								Can Impact Be Mitigated?	Comment Number
	Direct & Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High		
No-Action										
Health and Human Safety	**X**				**X**					
Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**					
Quantity and Distribution of Employment	**X**				**X**					
Local Tax Base and Tax Revenues	**X**				**X**					
Demand for Government Services	**X**				**X**					
Density and Distribution of Population and Housing	**X**				**X**					
Social Structures and Mores	**X**				**X**					
Cultural Uniqueness and Diversity	**X**				**X**					
Action										
Health and Human Safety		**X**				**X**			**yes**	**1**
Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**					
Quantity and Distribution of Employment		**X**				**X**			**yes**	**2**
Local Tax Base and Tax Revenues	**X**				**X**					
Demand for Government Services	**X**				**X**					

Would the No-Action or Action Alternatives result in potential impacts to:	Impact								Can Impact Be Mitigated?	Comment Number
	Direct & Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High		
Density and Distribution of Population and Housing	X				X					
Social Structures and Mores	X				X					
Cultural Uniqueness and Diversity	X				X					

Comment Number 1:
Impact
Log truck traffic in the area would *increase for the duration of the timber sale, which could cause a low impact to human safety.*

Mitigations:

- *Signs would be posted indicating that log truck traffic is present in the area.*
- *If necessary, a slower speed limit may also be imposed in the timber harvest contract.*
- *Log hauling would take place typically from during the general "work week".*

Comment Number 2:
Impact
According to the Montana Bureau of Business and Economic Research a general rule of thumb is that for every million board feet of sawtimber harvested in Montana ten person years of employment occur in the forest products industry.

This harvest is viewed as a continuation of a sustainable yield and as such would not create any new jobs but rather sustain approximately 45 person years of employment in the forest products industry. A few short-term jobs would also be created/sustained by issuing pre-commercial thinning contracts following harvest. Additionally, local businesses, such as hotels, grocery stores, and gas stations would likely receive additional revenues from personnel working on the proposed project. This would be a positive low impact to quantity and distribution in the area.

Mitigations:

- *This impact would be positive and mitigations would not be necessary.*

LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS *(includes local MOUs, management plans, conservation easements, etc.):*

None

OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

The proposed action has a projected harvest volume of 7.0MMBF. This volume is worth approximately $430/MBF delivered to a forest products manufacture site at current market prices. Delivered to market, the proposed action has a total revenue value of an estimated $3,010,000.00 Removing the timber sale purchaser's contracted operations and DNRC's development, administration, and operation expenses, the trust beneficiaries net between an

estimated 15 and 35 percent of total delivered sawlog market value. Therefore, the proposed action may generate net income for trust beneficiaries between $1,956,300 and $2,258,500. Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not 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. These revenue-to-cost ratios are a measure of economic efficiency. A recent revenue-to-cost ratio of the Southwestern Land Office was 1:1.82. This means that, on average, for every $1.00 spent in costs, $1.82 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.

Mills in Montana need 351 MMBF per year to maintain current production levels and industry infrastructure. Currently the Sustained yield and target harvest from Trust Lands is 57.6 MMBF, which represents approximately 16.4% of timber harvested in the state of Montana. This project would provide approximately 7.0 MMBF of timber towards the sustained yield target thus helping sustain current mill capacity.

Environmental Assessment Checklist Prepared By:

Name: Bill Burdick
Title: Missoula Unit Management Forester
Date: March 19, 2015

Finding

Alternative Selected

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed DeBorgia-Deer Project prepared by the Montana Department of Natural Resources and Conservation (DNRC). Two alternatives were presented and the effects of each alternative were fully analyzed in the EA. After a review of the EA, project file, public correspondence, Department Administrative Rules, policies, and the State Forest Land Management Plan (SFLMP), I have made the following decisions:

Alternative A (No Action) does not include the harvest of any timber. Alternative B (Action Alternative) proposes to harvest approximately 7,000,000 board feet of timber on 866 acres. Subsequent review determined that the alternatives, as presented, constituted a reasonable range of potential activities.

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

The Action Alternative meets the Project Need and the specific project objectives as described on page 2 of the EA. The Action Alternative would produce revenue to the trust beneficiaries,

while providing a mechanism whereby the existing timber stands would be moved towards conditions more like those that existed historically.

The analysis of identified issues did not disclose any reason compelling the DNRC to not implement the timber sale.

The Action Alternative includes mitigation activities to address environmental concerns identified during both the Public Scoping phase and the project analysis.

Significance of Potential Impacts

For the following reasons, I find that the implementation of Alternative B (Action Alternative) would not have significant impacts on the human environment:

Soils-Leaving 5-15 tons of large, woody debris on site would provide for long-term soil productivity. Harvest mitigation measures such as skid trail planning and season of use limitations would limit the potential for severe soil impacts.

Water Quality-The Action Alternative would improve the surface drainage on existing roads, thereby reducing the amount of current sedimentation within the project area. Newly constructed roads would be located on mid to upper slopes away from surface waters, limiting affects to water quality. Water Quality Best Management Practices for Montana Forests (BMPs) and the Streamside Management Zone (SMZ) law would be strictly adhered to during all operations involved with the implementation of the Action Alternative.

Cumulative Watershed Effects-Estimated increases in annual water yield for the proposed action have been determined to be negligible by the DNRC Hydrologist. Increases in sediment yield are expected to be negligible due to the amount of area treated, location along the landscape, replacement and/or improvement of existing culverts and mitigations designed to minimize erosion.

Cold Water Fisheries- Due to planning and associated mitigation, it is unlikely that the proposed timber sale would affect large woody debris recruitment, shade or in-stream temperature in any fish-bearing streams within the project area.

Air Quality-Any slash burning conducted as part of the DeBorgia-Deer Project would be conducted in coordination with the Montana/Idaho Airshed group in order to ensure that ideal smoke dispersion conditions exist prior to ignition and throughout the duration of any burning operations. As a result, impacts to air quality should be minor and short in duration.

Noxious Weeds-Equipment would be cleaned prior to entering the project area, which would reduce the likelihood of weed seeds being introduced onto treated areas. The DNRC would monitor the project area for two years after harvest and would use an Integrated Weed Management strategy to control weed infestations should they occur.

Forest Conditions and Forest Health-The proposed harvest would begin the process of returning the timber stands within the project area to those conditions that most likely existed on the site(s) prior to organized fire suppression.

Log Truck Use of Public Roads-Implementation of the recommended mitigations-i.e. strict adherence to posted speed limits, dust control if necessary and restrictions on the use of

compression brakes should minimize the opportunity for conflicts between log trucks, other traffic and/or residences within the project area.

Wildlife-The proposed harvest operations present a minimal likelihood of negative impacts to Threatened and Endangered Species. Those potential impacts that do exist have been mitigated to levels within acceptable thresholds. The same is true for those species that have been identified as "sensitive" by the DNRC. The effects of the proposed action on Big Game species would be low to moderate.

Economics- The Action Alternative would produce an estimated net return of $1,956,300-$2,258,500 to the trust beneficiaries (79% Common Schools, 21% Public Buildings) and does not limit the DNRC's options for generating revenue from these sites in the future.

PRECEDENT SETTING AND CUMULATIVE IMPACTS-
The project area is located on State-owned lands, which are "principally valuable for the timber that is on them or for growing timber or for watershed" (**MCA 77-1-402**). The proposed action is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber harvest is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the identified impacts of the proposed timber sale are within established threshold limits. Proposed timber sale activities are common practices and none of the project activities are being conducted on fragile or unique sites.

The proposed timber sale conforms to the management philosophy adopted by DNRC in the SFLMP and is in compliance with existing laws, Administrative Rules, and standards applicable to this type of action.

SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?
Based on the following, I find that an EIS does not need to be prepared:

- The EA adequately addressed the issues identified during project development, and displayed the information needed to make the pertinent decisions.
- Evaluation of the potential impacts of the proposed timber sale indicates that significant impacts to the human environment would not occur as a result of the implementation of the Action Alternative.
- The ID Team provided sufficient opportunities for public review and comment during project development and analysis.

Need for Further Environmental Analysis

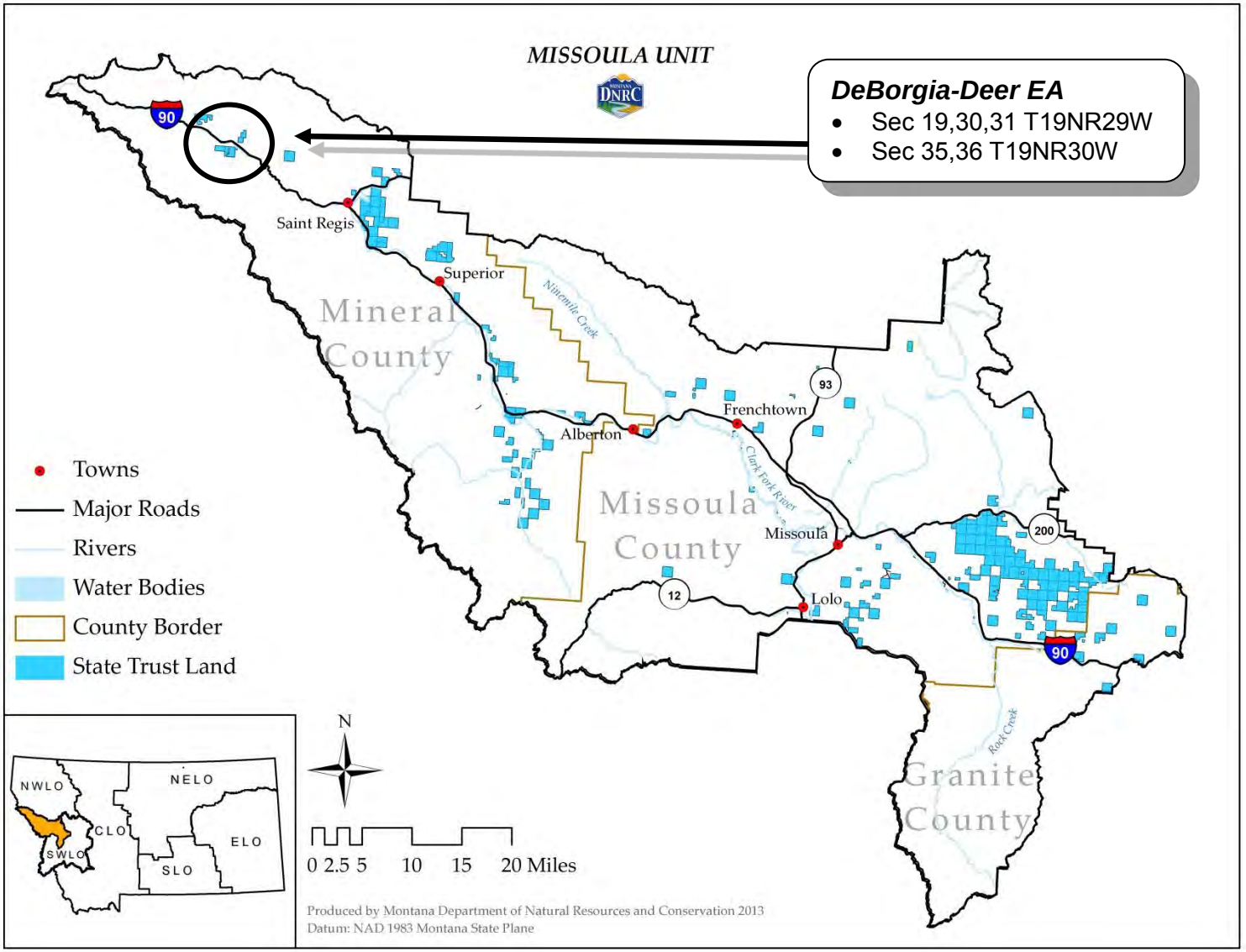
☐	EIS	☐	More Detailed EA	☒	No Further Analysis

Environmental Assessment Checklist Approved By:

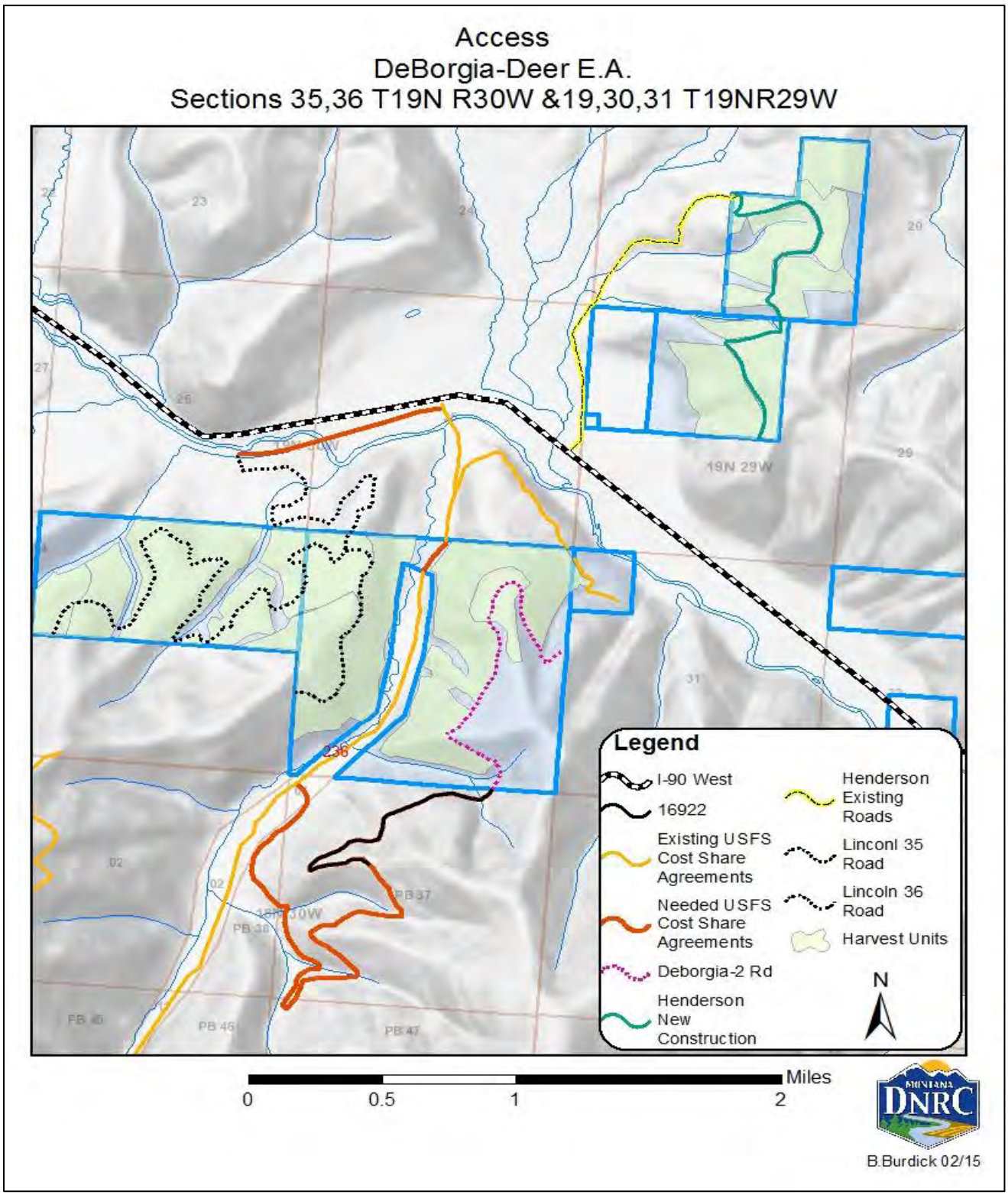
Name: Amy Helena
Title: Forest Management Supervisor
Date: March 19, 2015
Signature: /s/ Amy Helena

Attachment A - Maps

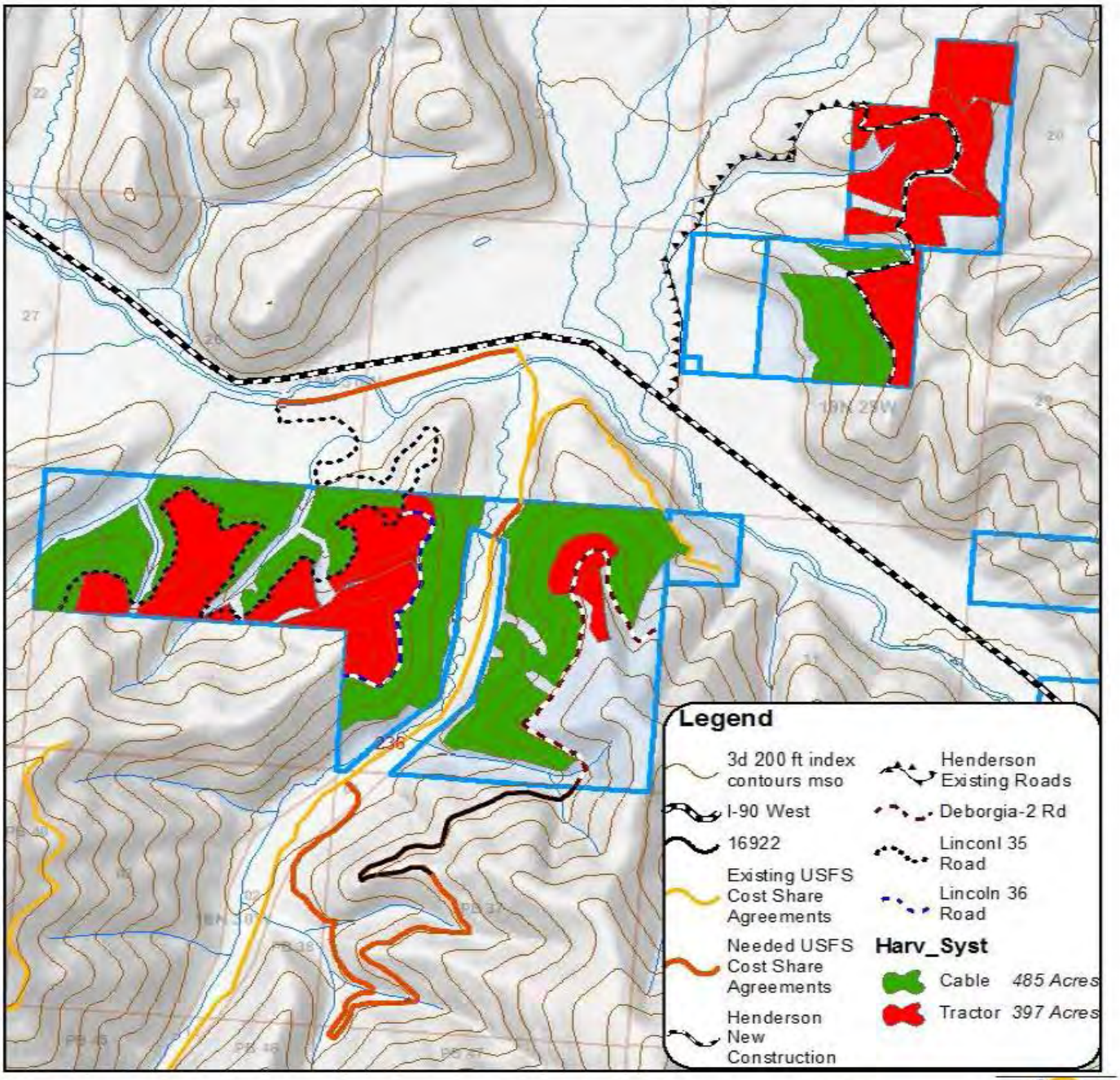
A-1 DeBorgia-Deer Project Vicinity Map



A-2: DeBorgia-Deer Access Map



Harvest Systems
DeBorgia-Deer E.A.
Sections 35,36 T19N R30W &19,30,31 T19NR29W



Attachment B – Vegetation

DeBorgia-Deer – Vegetation Analysis

Analysis Prepared By:
Name: Bill Burdick-Forest Vegetation & Jeff Collins-Noxious Weeds
Title: Management Forester, Missoula Unit, & Hydrologist/Soil Scientist, SWLO

Introduction

The vegetation section describes present conditions and components of the forest as well as the anticipated effects of both the No-Action and the Action Alternatives.

Issues

- Forest management activities may introduce or spread noxious weeds in the project area.
- Stand productivity and tree vigor would continue to decline in absence of treatment, resulting in lost revenue to the associated trusts and increased fire hazard potential.
- Tree mortality among Lodgepole pine, Western White pine and Ponderosa pine would continue with the presence of Mountain Pine Beetle and root rot.
- Shade tolerant species would continue to out-compete seral species-removing stands from their historic cover type and species distribution.
- Current generation of western white pine suffers high mortality from white pine blister-rust (*Cronartium ribicola).*

Issues dismissed from further review

- Wildlife winter range and snowmobile trails.

This issue has been dismissed from further study because the area of concern for wildlife is not within the project area. Snowmobile recreation is dismissed because the proposed project area is not near a snowmobile trail.

- There is concern the proposed project could negatively impact populations of threatened, endangered, or sensitive plant species.

This issue has been dismissed from further study because no rare plants have been identified within the project area through field surveys or a search of the Montana Natural Heritage Program. Therefore no direct, indirect, or cumulative impacts to rare plants would be expected under either alternative.

Regulatory Framework

The following plans, rules, and practices have guided this project's planning and/or would be implemented during project activities:

State Forest Land Management Plan
DNRC developed the SFLMP to "provide field personnel with consistent policy, direction, and guidance for the management of state forested lands" (DNRC 1996: Executive Summary). The SFLMP provides the philosophical basis, technical rationale, and direction for DNRC's forest management program. The SFLMP is premised on the philosophy that the best way to produce long-term income for the trust beneficiaries is to manage intensively for healthy and biologically diverse forests. In the foreseeable future, timber management

would continue to be the primary source of revenue and primary tool for achieving biodiversity objectives on DNRC forested state trust lands.

DNRC Forest Management Rules
DNRC Forest Management Rules (*ARM 36.11.401 through 456*) are the specific legal resource management standards and measures under which DNRC implements the SFLMP and subsequently its forest management program. The Forest Management Rules were adopted in March 2003 and provide the legal framework for DNRC project-level decisions and provide field personnel with consistent policy and direction for managing forested state trust lands. Project design considerations and mitigations developed for this project must comply with applicable Forest Management Rules.

Montana Best Management Practices (BMPs) for Forestry
Montana BMPs consist of forest stewardship practices that reduce forest management impacts to water quality and forest soils. The implementation of BMPs by DNRC is required under *ARM 36.11.422*. Key forestry BMP elements include: streamside management; road design and planning; timber harvesting and site preparation; stream crossing design and installation; winter logging; and hazardous substances storage, handling, and application.

Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP)
DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP.

Noxious Weed Applicable Weed Management Requirements
All applicable weed management requirements of the County Weed Control Act 7-22-2101 to 7-22-2153, Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes, but is not limited to management rules for classified forest lands ARM 36.11.445 where the department shall use an integrated pest management approach for noxious weed management that includes prevention, education, cultural, biological, and chemical methods as appropriate.

Analysis Areas

Direct and Secondary Effects Analysis Area
The proposed treatment areas- approximately 866 acres

Cumulative Effects Analysis Area
The proposed project area-Sections 35, 36 T19N R30W, and Sections 19, 30, 31 T19N R29W -1294 acres.

Existing Conditions

Noxious Weeds

Noxious weeds occurring in the project parcels are mainly a knapweed (Centaurea maculosa), and spot infestations of houndstongue (Cynoglossum officinale L) and yellow hawkweed (Hieracium pratense). Knapweed is extensive throughout the area, principally along roads on adjacent ownerships as well as in some

drier forested portions of the project area. Houndstongue and hawkweed were found mostly along roadsides along the access haul routes on adjacent lands. Road use, timber harvest activities, grazing, and soil disturbance from fire are most likely the reasons for the existing rate of spread of noxious weeds and the potential future spread and introduction of noxious weeds. The prevailing winds from Idaho also carry windblown weed seed throughout this area. Moist sites with well-established surface vegetation provide a competitive advantage over noxious weed establishment. Weed management treatments on adjacent ownerships in the area varies from no-action to combinations of revegetation, herbicide treatments and bio-control measures.

Standard Vegetative Community

- **Stand History/Past Management**

This area falls within climatic section M333D, which was historically 97% forested. The core of the area was dominated by the white pine type and probably represented some of the type's best development. (Losensky, 1997). Climatic Section M333D includes valley bottoms as well as high elevations from Lake Coeur d'Alene east to the Clark Fork Valley and then south including the Lochsa River and Palouse Prairie region. The project area falls within this climatic section and ranges in elevation from 3000'- 4100'. These areas were historically dominated by mature white pine with ponderosa pine along with other mixed conifers. Pole size Lodgepole pine minorly dominated the upper slopes, with the mature larch-Douglas fir type found in mixtures within the white pine type on slightly warmer sites. Fire has played a large role in shaping these stands in the last 100 + years, which has changed the dominant forest type from a white pine to Lodgepole type where stand replacing fires have occurred. Throughout the project area there is evidence of both infrequent stand replacing fires and light ground fires. Evidence (fire scars on 200+ year old larch and ponderosa pine trees, thick stands of even age Lodgepole pine) found during field recon indicates that these fires burned in the late 1800s and early 1900s.

No evidence of large scale harvesting projects have occurred within the project area in the past 100 years. Although evidence of high grading in Western White Pine shows that random small scale harvesting occurred on slopes less than 45% a few years after the 1910 fires.

- **Current stand conditions and composition**

The current stand condition in the project area is a result of minimal timber management and wildfire activity and/or fire suppression. Current cover types differ from the desired future condition (DFC). *See table V-1 for current project area cover types as well as the DFC for the project area.*

The Lolo Land Exchange project in 2010 acquired the 360 acres in Section 35 T19N R30W (*South of I-90*)and 200 acres in section 19, T19N R29W *(Henderson Hill*) from the Forest Service. Past harvest prescriptions included selection harvesting or a high-grade harvesting of remaining western white pine within these stands. The main reason for this species select harvest was the introduction of white pine blister rust (*Cronartium ricola)* after the 1910 fires and its high mortality rate to western white pine. The remaining western white pine is 80% infected with white pine blister rust *(Cronartium ribicola*).

Section 35 T19NR30W

The existing overstory within the project area varies, but is predominantly Douglas-fir at 45% of stocking and Lodgepole pine at 30% with 80% existing in the western half of the project area in section 35. Mixed conifer in the western half consists of western larch, grand-fir, subalpine-fir, spruce and western hemlock stocked at less than 10% each. The recently acquired land in section 35 has average stem diameters of 8"-18", with a few larch with 24"+. The average height for Lodgepole in these stands is 70-80 feet, Douglas–fir; 90 feet, Western larch 100 feet and scattered Ponderosa pine 120 feet. A few relic western white pine were found with diameters of 28"+ and heights of 130 feet.

Sections 31, 35, 36 T19NR30W and Sections 19, 30 T19NR29W
The project area has an overstory consisting of 45% Douglas-fir, 20% western larch, 15% Lodgepole pine, and 5% respectively of spruce, hemlock, grand-fir, and Ponderosa pine. In portions of section 36 and 31 within the Deer Creek drainage there is a higher percent of grand fir within the stands with average diameters of 14 inches and heights reaching 90 to 100 feet. Species composition within the Deer Creek drainage in section 36 is more diverse and contains a wider variety of species. The *upper level* canopy has tree heights of 65-120 feet, diameters of 10-27" dbh, with an average age of 60-200 years and is moderately to well stocked. The *mid-level* canopy throughout the project area has heights of 35-80 feet, diameters of 6-14" dbh, ages of 60-120 years and is poor to well stocked in places, but mostly of poor stocking levels with some moderately stocked areas. Most of the projected volume for the proposed projects would come from the upper level canopy and some from the mid-level canopy. The *lower level* canopy consists of 0-400 trees per acre with heights up to 25 feet, diameters 0-5" dbh and average age 0 to 50 years. This lower level canopy is moderately stocked and primarily exists in small openings.

The current mortality rate in these stands ranges from 25 to 35 percent with the majority of the mortality caused by mountain pine beetle infestations in the Lodgepole pine.

In addition to Mountain Pine Beetle in Lodgepole pine stands, other species are also being impacted by bark beetles and/or root rot, resulting in high amounts of coarse woody debris. These high levels of downfall add to the increased fire hazard potential of these stands.

Table V-1 – Current and appropriate cover type for the DeBorgia-Deer Project Area.

Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Subalpine fir	0	0%	0	0%
Douglas-fir	0	0%	0	0%
Lodgepole pine	276	32%	0	0%
Mixed conifer	92	10%	99	11%
Ponderosa pine	147	17%	78	9%
Western larch/Douglas-fir	351	41%	103	12%
Western white pine	0	0%	586	68%
Non-stocked	0	0%	0	0%
Non-forest	0	0%	0	0%
Other (specify)	0	0%	0	0%
Total:	***866***	***100***	***866***	***100***

- ***Species composition, size, density and age class***

The ***overstory*** is currently dominated by western white pine mixed with Douglas-fir and western larch with average diameter from 14"-25+" with 10-40 foot spacing. The *Douglas-fir* has moderate amounts of defect throughout the stands. Examples of defect include: crooked boles, fire scars, cat faces, root rot and bark beetle infestation. The *western larch* have good vigor and show little signs of defect. The *ponderosa pine* that exist on

favorable sites display some signs of defect with crooked boles and some fire scars, but are healthy overall. The age class for these species is 100-180+ years old with a few older ones throughout. By *Green et al* definition these stands don't classify as Old Growth. The overstory species composition in section 35 is 80% Lodgepole pine with few western larch and Douglas-fir intermixed within the stand. As the stand gains topographic elevation more western larch, Douglas-fir and grand fir exist in the overstory with the composition respectively changing to a 50/50% lodgepole/mixed conifer overstory.

The ***middle story*** composition is more diverse compared to the overstory in the western part of the project area with more shade tolerant species throughout, with the exception being section 35, where climax species of grand fir, subalpine fir, Douglas-fir and hemlock exist at a lower level and middle story. Due to the introduction of white pine blister rust post 1910 fires, mortality rates have increased among the remaining western white pine. This is evident in both the overstory and understory generations of white pine. Blister rust has reduced white pine populations low enough to be a level of concern.

Throughout the rest of the project area, species composition in the ***middle story*** includes clumps of Douglas-fir, western larch, grand fir, subalpine fir, and hemlock. These clumps vary in stocking, with an average spacing of 2'- 20' between stems. Although some trees have small diameters, they are 50+ years old and up to 50' tall. The third tier ***lower lever understory*** is a mix of grand fir, Douglas-fir, western larch and Lodgepole pine and ponderosa pine advanced regeneration ranging in height form 0-25 feet tall and diameters range from 0"-5" DBH. Douglas-fir and grand fir are the dominant species existing in clumps, with western larch and Lodgepole pine also well represented throughout. Occasional ponderosa pine advanced regeneration can also be found in the lower level understory. This third tier ranges in age from 0-30 years old with heights 0-20'.

In the lower elevations of Section 36, near Deer Creek, the ***overstory*** is dominated by Douglas-fir with western larch and ponderosa pine on south facing slopes and ridges with occasional grand fir and Engelmann spruce being present in the lower elevations. Diameters in this area range from 10"-30" DBH. Trees are spaced from 10-70 feet apart with an occasional clumpiness on north and west facing slopes within the main Deer Creek drainage. ***Overstory*** trees in this stand tend to be older, the average age class among stands is 100-149 years with a few stands in the younger age class of 40-99 years. Most of these stands do not meet Old Growth criteria outlined in Green et al. with the exception of one stand of Old Growth spruce in the bottom adjacent to Deer Creek.

The ***understory***, or second tier of this area is a mix of western larch, Douglas-fir, ponderosa pine, grand fir, hemlock and subalpine fir anywhere from 5-50 feet tall evenly distributed throughout the harvest units. Current stocking levels are anywhere from 400-1000 stems per acre.

- ***Stand types***

The ***first stand type*** is a two tier stand. These stands appear to historically have had mostly stand replacing fires. The overstory is populated predominately by 16-30" DBH western larch, Douglas-fir and ponderosa pine of similar size. These trees range in age from 49-149+ years old and vary in spacing from clumps of one or two existing 5 feet apart to a wider spacing of 30-60 feet apart. Stumps from both species indicate fire historically burned in the area. The ***second ti***er is showing very little growth in places. This understory exists throughout the stand and immediately under the overstory. Heavy fuels exist in these stands, not only in the form of downed material, but also as ladder fuels. There is little to no vegetation because sunlight rarely reaches the ground due to the thick canopy, however there is a thick litter layer comprised of needles, pine cones and other downed material.

The ***second stand type*** is predominately a single-storied mix of Lodgepole pine, western larch 6"-18" DBH and heights ranging from 45-100 feet tall with some larch 25"+ DBH and up to 120' tall and Douglas-fir in the 4-16" DBH with tree heights 50-100'. Trees are approximately 15-40 feet apart (400+ stems per acre). Diameters range from 14"-28" DBH, although heights are similar on average 85 feet. These stands have a

dense canopy (tree spacing ranges from 10-20 feet) with very little regeneration occurring in the understory. Root rot is prevalent, resulting in occasional openings. These openings are currently producing scattered Douglas-fir and western larch 2-10 feet tall, although root rot has also caused mortality in the young Douglas-fir.

The ***third stand type*** is a mix of the previous two stands. There is evidence of fire activity in most of the stands, as well as areas that have not seen a stand altering fire activity in the last 200 years. This disturbance history has created a mosaic of stands with some older dominant species. The first being a scattered large overstory of western larch and Douglas-fir. These trees dominate draw bottoms and become more scarce and scattered upslope. Diameters range from 20-30" DBH with ages of 150-200+. Trees are moderate in defect with cat faces, fire scars, crooked boles, and beetle attacks. Beneath those trees are Douglas-fir, western larch, and grand fir, Lodgepole pine and a small amount of western red cedar and Engelmann spruce 8"-20" DBH. Douglas-fir dominates this tier. Density varies with topography and aspect, but average spacing is 10-30 feet. Openings have been created by root rot pockets and wind fall. In these areas advance regeneration exists with a species mix of western larch, Douglas-fir, ponderosa pine, Lodgepole pine, subalpine fir, grand fir and hemlock. Size classes range from 5-15 feet tall and 0"-4" in diameter. In areas infected by root rot pockets the younger age class of Douglas-fir is experiencing mortality. Advanced regeneration is prolific in openings and unevenly distributed throughout the stand.

Armillaria Root disease is prevalent in all fir, pine and spruce species throughout the project area. Approximately 25% of Douglas-fir across all size classes are experiencing some level of root rot induced stress or mortality. Along with the root disease, approximately 35% of the Lodgepole pine is experiencing mountain pine beetle attacks and windthrow. Fading tops, mycelium on the outside of the root collars, conks and standing dead trees and snags can be observed throughout the project area. In some isolated pockets the older and larger diameter Douglas-fir are infected with root rot and Douglas-fir beetle (*Dendroctonus pseudotsugae*) along with Mountain pine beetle (*Dendroctonus ponderosae)* infested Lodgepole pine stands.

Old Growth

Old Growth is identified and analyzed using criteria outlined in Green et al. Stand Level Inventories of the project area were queried to identify potential Old Growth and Old Growth stands. See table V-2 for current verified Old Growth within the project area.

Table V-2 –Old Growth in project area

Stand ID	SLI Old Growth Status	*Field Verified Old Growth Status	Old Growth Type	Acres of verified Old Growth
3600001	Old Growth	Yes	4	14
TOTAL				**14 acres**

**The" field verified Old Growth status" column indicates Old Growth status following field verification in which all the stands listed in the table were ocularly inspected.*

Environmental Effects

Noxious Weeds

No-Action Alternative: Direct, Indirect, and Cumulative Effects

With no action, noxious weeds would continue to spread along roads and may increase on the drier site habitats. Hawkweed is a shade tolerant plant and the windblown seed is expected to increase across the landscape as it has done in Idaho and northwest Montana. Limited weed control efforts on access roads across multiple ownerships in the area, increases the potential for windblown seed. Following disturbance events such as fires, road construction and timber harvest, the establishment and spread of noxious weeds can be more prevalent than in undisturbed areas. DNRC would continue to treat selected sites on DNRC roads based on priorities and funding availability, but the levels of weed control treatments would be lower than with the Action Alternative. If new weed invader species are found they would have highest priority for management.

Cumulative effects of noxious weeds within the project areas are moderate. Weeds are established along most roads in the DeBorgia-Deer drainage and have spread across ownerships over time by multiple uses from wind, fire, traffic, forest management, wildlife and grazing animals. As tree density and ground cover vegetation increase over time, weeds are reduced through vegetative competition.

Standard Vegetative Community & Old Growth

No Action Alternative: Direct, Secondary and Cumulative Effects

Under the No Action Alternative natural processes would continue to have a direct influence on forest conditions. Mountain Pine Beetle and root rot would continue to cause mortality in all species except larch across all size classes. The one stand classified as Old Growth could potentially become non-Old Growth as older Spruce would suffer from root rot mortality and windthrow. Fuels would continue to build as coarse woody material accumulates in stands increasing the potential for stand replacing wildfire. In areas not impacted by root rot, grand fir, Douglas-fir, and other non-seral species would continue to out compete western larch and ponderosa pine and the remaining white pine across all age classes, further removing the stands from the desired future condition.

Cumulative effects of a no Action Alternative would continue to drive our forest away from a productive manner. This would violate the state mandate for each individual trusts.

Noxious Weeds

Action Alternative: Direct, Secondary, and Cumulative Effects

Implementation of the Action Alternative would involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types, principally on drier vegetation types. For the Action Alternative, an Integrated Weed Management (IWM) approach was considered for treatment of existing and prevention of potential noxious weeds. For this project: prevention, revegetation of new roads and weed control measures on existing roads are considered the most effective weed management treatments. Prevention measures would require cleaning of off-road equipment prior to use. Roadsides would be sprayed prior to operations and weed control and revegetation would slow noxious weed spread and reduce weed density and occurrence compared to no-action, yet noxious weeds are expected to spread along roadways. There would be a similar increase in weed infestation within harvest units due to soil disturbance and reduction of tree canopy, especially with hawkweed which can be slowed but would expand into the area unavoidably. The silvicultural prescriptions are designed to control disturbance and scarification to goals need for sustained forest growth. Noxious weed control efforts would promote rapid revegetation and emphasize treatment of any new noxious weeds found.

Herbicide application would be completed along the haul route, to reduce weed spread along roads, promote desired vegetation for weed competition and to reduce sedimentation. Herbicide would be applied according to label directions, laws and rules, and would be applied with adequate buffers to prevent herbicide runoff to surface water resources. Implementation of IWM measures listed in the mitigations are expected to reduce existing weeds, limit the possible spread of weeds, and improve current conditions and to promote existing native vegetation. More weed control would occur compared to the No-Action Alternative and grass and competitive vegetation would increase along roads.

Overall cumulative effects of increased noxious weeds within the project area are expected to be moderate, based on herbicide treatments of existing weeds along roads and implementing prevention measures to reduce new weeds, by cleaning equipment and planting grass on roads to compete against weeds. The combined weed control across ownerships continues to improve through cooperative efforts with the Mineral County Weed District and local weed control interest groups.

Standard Vegetative Community

Action Alternative: Direct, Secondary, and Cumulative Effects

The proposed Action Alternative includes harvest treatments on approximately *866 acres* out of the 1294 acre project area. In addition, 500 acres of Forest Improvement treatments would take place. Treatment type and size would vary based on stand conditions. The proposed treatment types would include:

Tree planting would occur on approximately 500 acres. Areas currently experiencing high amounts of root rot, and subsequent mortality in the Douglas-fir and Lodgepole pine would be planted with blister rust resistant western white pine, western larch and some ponderosa pine seedlings.

The Lincoln Silver Dogwood Timber Sale would be designed to promote future desired conditions and emulate natural disturbances based on fire regimes historically present in the project area. This harvest would occur across *362 acres* in the 866 acre project area, removing approximately 70% of the overstory, 90% of which is Lodgepole Pine. The prescription would be a selection harvest with small clearcuts leaving western larch, western white pine and healthy Douglas-fir 8”-30+” dbh on a variable spacing based on historic stand conditions. Post-harvest stand appearance would resemble a natural disturbance with scattered clumps remaining as well as unevenly spaced overstory trees of desirable species remaining. The overstory would be dominated by western larch, Douglas-fir and western white pine with a stand density of 20-60 trees/acre, depending on the site and stand characteristics. At least two snag and snag recruits 21”dbh and greater per acre would exist scattered among the overstory component. Advanced regeneration would be protected during harvest activities.

The Second timber sale that would take place, the second timber sale, would be a selection and overstory removal harvest on approximately *187 acres* not previously harvested during the Lincoln Silver Dogwood Timber Sale. In overstory removal areas, a minimum of two snags and two snag recruits per acre would be retained. In selection harvest areas, stands would be harvested similar to what would occur in the *Lincoln Silver Dogwood Timber Sale* with post-harvest stands resembling a natural disturbance with scattered clumps remaining as well as unevenly spaced overstory trees. The overstory would be dominated by ponderosa pine, western larch and Douglas-fir with a stand density of 20-40 trees/acre, depending on the site and stand characteristics. At least two snag and snag recruits 21” and greater per acre would exist scattered among the overstory component. Advanced regeneration would be protected during harvest activities.

The third timber sale and remaining timber permits of the project area would be a selection harvest based on desired future conditions and favorable species with post-harvest stands resembling a natural disturbance with scattered clumps remaining as well as unevenly spaced overstory trees. This would consist of *approximately*

317 acres. The overstory would be dominated by ponderosa pine, western larch and Douglas-fir with a stand density of 20-40 trees/acre, depending on the site and stand characteristics. At least two snag and snag recruits 21" and greater per acre would exist scattered among the overstory component. Advanced regeneration would be protected during harvest activities.

Harvest would not occur in Streamside Management Zones (SMZ). Depending on slope, these areas vary from 50 feet -100 feet from the stream.

Fuel loading concerns would vary according to the pre-harvest stand condition. In accordance with ARM 36.11.410 and ARM 36.11.414 the majority of fine slash foliage and approximately 5 to 15 tons of coarse woody debris would be left scatted on the forest floor in all harvest units. This would increase the intensity and reduce the ability to control ground fires in all harvest units for up to three years following harvest activities. In stands that have numerous leave trees post-harvest, the results of a ground fire would increase the potential mortality rate and increase the risk of crown fires. In areas with few leave trees the risk of a catastrophic crown fire would be low.

Given the following factors;

- Douglas-fir across all age and size classes are succumbing to root rot and bark beetles due to stress from limited resources.
- Lodgepole pine is being attacked by Mountain Pine Beetle, which could turn into full stand infestations leading to high fuel hazards and non-utilized resources by the department.
- Post-harvest overall stand health and vigor would improve in the residual overstory.
- Shade tolerant species would be removed, favoring species of desired future condition.
- Tree species resistant to root rot and white pine blister rust would be planted.

The proposed action would result in low to moderate direct, indirect, and cumulative impacts on forest vegetation beyond those projected for the no Action Alternative.

Old Growth

Action Alternative: Direct, Secondary, and Cumulative Effects

Fourteen acres of Old Growth (as defined by Green et. al.) exist within the project area. None of the Old Growth stands within the project area would be treated. These stands would retain Old Growth classification.

Vegetation Mitigations

- Favor western larch and remaining western white pine to limit effects of root rot and white pine blister rust in the project area.
- Increase the potential for western white pine historic habitat recovery through planting of F2 stock.
- Plant western larch and ponderosa pine in root rot infected areas to convert stands to a resistant species.
- Remove Lodgepole pine at the edge of its life cycle and being attacked by MPB and plant with rust resistant white pine stock and western larch.
- Prescribe a variety of selection harvests in order to emulate natural disturbances historically present on the landscape.
- All road maintenance and harvest equipment would be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment would be inspected by the Forest Officer prior to moving on site.

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

- Weed treatment measures would include roadside and spot herbicide treatment of noxious weeds. Where herbicide treatments are required by the Forest Officer, herbicide must be applied under the supervision of a licensed applicator following label directions in accordance with Department of Agriculture regulations, applicable laws and rules and regulations of the Mineral County Weed Board.

- DNRC would monitor the project roads and areas to evaluate weed control measures implemented and to determine if any new noxious weeds become established.

Recommended Mitigations and Adjustments of Treatments for the Benefit of Other Resources

- *Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.

- No harvest in any SMZ's, wetlands, Old Growth stands or Lynx denning areas.

VEGETATION REFERENCES

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Attachment C – Wildlife

Deborgia-Deer– Wildlife Analysis

Analysis Prepared By:

Name: Garrett Schairer

Title: Wildlife Biologist, Montana DNRC

Introduction

The following sections disclose the anticipated direct, indirect, and cumulative effects to wildlife resources from the proposed action in the project area and cumulative-effects analysis areas described for each resource category. Past and ongoing activities on all ownerships, as well as planned future agency actions, have been taken into account in each cumulative-effects analysis for each resource topic.

Issues

- Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.
- Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.
- Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.
- Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles
- Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.
- Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.
- Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.
- Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.
- Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

- Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Regulatory Framework

Various legal documents dictate or recommend management direction for terrestrial wildlife species and their habitats on state trust lands. The documents most pertinent to this project include DNRC Forest Management Rules, the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Analysis Areas

The discussions of existing conditions and environmental effects within each subsection pertain to land areas of 2 different scales. The first scale of analysis is the Project Area (1,294 acres), which includes DNRC-managed lands in sections 19, 30, and 31; T19N, R29W and sections 35 and 36; T19N, R30W where activities are being proposed. The second scale is the cumulative-effects analysis area, which refers to a broader surrounding landscape useful for assessing cumulative effects to wildlife and habitat. For this proposed project, two distinct cumulative-effects analysis areas were identified. The first cumulative effects analysis area includes the project area and those lands within 1 mile of the project area (10,003 acres). This area includes 3,821 acres that are privately owned (38%), 4,854 acres (49%) managed by the US Forest Service, 1,294 acres (13%) managed by DNRC, and smaller amounts managed by Five Valleys Land Trust (7 acres, <1%), and Montana Department of Transportation (28 acres, <1%). The second cumulative effects analysis area is approximately 30,511 acres and includes the area along the St. Regis River from lower Twelvemile drainage through Packer Creek near Saltese MT. This cumulative effects analysis area contains a sizeable amount of lands managed by the US Forest Service (18,120 acres, 59%) as well as a large component of privately-owned (10,277 acres, 34%) lands, with a smaller amount managed by DNRC (2,050 acres, 7%), and trace amounts managed by Five Valleys Land Trust (7 acres, <1%), and Montana Department of Transportation (28 acres, <1%).

Analysis Methods

Analysis methods are based on DNRC State Forest Land Management Rules, which are designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, and consultation with other professionals.

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, and species managed as big game by the Montana Dept. of Fish Wildlife and Parks (DFWP).

Coarse Filter Wildlife Analysis

Issue

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Introduction
A variety of wildlife species rely on mature to old stands for some or all life requirements. Mature forests, generally characterized by abundant large diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipter gentilis*), and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open, non-forested patches that over time develop into young, conifer forests. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 30,511-acre area described above in the Analysis Areas portion of this analysis. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Affected Environment
The project area currently contains approximately 656 acres (50% of project area) of mature stands (100-plus years in age) of Douglas-fir and western larch stands that have a reasonably closed canopy. At least 14 acres of Old Growth, as defined by Green et al. (1992), exist in the project area (see Vegetation section for additional details). Currently, forested areas cover most of the project area, facilitating some use by those species requiring connected-forested conditions and/or forested-interior habitats. A portion of the 14,224 acres (50% non-DNRC lands) of reasonably closed forested habitats and some of the 9,728 acres of moderately stocked forested stands (34% non-DNRC lands) on other ownerships in the cumulative effects analysis area are likely also providing habitat for those species requiring mature, forested habitats and/or forested connectivity. Conversely, much of the 4,510 acres (16% of non-DNRC lands) of shrubs, herbaceous areas, poorly stocked forested stands, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful for these species requiring forested habitats. The general vicinity has been identified as a potential wildlife linkage area that likely facilitates movements of a variety of medium and large wildlife species (Servheen et al. 2003, American Wildlands 2008). Past timber management, human developments, roads, and the natural openness of certain habitats in the cumulative effects analysis area has influenced landscape-level connectivity in the cumulative effects analysis area. Ongoing timber management associated with West Fork Timber Creek project on DNRC-managed lands in the cumulative effects analysis area would continue altering mature forested stands and overall landscape connectivity.

Environmental Effects- Mature Forested Habitats and Landscape Connectivity

No Action Alternative: Direct and Indirect Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. No changes to those stands meeting the old stand definition would occur. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no direct or indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) no changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur, and 3) no alterations to existing corridors would be anticipated.

No Action Alternative: Cumulative Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. No changes to those stands meeting the old stand definition would occur, thus no changes to the amount of old stands in the cumulative effects analysis area. Past harvesting has reduced the amount of mature, forested habitats in a sizeable portion of the cumulative effects analysis area; however, continued successional advances across the cumulative effects analysis area are moving stands toward mature forests. This alternative would continue to contribute to the amount of mature forested stands in the cumulative-effects analysis area. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) no changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur; and 3) no alterations to existing corridors would be anticipated.

Action Alternative: Direct and Indirect Effects

Approximately 390 acres (59%) of existing mature Douglas-fir and western larch stands with a closed canopy would be harvested. The majority of these stands would receive a treatment that would reduce habitat for those species relying on mature, closed-canopied forested habitats. In general, habitats for those species adapted to more-open forest conditions would increase in the project area, meanwhile habitats for wildlife species that prefer dense, mature forest conditions would be reduced in the project area. Although proposed treatments on 866 acres (67%) would create more open stands that may not be used by wildlife species that use mature stands to move through the landscape, corridors, particularly along ridges, draws, and other topographic features, would be retained. Additionally, the only permanent human development constructed would be roughly 7 miles of new restricted roads; however, this could increase human activity in the project area beyond the proposed timber management activities. No changes in motorized public access would occur in the project area; increases in non-motorized access would occur which could concentrate human activity beyond the activities included in this proposal. Contract stipulations would minimize the presence of human-related attractants for the duration of the proposed activities. Some changes in visual screening would occur within individual units, but the combination of irregular-shaped units, topography, un-harvested patches throughout the project area, and distance from open roads would minimize the effects of the reductions in visual screening. Thus, a moderate risk of adverse direct and indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce forested cover in a sizeable portion of the project area(67%) , but corridors would be retained; 2) increased human developments in the form of restricted roads, could concentrate human activity, but no changes in human-related attractants would occur; 3) no changes to motorized public access would occur, but increases in non-motorized access could facilitate increased human use of the project area; and 4) visual screening in portions of the project area would be reduced, but some visual screening would be retained across the project area.

Action Alternative: Cumulative Effects
Modifications to mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities in the cumulative effects analysis area. Across the cumulative effects analysis area a variety of stands are providing for wildlife movements. Minor increases in human developments would occur with the proposed construction of roughly 7 miles of restricted roads. No changes in the presence of human-related attractants would occur. No changes to motorized public access to the cumulative effects analysis area would occur. Minor reductions in visual screening in a small portion of the cumulative effects analysis area would be anticipated. Thus, a minor risk of adverse cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce forested cover in a small portion of the cumulative effects analysis area, but corridors would exist; 2) minor increases in human developments that could concentrate human activities would occur, but no changes in human-related attractants would occur; 3) no changes to motorized public access would occur; and 4) visual screening in a small portion of the cumulative effects analysis area would be reduced, but considerable visual screening would persist across the cumulative effects analysis area.

Fine Filter Wildlife Analysis

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. Table WI-1 – Fine Filter provides an analysis of the anticipated effects for each species.

Table WI-1 –Anticipated Effects of the DeBorgia-Deer Project on wildlife species

Species/Habitat	**Potential for Impacts and Rationale** [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Threatened and Endangered Species	
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	[Y] Detailed analysis provided below.
Canada lynx (*Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	[Y] Detailed analysis provided below.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest more than 1 mile from open water	[Y] Detailed analysis provided below.
Black-backed woodpecker *(Picoides arcticus)*	[N] No preferred, recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would

Species/Habitat	Potential for Impacts and Rationale [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Habitat: Mature to old burned or beetle-infested forest	be expected to occur as a result of either alternative.
Coeur d'Alene salamander *(Plethodon idahoensis)* Habitat: Waterfall spray zones, talus near cascading streams	[N] No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse *(Tympanuchus Phasianellus columbianus)* Habitat: Grassland, shrubland, riparian, agriculture	[N] No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	[N] No suitable lakes occur in the project area. Thus no direct, indirect, or cumulative effects to common loons would be expected under either alternative.
Fisher *(Pekania pennanti)* Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[Y] Detailed analysis provided below.
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest	[Y] Detailed analysis provided below.
Gray Wolf *(Canis lupus)* Habitat: Ample big game populations, security from human activities	[Y] Detailed analysis provided below.
Harlequin duck *(Histrionicus histrionicus)* Habitat: White-water streams, boulder and cobble substrates	[N] No suitable high-gradient stream or river habitats occur in the project area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Mountain plover (*Charadrius montanus*) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] No prairie dog colonies or other shortgrass prairie habitats occur in the project area. Thus, no direct, indirect, or cumulative effects to mountain plovers would be anticipated to occur as a result of either alternative.
Northern bog lemming *(Synaptomys borealis)* Habitat: Sphagnum meadows, bogs, fens with thick moss mats	[N] No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or	[N] No preferred cliffs or suitable rock outcrops suitable for use by peregrine falcons occur on, or within 1 mile of the proposed project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be

Species/Habitat	Potential for Impacts and Rationale [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
wetlands	anticipated as a result of either alternative.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	[Y] Detailed analysis provided below.
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the project area or vicinity. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Wolverine *(Gulo gulo)* Habitat: Alpine tundra and high-elevation boreal and coniferous forests that maintain deep persistent snow into late spring	[N] Generally wolverines are found in sparsely inhabited remote areas near treeline characterized by cool to cold temperatures year round and rather deep and persistent snow well into the spring (Copeland et al. 2010). The availability and distribution of food is likely the primary factor in the large home range sizes of wolverines (Banci 1994). The project area is generally below the elevations where wolverines tend to be located. No areas of deep persistent spring snow occur in the project area. Individual animals could occasionally use lands in the project area while dispersing or possibly foraging, and they could be displaced by project-related disturbance if they are in the area during proposed activities. However, given their large home range sizes (~150 sq. mi. -- Hornocker and Hash 1981), and manner in which they use a broad range of forested and non-forested habitats, the proposed activities and alterations of forest vegetation on the project area would have negligible influence on wolverines. Thus, minimal direct, indirect or cumulative effects to wolverines would be anticipated.
Other Species Considered	
Idaho Giant Salamander *(Dicamptodon aterrimus)* Habitat: Found in moist areas such as under logs and rocks in moist coniferous forests near mountain streams. Larvae usually found in cold, swift mountain streams.	[N] Idaho Giant Salamanders are generally closely tied to moist riparian areas near mountain streams. Riparian Management Zones (RMZs) with a width of 100 feet would be established on Class 1 streams and SMZ's of 50-100 feet would be established on either side of all streams in the project area; no timber management would occur in SMZs or the wider RMZs that include any potential Idaho Giant Salamander habitat in the project area. Thus, minimal direct, indirect or cumulative effects to Idaho Giant Salamander would be anticipated.

Species/Habitat	Potential for Impacts and Rationale [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Big Game Species	
Elk	[Y] Big game winter range exists in the project area. Potential big game security habitat exists in the project area - Detailed analysis provided below.
Moose	
Mule Deer	
White-tailed Deer	

Threatened and Endangered Species

GRIZZLY BEAR

Issue
Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Introduction
Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The search for food drives grizzly bear movements, with bears moving from low elevations in spring to higher elevations through the summer and early fall, as fruits ripen throughout the year. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing human access into secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase the risk of bears being illegally shot. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 30,511-acre area described above in the Analysis Areas portion of this analysis. This area approximates the home range size of a female grizzly bear.

Existing Environment
The project area is approximately 14 miles south of the Cabinet-Yaak grizzly bear recovery area, which is known to have a small grizzly bear population. Additionally, the project area is outside of the 'occupied habitat' area as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger 2002). Grizzly bears have been documented passing through the area (C. Servheen, USFWS, personal communication, 2014) and use of the project area is possible. Grizzly bears generally use different habitats relative to season. The project area primarily provides

mid-elevation forested areas used during the summer along with some riparian habitats and big game winter range.
Managing human access is a major factor in management for grizzly bear habitat. There are roughly 0.7 miles of open roads in the project area, and although this appears fairly low, the locations of those roads, their dispersed nature across the project area, landownership patterns within the and vicinity (USFS ownership of road corridor through the middle of the project area), and the presence of open roads just off DNRC-managed parcels, would be anticipated to have effects to grizzly bears that would be similar to areas with higher levels of motorized access. Non-motorized access to the project area is also fairly high given this level of motorized access, the presence of the Up-Up Trail crossing through the project area, and other restricted roads near the project area. Open road densities are fairly high in the cumulative effects analysis area (2.7 mi. /sq. mi., simple linear calculation); the potential for disturbance to grizzly bears in the cumulative effects analysis area is also fairly high. Hiding cover exists on roughly 1,167 acres (90%) in the project area. Grizzly bear hiding cover is likely present on most of the 14,224 acres (50% of non-DNRC lands) of forested stands with ≥40% canopy closure across the cumulative effects analysis area on other ownerships. Within the cumulative effects analysis area, hiding cover is largely absent from the 4,510 acres (16% of non-DNRC lands) of shrubs, herbaceous, and non-forested habitats and is likely somewhat limited on the other 9,728 acres (34% of non-DNRC lands) of sparsely stocked and young forest habitats in the cumulative effects analysis area. No grizzly bear security habitats exist (≥ 0.3 miles from roads receiving motorized use and ≥2,500 acres in size) in the project area or cumulative effects analysis area; however portions of sections 35 and 36, T19N R30W could contribute to a potential block of grizzly bear security habitat that extends outside of the cumulative effects analysis area and towards the Montana-Idaho border. Timber harvesting and human development that is occurring or has occurred in the cumulative effects analysis area likely altered grizzly bear habitats and/or human disturbance levels. Ongoing timber management with the West Fork Timber Creek project on DNRC-managed lands in the cumulative effects analysis area would continue altering potential grizzly bear habitats while introducing potential disturbance to grizzly bears. Across the cumulative effects analysis area, the reductions in hiding cover, the levels of human disturbance, and the mosaic of available habitats could reduce the overall quality of the cumulative effects analysis area for grizzly bears.

Environmental Effects- Grizzly Bears

No Action Alternative: Direct and Indirect Effects
No direct or indirect effects to grizzly bears would be anticipated since: 1) no disturbance or displacement would be expected, 2) no changes in hiding cover would occur, 3) security habitat would not be altered, 4) no changes in long-term open-road density would be anticipated, and 5) no changes in availability of unnatural bear foods or attractants would occur.

No Action Alternative: Cumulative Effects
No appreciable changes to existing habitats would be anticipated; advances in succession within those recently harvested stands could improve hiding cover and potentially foraging habitats for grizzly bears. Thus, no further adverse cumulative effects to grizzly bears would be anticipated since: 1) no changes in human disturbance levels would be expected; 2) no changes to open road density would occur; 3) no further modifications to hiding cover would occur; 4) no changes to security habitat would be expected; and 5) no changes in availability of unnatural bear foods or attractants would occur.

Action Alternative: Direct and Indirect Effects
This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These potential disturbances would only be present during harvesting operations; therefore, the season of disturbance is important in addressing effects to grizzly bears. Proposed harvesting would likely occur during the non-denning period; some disturbance of grizzly bears would be

possible with activities that may occur during the non-denning period, but timing of proposed activities would likely occur when grizzly bears in the area would be able to access considerable other habitats in the vicinity. Overall, the proposed activities would occur in areas where low- to moderate-levels of grizzly bear use would be anticipated and during a time period when habitat availability would not be limited, leading to minor potential for disturbance and displacement of grizzly bears.

About 7.0 miles of new, restricted roads would be constructed with the proposed activities. No changes in open road density or motorized public access would be anticipated. Increases in non-motorized public access would occur on the newly constructed roads, which could facilitate increased contact between humans and grizzly bears. Hiding cover, defined as vegetation that would hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on most of the 787 acres (67%) of hiding cover proposed to receive treatments. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees would persist in several of the units, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 5 to 10 years. Although hiding cover would be reduced, no appreciable changes to security habitat would occur given no changes in open roads would occur in the project area.

Any unnatural bear foods or attractants (such as garbage) would be kept in a bear resistant manner. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal. Thus, a minor risk of adverse direct or indirect effects to grizzly bears would be anticipated since: 1) minor disturbance and displacement would be possible; 2) hiding cover would be reduced in a portion of the project area, but would remain in portions of the project area, and would be expected to recover in the short-term; 3) habitats in potential security habitat would be modified, but no changes in the availability of security habitats would occur; 4) no changes to long-term open road density would be anticipated; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Action Alternative: Cumulative Effects
The increased use of road systems during the proposed project could temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area. Collectively, short-term (2-4 years) increases in human disturbance would be anticipated in the cumulative effects analysis area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present. On DNRC-managed lands in the cumulative effects analysis area, hiding cover would be reduced on most of the 787 acres of hiding cover proposed for treatment; no changes to the hiding cover on other ownerships would be anticipated. Reductions in hiding cover would be additive to the reductions from past timber harvesting, ongoing harvesting, as well as more permanent land-cover changes in the cumulative effects analysis area. Early successional stages of vegetation occurring in harvest units could provide additional foraging opportunities for grizzly bears. Quality of grizzly bear security habitat would be reduced in short-term, but would persist through time. No changes in long-term open-road density would be anticipated; a slight increase in non-motorized access to a small portion of the cumulative effects analysis area could occur with the proposed construction of roughly 7 miles of new, restricted roads. Thus, a minor risk of adverse cumulative effects to grizzly bears would be anticipated since: 1) increases in human disturbance levels in the short-term could occur in a small portion of the cumulative effects analysis area; 2) hiding cover would be removed in the short-term on 787 acres in the cumulative effects analysis area; 3) no changes in long-term open road density would occur, 4) quality of security habitats would be reduced, but would persist into the future; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

CANADA LYNX

Issue
Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.

Introduction
Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). Lynx in western Montana preferred mature, multi-storied stands with dense horizontal cover year-round; during the summer lynx also selected earlier successional stands with a high horizontal cover (Squires et al. 2010). For denning sites, the primary component appears to be abundant large woody debris, particularly in the form of downed logs, root wads, slash piles, and live trees (Squires et al. 2008). These conditions are found in a variety of climax vegetation habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) occurred in continuous dense forests of Lodgepole pine, subalpine fir, and Engelmann spruce. These fires created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 30,511-acre area described above in the Analysis Areas portion of this analysis. The scale of this analysis area approximates the home range size of an individual lynx (Ruediger et al. 2000).

Existing Environment
The proposed project area ranges from approximately 3,040 to 4,480 feet in elevation and is dominated by Douglas-fir, western larch, and Lodgepole pine. Approximately 1,144 acres of lynx habitat occur in the project area (Table WI-2 – Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the DeBorgia-Deer Project). Much of this habitat was identified as winter/mature foraging habitat, with lesser amounts of other suitable habitats (largely forested lands that provide cover to facilitate movement), denning habitat, summer/young foraging habitat, and temporary non-suitable habitat. Connectivity of forested habitats in the project area is relatively intact.

On DNRC-managed lands within the cumulative effects analysis area, roughly 1,170 acres of winter/mature lynx foraging habitats exist, along with roughly 8 acres of summer/young foraging habitats, 550 acres of other suitable habitats, 132 acres of temporary non-suitable habitats, and 33 acres of denning habitat. On other ownerships, there are roughly 14,224 acres (50% of non-DNRC lands) of forested stands with ≥40% canopy closure across the cumulative effects analysis area; a portion of those stands would likely be suitable lynx habitats and probably include some winter/mature foraging habitats. Additionally, summer/young foraging habitats likely exists on a portion of the 9,728 acres (34% of non-DNRC lands) of sparsely stocked and young forest on other ownerships; no lynx habitats likely exist on the 4,510 acres (16% of non-DNRC lands) of shrubs, herbaceous, and non-forested types on other ownerships in the cumulative effects analysis area. Ongoing timber management with the West Fork Timber Creek project on DNRC-managed lands in the cumulative effects analysis area would continue altering potential Canada lynx habitats. Roughly 73.3% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas, which includes the project area, are in suitable lynx habitat categories.

Environmental Effects- Canada Lynx

No Action Alternative: Direct and Indirect Effects
In the short-term, no changes in lynx habitat elements would be expected in the project area. Landscape connectivity would not be altered. Thus, a negligible risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) existing winter/mature foraging habitats would persist; 2) summer/young foraging habitats would continue to be a relatively minor component in the project area; 3) the amount of temporary non-suitable habitats would not change; and 4) landscape connectivity would not be altered.

No Action Alternative: Cumulative Effects

No appreciable change in lynx habitats in the cumulative effects analysis area would occur. No appreciable changes to landscape connectivity would be anticipated. Roughly 73.3% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories with this alternative. Thus, a negligible risk of adverse cumulative effects to lynx would be expected since: 1) some winter/mature foraging habitats would persist in the cumulative effects analysis area; 2) summer/young foraging habitats would persist in the near-term across the cumulative-effects analysis area, but longer-term availability of summer foraging habitats would likely decline without disturbance; 3) no changes in the amount of the cumulative-effects analysis area that is in the temporary non-suitable habitat class would occur; and 4) landscape connectivity would not be altered.

Action Alternative: Direct and Indirect Effects

Approximately 752 acres of lynx habitats (66% of lynx habitats in the project area) would be altered with this alternative (Table WI-2 – Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the DeBorgia-Deer Project). The proposed treatments in lynx habitats would reduce canopy cover and horizontal cover, which would reduce the habitat quality for lynx in the short-term. Thus roughly 67% of the lynx habitats in the project area would be in temporary non-suitable habitats following proposed treatments. Roughly 30% of the project area would be in foraging habitats and 3% would be in other suitable habitats. Following proposed treatments, sufficient habitats would be retained on DNRC-managed lands to satisfy DNRC's commitment for these habitat attributes as required in ARM 36.11.435. The retention of patches of advanced regeneration of shade-tolerant trees, such as grand fir, sub-alpine fir, and Engelmann spruce, would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx. Coarse woody debris would be retained (emphasizing retention of some logs 15 inches dbh and larger) to provide some horizontal cover and security structure for lynx. In the short-term, lynx use of the project area could decline due to the resulting openness in the project area. Forested connectivity would be reduced with the proposed activities, but some connectivity would be retained along riparian areas and through unharvested patches between harvested units. Collectively, a moderate risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) the majority of winter/mature foraging habitats (66%) would be removed, with most of those habitats moving into the temporary non-lynx habitat category in the short-term; 2) much of the limited summer/young foraging habitats would be altered (43%) with most of those habitats moving into the temporary non-lynx habitat category; 3) the amount of the project area in the temporary non-suitable lynx habitat category would increase to 67%; and 4) connectivity could be altered, but some connectivity would be maintained along riparian areas and through unharvested patches between units.

Table WI-2 –Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the DeBorgia-Deer Project

Lynx Habitat Element	Exiting Condition and No-Action Alternative	Proposed Changes Under Action Alternative	Action Alternative
Winter/Mature Foraging	1017 (89%)	-676 (59%)	341 (30%)
Summer/Young Foraging	7 (0%)	-3 (0%)	4 (0%)
Other Suitable	106 (9%)	-72 (6%)	34 (3%)
Temporary Non-Suitable	13 (1%)	+752 (66%)	765 (67%)
Total	1,144		1,144

Action Alternative: Cumulative Effects

Within the cumulative-effects analysis area, a sizable portion of the existing lynx habitats on DNRC-managed lands would be modified, and up to 819 acres (43%) would be in the temporary non-suitable habitat category following proposed treatments. The reductions in winter/mature foraging (676 acres) and other suitable lynx habitats (72 acres) coupled with an increase in temporary non-suitable habitats (752 acres) on a small portion

of the cumulative effects analysis area could slightly decrease the quality of the lynx habitats in the larger cumulative effects analysis area. Near-term increases in summer/young foraging habitats could occur with the proposed harvesting within a portion of the cumulative effects analysis area. Anticipated reductions in lynx habitats would be additive to past losses from timber harvesting and any ongoing modifications in the cumulative-effects analysis area; likewise, increases in temporary non-suitable lynx habitats would be additive to habitats that have been recently converted due to timber harvesting. No appreciable changes to the suitable lynx habitats on other ownerships would be anticipated. Forest connectivity would be modified in the project area, but negligible changes to connectivity across the cumulative effects analysis area would be anticipated. Roughly 72.0% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories following proposed treatments. Thus, a minor risk of adverse cumulative effects to Canada lynx would be expected since: 1) some winter/mature foraging habitats would persist; 2) summer/young foraging habitats would continue developing for the next 10 to 30 years across the cumulative effects analysis area; 3) a relatively small percentage of lynx habitats would be in the temporary non-suitable habitat category; and 4) negligible alterations in landscape connectivity would not prevent lynx movements.

Sensitive Species

BALD EAGLE

Issue

Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles

Introduction

Bald eagles are diurnal raptors associated with significant bodies of water, such as rivers, lakes, and coastal zones. The bald eagle diet consists primarily of fish and waterfowl, but includes carrion, mammals, and items taken from other birds of prey. In Montana, bald eagles begin the breeding process with courtship behavior and nest building in early February; the young fledge by approximately mid-August, ending the breeding process. Preferred nest-stand characteristics include large emergent trees that are within sight distances of lakes and rivers and screened from disturbance by vegetation.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 1,294-acre project area. Cumulative effects were analyzed on home range associated with the DeBorgia bald eagle territory. This scale includes enough area for a nesting pair of bald eagles.

Existing Environment

A small portion of the project area is within the nest area and much of the project area is within the home range associated with the DeBorgia bald eagle territory. The DeBorgia territory has been fairly productive for the last 6-8 years. The aquatic habitats associated with this bald eagle territory include the St. Regis River and numerous smaller streams and wetlands. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitat incorporated by the territories is a coniferous/deciduous mixture along the riparian areas, with coniferous forests and grasslands in the upland areas. Within the home range, black cottonwood is the deciduous tree of primary importance to bald eagles despite being somewhat limited in the vicinity; however large emergent conifers also provide important nesting, roosting, and perching habitats.
Human disturbance, including timber harvesting, the Highway 90 corridor, limited agricultural activities, and various forms of recreation are potential sources of disturbance to the nesting territory. Numerous large emergent trees are available across portions of the home range, but logging and other human developments in the last 100 years has likely reduced some of these attributes while others have experienced mortality and are declining in quality.

Environmental Effects-Bald Eagle

No Action Alternative: Direct and Indirect Effects
No direct or indirect effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees suitable for perching or nesting would be expected.

No Action Alternative: Cumulative Effects
No cumulative effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected.

Action Alternative: Direct and Indirect Effects
No activities would occur in the nest area or primary use areas associated with the bald eagle territory. Proposed harvesting on 831 acres (96% of proposed units) would occur in the home range associated with the bald eagle territory. Proposed activities could occur when soils are dry, frozen, or snow covered. Thus, the proposed activities could occur during the nesting season (February 1 –August 15), or the non-nesting (August 16-February 1) season. Minor disturbance to bald eagles could occur should any activities be conducted during the nesting period. Conversely, should those activities be conducted during the non-nesting period, no disturbance to bald eagles would be anticipated. Minor reductions in the availability of large snags or emergent trees that could be used as nest or perch trees could occur in the home range. No changes to human access to the home range would occur, thereby limiting potential for introducing additional human disturbance to the territory. Thus, a negligible risk of direct and indirect effects to bald eagles would be anticipated since: 1) disturbance could be slightly elevated within the home range during operations, should they occur during the nesting period; 2) no appreciable change in human access within the project area would occur; and 3) minor reductions in the availability of large, emergent trees could occur in the home range, but none in the high use areas along the St. Regis River.

Action Alternative: Cumulative Effects
Nesting bald eagles would continue to experience varying levels of disturbance. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance, however no changes in bald eagle behavior would be anticipated. Negligible reductions in emergent trees or snags could occur on a small portion (7%) of the home range. Thus, a negligible risk of cumulative effects to bald eagles would be anticipated since: 1) disturbance would be slightly elevated within the territory during harvesting operations; 2) no changes in human access within the territory would occur; and 3) negligible changes in the availability of large, emergent trees would be expected.

FISHER

Issue
Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

Introduction
Fishers are a mid-sized forest carnivore whose prey includes small mammals such as voles, squirrels, snowshoe hares, and porcupines, as well as birds (Powell and Zielinski 1994). They also take advantage of carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of successional stages, but are disproportionately found in stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994) and avoid openings or young forested stands (Buskirk and Powell 1994). However, some use of openings may occur for short hunting forays or if sufficient overhead cover (shrubs or saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live

trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the 30,511-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to approximate overlapping home ranges of male and female fishers (Heinemeyer and Jones 1994).

Existing Environment
There are approximately 501 acres (39%) of potential upland fisher habitats and 35 acres (3%) of potential riparian habitats in the project area. Within the cumulative effects analysis area, there are roughly 27,959 acres that would be classified as upland (more than 100 ft. from Class 1 and more than 50 feet from Class 2 streams) and 2,568 acres that would be classified as riparian that are associated with the 148 miles of streams in the cumulative effects analysis area. On DNRC-managed lands, all (100%) of the potential riparian fisher habitats in the cumulative effects analysis area are providing structural habitat attributes that would facilitate use by fisher. Potential fisher habitats likely exist on a portion of the 14,224 acres (50% of non-DNRC lands) of forested stands with ≥40% canopy closure across the cumulative effects analysis area, including roughly 789 acres that are in close proximity to the streams in the cumulative effects analysis area. Within the cumulative effects analysis area, fisher habitats are largely absent from the 4,510 acres (16% of non-DNRC lands) of shrubs, herbaceous, and non-forested habitats and is likely fairly limited on the other 9,728 acres (35% of non-DNRC lands) of sparsely stocked and young forest habitats in the cumulative effects analysis area. Ongoing timber management with the West Fork Timber Creek project on DNRC-managed lands in the cumulative effects analysis area would continue altering potential fisher habitats in the cumulative effects analysis area.

Environmental Effects-Fisher

No Action Alternative: Direct and Indirect Effects
No direct and indirect effects to fishers would be anticipated since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be further altered; 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to public access or the potential for trapping mortality would be anticipated.

No Action Alternative: Cumulative Effects
No further cumulative effects to fishers would be anticipated since: 1) no changes to existing habitats on DNRC-managed lands would occur; 2) any landscape connectivity afforded by the stands on DNRC-managed lands would not change appreciably; 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected; and 4) no changes to public access or the potential for trapping mortality would be anticipated.

Action Alternative: Direct and Indirect Effects
No riparian habitats associated with Class 1 or 2 streams would be altered with this alternative. Approximately 295 of the 501 acres (59%) of upland fisher habitats in the project area would receive treatments that would reduce canopy closure and would likely be too open to be used by fisher. No changes in open roads would be anticipated, this trapping pressure and the potential for fisher mortality would not be anticipated to change appreciably. Minor reductions in landscape connectivity could occur with the proposed activities, but activities would avoid riparian areas commonly used by fisher. Thus, a minor risk of adverse direct and indirect effects to fisher would be anticipated since: 1) harvesting would avoid riparian areas, but would modify upland fisher habitats; 2) minor reductions in landscape connectivity would occur, but those areas associated with riparian areas would remain unaffected; 3) harvesting would reduce snags and snag-recruitment trees while increasing

coarse woody debris levels; however, some of these resources would be retained; and 4) no appreciable changes in motorized human-access levels would be anticipated.

Action Alternative: Cumulative Effects
Since no riparian habitats associated with Class 1 or 2 streams would be modified, no changes in the amount of the preferred riparian fisher cover types meeting structural requirements for fishers at the cumulative-effects analysis area would occur. Reductions in upland habitats on DNRC-managed lands (295 acres) would further reduce the amount of suitable upland fisher habitats in the cumulative effects analysis area. These reductions would be additive to the losses associated with past timber harvesting in the cumulative-effects analysis area as well as any ongoing harvesting. No appreciable changes to landscape connectivity would be anticipated, and activities would avoid riparian areas commonly used by fisher. Minor increases in non-motorized access could occur, but no appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, a minor risk of adverse cumulative effects to fisher would be anticipated since: 1) harvesting would modify some upland fisher habitats, but upland habitats would persist; 2) no appreciable changes in landscape connectivity would be anticipated and connectivity in riparian areas would not be altered; 3) harvesting in a relatively small portion of the cumulative-effects analysis area would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces; and 4) no changes to motorized public access would occur.

FLAMMULATED OWLS

Issue
Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

Introduction
Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. In Montana flammulated owls appear to initiate nesting later than most of the other owl species; they generally initiate nesting in May, and nestlings usually fledge during August. In general, preferred habitats have open to moderate canopy closure (30-50 percent) with at least 2 canopy layers, and are often near small clearings. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh ponderosa pine, Douglas-fir, or aspen. Without disturbance, Douglas-fir encroach upon ponderosa pine stands resulting in increased stand density and decreased habitat quality for flammulated owls. Periodic, low-intensity underburns can increase habitat suitability and sustainability by reducing the density of understory seedlings and saplings, stimulating shrub growth, and by protecting large dominant trees from ladder fuels and competition with other mature trees.

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the 1,294-acre project area. Cumulative effects were analyzed on the 10,003-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support several pairs of flammulated owls (McCallum 1994).

Existing Environment
There are approximately 150 acres (12%) of potential flammulated owl habitats in ponderosa pine and dry Douglas-fir stands across the project area. No other lands managed by DNRC in the cumulative-effects analysis area contain potential flammulated owl habitats. Some suitable habitats likely exist on a portion of the 6,788 acres (78% of non-DNRC-managed lands) of open and closed forested habitats on other ownerships in the cumulative effects analysis area; however, like the project area, much of these forested areas are not likely preferred flammulated owl habitat types. A portion of the cumulative effects analysis area has been harvested in the recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a

portion of the Douglas-fir encroachment and opening up stands of ponderosa pine; however retention of large ponderosa pine and/or Douglas-fir was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Modern fire suppression has allowed Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls.

Environmental Effects-Flammulated Owl

No Action Alternative: Direct and Indirect Effects
Existing flammulated owl habitats in the project area would persist. Thus, a negligible risk of adverse direct and indirect effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

No Action Alternative: Cumulative Effects
Existing flammulated owl habitats would persist. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

Action Alternative: Direct and Indirect Effects
Flammulated owls can be tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur when flammulated owls are present. Proposed activities could overlap the nestling and fledgling period. Since most snags would be retained, loss of nest trees would be expected to be minimal. Proposed activities on 109 acres of potential flammulated owl habitats (73% of the habitats in the project area) would open the canopy while favoring western larch, ponderosa pine, and Douglas-fir. Elements of the forest structure important for nesting flammulated owls, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed units. The subsequent regeneration in the existing habitats would likely be beneficial for flammulated owls as potential foraging habitats. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the project area toward historical conditions, which is preferred flammulated owl habitat. Thus, a minor risk of adverse direct and indirect effects would be expected to flammulated owls since: 1) the potential exists to disturb flammulated owls; and 2) harvesting would open denser stands up while retaining elements of forest structure used for foraging and nesting by flammulated owl, improving flammulated owl habitat conditions.

Action Alternative: Cumulative Effects
Disturbance in flammulated owl habitats would be possible on a small portion of the cumulative effects analysis area. Proposed harvesting would increase the amount of the cumulative effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of losing snags and large trees important for nesting. Overall no change in the amount of potential flammulated owl habitats would exist on DNRC-managed lands or any other ownerships; a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative and the more historic conditions likely after proposed activities. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be expected since: 1) harvesting could disturb flammulated owls in a small portion of the cumulative effects analysis area should activities occur during the period when flammulated owls are in the vicinity; and 2) harvesting would improve the quality and sustainability of flammulated owl habitat on a portion of the cumulative effects analysis area by making this area more representative of historic conditions.

GRAY WOLF

Issue
Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

Introduction
Wolves are a wide-ranging, mobile species that occupy a wide variety of habitats that possess adequate prey and minimal human disturbance, especially at den and/or rendezvous sites. Wolves are opportunistic carnivores that frequently take vulnerable prey (including young individuals, older individuals, and individuals in poor condition). In general, wolf densities are positively correlated to prey densities (Fuller et al. 1992, Oakleaf et al. 2006). In Montana, wolves prey primarily on white-tailed deer and elk (Kunkel et al. 1999, Arjo et al. 2002). Thus, reductions in big game populations and/or winter range productivity could indirectly be detrimental to wolf populations.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the 1,294-acre project area. Cumulative effects were analyzed on the 30,511-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support at least 1 pack of wolves.

Existing Environment
The project area is partially in past annual home ranges of the DeBorgia wolf pack. More recently, this pack has lacked a collar and the actual annual home range has not been documented. Additionally, the Mineral Mountain wolf pack has been near the project area. In general, some wolf use of the project area is possible. Several landscape features commonly associated with denning and rendezvous sites occur in the project area, such as areas with gentle terrain near a water source (valley bottoms), areas that are close to big game winter ranges, and areas that are close to meadows or other openings. No known den or rendezvous sites occur in the project area, but some use of the project area by wolves could occur for breeding, hunting, or other life requirements. Big game populations appear to be somewhat depressed in the vicinity, but big game species exist in the vicinity of the project area much of the year. Big game winter range exists in the project area. Within the cumulative-effects analysis area, big game species are fairly common and winter range for deer, elk, and moose are fairly widespread in the lower elevation areas of the cumulative effects analysis area. Roughly 17,022 acres of winter range (56% of the cumulative effects analysis area) exist in the cumulative effects analysis area; at least 15,505 acres (51%) of the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water, near big game winter range, and in gentle terrain, occur in the cumulative-effects analysis area. Past timber management and human developments have altered big game and wolf habitats in the cumulative effects analysis area. Ongoing timber management with the West Fork Timber Creek project on DNRC-managed lands in the cumulative effects analysis area would continue altering potential gray wolf and big game habitats.

Environmental Effects-Gray Wolf

No Action Alternative: Direct and Indirect Effects

Negligible direct and indirect effects would be expected to gray wolves since: 1) no changes in human disturbance levels would occur; and 2) no appreciable changes to prey availability would occur.

No Action Alternative: Cumulative Effects

White-tailed deer, mule deer, and elk winter ranges would not be affected and substantive changes in big game populations, distribution, or habitat use would be not anticipated. Levels of human disturbance would be expected to remain similar to present levels. Past harvesting and any ongoing harvesting may cause shifts in big game use and, subsequently, gray wolf use, of the cumulative-effects analysis area; however, no further changes would be anticipated that would alter levels of gray wolf use of the cumulative-effects analysis area. Thus, no further cumulative effects to gray wolves would be expected since: 1) no changes in human disturbance levels would occur, particularly near known wolf den and/or rendezvous sites; and 2) no changes to prey availability would occur.

Action Alternative: Direct and Indirect Effects

Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites, which are not known to occur in the project area or within 1 mile of the project area. If a den or rendezvous site were identified within 1 mile of the project area, a DNRC biologist would be consulted to determine if additional mitigations would be necessary. Although no seasonal operational constraint would be implemented, it would be highly unlikely that any activities would occur during the spring period due to the anticipated snow levels/soil moisture limitations, limiting potential disturbance at den sites and reducing the potential for disturbing rendezvous sites. After proposed activities, human disturbance levels would likely revert to pre-harvest levels; however increases in restricted roads could increase non-motorized human access and thus a slight increase in potential for disturbance to wolves in the project area. After proposed activities, wolf use of the project area for denning and rendezvous sites would likely revert to pre-harvest levels. In the short-term, the proposed harvesting could lead to slight shifts in big game use, which could lead to a shift in wolf use of the project area. Proposed activities on approximately 866 acres (67% of the project area) would alter canopy closure, summer big game habitat, and big game winter range habitat. The modifications to summer range could alter some big game use of the project area, and subsequently could alter the use of the project area by wolves. Proposed activities would occur on roughly 256 acres (66%) of elk winter range, and 247 acres (69%) of moose winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 866 acres (67% of existing stands) that likely have attributes facilitating considerable winter use by big game. Collectively, reductions in big game winter range habitats could redistribute big game, but would not be expected to appreciably alter wolf prey abundance. Thus, a low risk of direct and indirect effects would be expected to gray wolves since: 1) minor increases in human disturbance levels would occur, with no increases near known wolf den and/or rendezvous sites anticipated; and 2) changes to big game summer habitats and winter range could alter big game use of the project area, but would not appreciably alter prey availability.

Action Alternative: Cumulative Effects

Disturbance to gray wolves in a portion of the cumulative effects analysis area would be possible, but would only occur for the short-period of time that activities would be occurring. No changes in motorized human access would be anticipated; minor increases in non-motorized access would be possible. Reductions in big game winter range would occur in a small portion of the cumulative effects analysis area; winter big game survival would not be expected to change appreciably. Reductions in cover in a small portion of the cumulative effects analysis area may cause slight changes in use by deer and elk; however, no appreciable changes in use within the cumulative-effects analysis area would be expected. These reductions in cover would be additive to losses from past timber-harvesting activities as well as any ongoing harvesting in the cumulative-effects analysis area. No substantive change in wolf use of the cumulative-effects analysis area would be

expected; wolves could continue to use the area in the long-term. Thus, a low risk of cumulative effects to gray wolves would be expected since: 1) elevated human disturbance levels would be short-lived and negligible changes to long-term disturbance levels would be anticipated with no increases near known wolf den and/or rendezvous sites; and 2) modifications to big game summer range and winter range could alter big game distributions, but no appreciable changes to wolf prey availability would be anticipated.

PILEATED WOODPECKERS

Issue
Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Introduction
The pileated woodpecker is one of the largest woodpeckers in North America and excavates the largest cavities of any woodpecker. Preferred nest trees are large diameter western larch, ponderosa pine, cottonwood, and quaking aspen trees and snags, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. Aney and McClelland (1985) described pileated nesting habitat as "...stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in stands (McClelland 1979).

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the project area (1,294 acres). Cumulative effects were analyzed on the 10,003-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support several pairs of pileated woodpeckers (Bull and Jackson 1995).

Existing Environment
In the project area, potential pileated woodpecker nesting habitat exists on approximately 576 acres (45% of the project area). These habitats are dominated by Douglas-fir and western larch. Additionally, 682 acres (53% of the project area) of sawtimber stands, dominated by Douglas-fir, western larch, and Lodgepole pine exist in the project area, which may be potential foraging habitats. Some suitable habitats likely exist on a portion of the 4,142 acres of reasonably closed forested habitats on other ownerships in the cumulative effects analysis area (48% of non-DNRC lands), and some of the 2,644 acres of moderately stocked forested stands on those other ownerships could also be suitable foraging habitats (30% of non-DNRC lands). Much of the 1,921 acres (22%) of shrubs, herbaceous areas, poorly stocked forested stands, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful to pileated woodpeckers.

Environmental Effects-Pileated Woodpecker

No Action Alternative: Direct and Indirect Effects
A negligible risk of adverse direct and indirect effects to pileated woodpeckers would be expected since: 1) no harvesting would occur; 2) no changes in the amount of continuously forested habitats would be anticipated; 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated; and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

No Action Alternative: Cumulative Effects
No disturbance of pileated woodpeckers would occur. Continued use of the cumulative-effects analysis area by pileated woodpeckers would be expected at similar levels as presently occurring. Thus, a negligible risk of adverse cumulative effects to pileated woodpeckers would be expected since: 1) no further changes to existing habitats would occur; 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated; and 3) long-term, succession-related changes in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

Action Alternative: Direct and Indirect Effects
Pileated woodpeckers can to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by any proposed activities that could occur during the nesting period. Harvesting would reduce forested habitats for pileated woodpeckers in the project area. Roughly 326 acres (57%) of the potential nesting habitat along with 529 acres (78%) of potential foraging habitats would be largely removed with proposed treatments. Some of these acres could be dense enough to receive some use by foraging pileated woodpeckers following proposed treatments, but many of these stands would be temporarily unsuitable for pileated woodpeckers due to the openness of the stands following proposed treatments. Quality of these potential pileated woodpecker habitats would be reduced for 20-40 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed harvest areas. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), pileated woodpecker densities in the project area would be expected to be reduced on 866 acres. The silvicultural prescriptions would retain healthy western white pine, western larch, ponderosa pine, and Douglas-fir while promoting the growth and/or regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, a moderate risk of adverse direct and indirect effects to pileated woodpeckers would be anticipated since: 1) harvesting would reduce the amount of continuous-forested habitats available; 2) potential nesting habitats and foraging habitats would be modified; 3) snags and snag recruits would be removed; however, mitigation measures to retain some snags and snag recruits would be included, and 4) proposed treatments would promote seral species in the project area.

Action Alternative: Cumulative Effects
Reductions in pileated woodpecker habitat quality and the amount of continuously forested habitats available for pileated woodpeckers would occur. On DNRC-managed lands, roughly 250 acres (43%) of pileated woodpecker nesting and 153 acres (22%) of foraging habitats would not be altered; no changes to the existing habitats on other ownerships would be anticipated. Snags, coarse woody debris, and potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities. Modifications to pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting; continued use of the cumulative effects analysis area would be anticipated, but likely at a slightly reduced level. Continued maturation of stands across the cumulative-effects analysis area would provide future pileated woodpecker habitats. Thus, a moderate risk of adverse cumulative effects to pileated woodpeckers would be anticipated since: 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative-effects analysis area; 2) potential nesting and foraging habitats would be modified, but habitats would persist in the cumulative-effects analysis area; 3) snags and snag recruits would be removed; however, mitigation measures would retain some of these attributes; and 4) proposed treatments would promote seral species in a portion of the cumulative effects analysis area.

BIG GAME
BIG GAME WINTER RANGE

Issue
Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

Introduction
Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose. Thus, removing cover that is important for wintering big game through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local big game herds.

Analysis Area
Direct and indirect effects were analyzed for activities conducted in the 1,294-acre project area. Cumulative effects were analyzed on the combined winter ranges in the 30,511-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Existing Environment
Montana Department of Fish, Wildlife, and Parks identified elk (385 acres) and moose (357 acres) winter range in the project area. These winter ranges are part of larger winter ranges in the area. Mature Douglas-fir, with lesser amounts of ponderosa pine and Lodgepole pine stands in the project area are providing attributes facilitating use by wintering big game. Approximately 1,281 acres of the project area (99%) appear to be providing snow intercept and thermal cover attributes for big game. Evidence of non-winter use by deer and moose was noted during field visits.

Roughly 17,022 acres of winter range (56% of the cumulative effects analysis area) exist in the cumulative effects analysis area; at least 15,505 acres (51%) of the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. In the recent past, timber harvesting within this area has reduced thermal cover and snow intercept; ongoing harvesting across the winter range, including the West Fork Timber Creek project on DNRC-managed lands in the cumulative effects analysis area, could continue altering these attributes while potentially disturbing wintering big game. Portions of the cumulative effects analysis area are in non-forested, herbaceous, or shrub types, which would not be expected to provide thermal cover or snow intercept in the future. Human disturbance within the winter range is associated with residential development, agricultural clearing, recreational snowmobile use, commercial timber management, and the several roadways, including Highway 90.

Environmental Effects-Big Game Winter Range

No Action Alternative: Direct and Indirect Effects
No direct or indirect effects to big game winter range would be anticipated since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would be anticipated; and 3) human disturbance levels would not change.

No Action Alternative: Cumulative Effects
Continued winter use of the larger winter range would be expected. No further changes in thermal cover and snow intercept would be anticipated. Human disturbance levels would be anticipated to continue at current levels. No appreciable changes to big game distribution or habitat use would be anticipated. Thus, no cumulative effects to big game winter range would be expected since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would occur; and 3) human disturbance levels would not change

Action Alternative: Direct and Indirect Effects
Proposed activities could occur in the winter, and disturbance created by mechanized logging equipment and trucks could temporarily displace big game animals during periods of operation for 2 to 4 years. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. There would be short-term added risk of disturbance and displacement of wintering animals that could result in moderate adverse effects associated with logging operations, short term road construction, and road use in the project area. However, no long-term effect to winter range carrying capacity or factors that would create long-term displacement or reduced numbers of big game would be anticipated.

Proposed activities would occur on roughly 256 acres (66%) of elk winter range, and 247 acres (69%) of moose winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 866 acres (67% of existing stands) that likely have attributes facilitating considerable winter use by big game. Following proposed activities, canopy densities in these stands providing snow intercept and thermal cover would be reduced, reducing habitat quality for wintering big game. In general, it could take 30 to 50 years for these stands to regenerate and attain a size capable of providing thermal cover for big game. Proposed activities would not prevent big game movement through the project area appreciably in winter and could stimulate browse production in the units. Thus, a moderate risk of adverse direct or indirect effects to big game winter range would be anticipated since: 1) the relatively short-term that logging activities could create disturbance in this area; 2) harvesting would alter a moderate amount of the stands that are providing thermal cover and snow intercept habitats for big game species; and 3) portions of winter ranges for several species of big game would be altered.

Action Alternative: Cumulative Effects
Disturbance and displacement associated with this alternative could be additive to any displacement associated with ongoing activities in the cumulative effects analysis area and any other disturbances that may be affecting wintering big game. Similarly, any harvesting that may be occurring in the cumulative effects analysis area could continue altering big game winter range and/or disturbing big game. Proposed activities would reduce canopy closure on 256 acres of winter range (2%) and roughly 866 acres (6%) that appear to have attributes facilitating considerable use by wintering big game. Modifications to thermal cover and snow intercept in the project area could further alter the amount of the larger winter range providing these attributes for big game. Continued use of the larger winter range would be expected. Thus, a minor risk of adverse cumulative effects to big game would be anticipated since: 1) the relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area; 2) a small percentage of the larger winter range would be altered; 3) availability of lower-quality cover in the vicinity that provides some opportunity for big game should they be displaced.

BIG GAME SECURITY HABITAT
Issue
Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Introduction
Timber harvesting can increase vulnerability of big game animals by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, moose, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters, or they may become displaced or reduced in numbers due to lowered effective carrying capacity of the local habitat. Reduced cover attributable to logging and roads can also influence the effective use of habitat for big game species. Big game security habitat are nonlinear blocks of hiding cover that are more than 0.5 mile from open roads and are a minimum of 250 acres in size. For the purpose of this analysis, cover was considered generically as big game cover for deer, elk, and moose. Because elk are highly social, wide-ranging species, providing for their cover needs helps ensure that habitat needs for other ungulates, such as deer and moose are met as well. Because of their smaller size and behavioral differences, mule deer and white-tailed deer are able to use smaller cover patches more effectively for escape and security. Moose are a solitary, wide-ranging species capable of effectively using relatively small cover patches, and the hunting season for moose is heavily regulated, greatly reducing risk of overharvest by humans. Therefore, for this analysis it is assumed that if available security cover would provide for the needs of elk, it would also generally be adequate to meet the needs of moose, mule deer, and white-tailed deer.

Analysis Area
Direct and indirect effects were considered at the scale of the project area (1,294 acres). Cumulative effects were analyzed on the 30,511-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Existing Environment
Hiding cover is abundant in the project area. Approximately 0.7 miles of open roads exist in the project area, and despite this appearing fairly low, the locations of those roads, their dispersed nature across the project area, landownership patterns within the project area and vicinity (USFS ownership of road corridor through the middle of the project area), and the presence of open roads just off DNRC-managed parcels, would be anticipated to have effects to wildlife that would be similar to areas with much higher levels of motorized access. Non-motorized access to the project area is also fairly high given this level of motorized access, the presence of the Up-Up Trail crossing through the project area, and other restricted roads near the project area. Much of the project area does not contain big game security habitats due to the proximity to these open roads and high use trails, however roughly 182 acres (14% of project area) in section 35 are distant enough and contain sufficient cover to be able to contribute to larger blocks of potential security habitat that extend beyond the project area.

Hiding cover varies within the cumulative effects analysis area with the recent modifications from timber management and other human activities, but the combination of topography, distance from open roads, and the presence of vegetation likely provides adequate cover for elk during the hunting season. In the cumulative effects analysis area, access for recreational hunting is fairly high (at least 130 miles, 2.7 miles/sq. mile), with numerous open roads that facilitate access and numerous restricted roads (at least 40 miles; 0.8 miles/sq. mile) that could be used for non-motorized use. Within the cumulative effects analysis area 8 small patches (total of 3,423 acres; 11%) of potential security habitat exist. These patches all extend beyond the cumulative effects analysis area and contribute to larger blocks of potential security habitats; numerous other smaller patches of hiding cover exist in the cumulative effects analysis area that are not sufficiently large to meet the definition within the cumulative effects analysis area, but also extend beyond the cumulative effects analysis area boundary and likely serves as big game security habitat.

Environmental Effects-Big Game Security Habitat

No Action Alternative: Direct and Indirect Effects

None of the proposed forest management activities would occur in the project area. No risk of adverse direct or indirect effects to security habitat for moose, elk, mule deer, and white-tailed deer would be expected since: 1) no changes in existing security habitat would be anticipated and continued maturation of forest cover would improve big game security habitat; 2) the level of public access to the project area would not change; and 3) no appreciable changes to big game survival would be anticipated.

No Action Alternative: Cumulative Effects

No changes in big game security habitat would be anticipated. Past harvesting has altered big game security habitat and allowed increased human access; continued maturation in previously harvested stands in the cumulative-effects analysis area would improve hiding cover in those areas. No other changes in disturbance and potential mortality due to hunting would be anticipated. Thus, no adverse cumulative effects to big game security habitat would be anticipated since: 1) no reductions in big game security habitat would occur and modest levels of security habitat and hiding cover would persist within the cumulative-effects analysis area; 2) no changes in open roads, motorized access, or public access would occur; and 3) no appreciable changes to big game survival would be anticipated.

Action Alternative: Direct and Indirect Effects

Tree density within proposed units would be reduced on 866 acres, including roughly 142 acres (78% of existing security cover) of forested stands in the project area contributing to big game security habitat; following proposed activities big game security habitat would be reduced to roughly 3% of the project area. Hiding cover would be reduced within the proposed units, but would improve as trees and shrubs become reestablished in the openings over the next 10-20 years. The retention of structure within proposed units and unharvested areas between the various units would reduce the potential effects of the hiding cover reductions. Slight increases in sight distance would be anticipated. Overall, changes to sight distance and hiding cover would have minor effects to big game vulnerability risk in the project area. No changes in open roads or motorized access for the general public would occur. During all phases of the project, any roads opened with project activities would be restricted to the public and closed after the completion of project activities. Slight increases in non-motorized access would occur with the proposed construction of approximately 7 miles of restricted roads. Numerous contract stipulations would minimize the effect on the existing big game security habitat by prohibiting contractors from carrying firearms while conducting contract operations and prohibiting contractors from accessing restricted areas for other purposes, such as hunting. Collectively, a moderate risk of adverse direct and indirect effects to big game security habitat would be anticipated since: 1) modifications to existing hiding cover would reduce the quality of the big game security habitat in the project area; 2) no changes in open roads or motorized access for the general public would be anticipated and minor increases in non-motorized access would occur that would alter hunter access; and 3) negligible changes in big game survival would be anticipated.

Action Alternative: Cumulative Effects

Alterations of cover could reduce the quality of big game security habitat in a small portion of the cumulative effects analysis area. Continued maturation across the cumulative-effects analysis area would improve hiding cover and big game security habitat. No changes in public, motorized access and negligible increases in non-motorized access would be expected, which would not affect big game vulnerability in the cumulative effects analysis area. Negligible effects to big game survival would be anticipated. Thus, a minor risk of adverse cumulative effects to big game security habitat would be anticipated since: 1) quality of hiding cover in a small portion of the cumulative effects analysis area would be reduced, which would reduce the quality of the big game security habitat, but security habitat and hiding cover would persist in the cumulative-effects analysis area; 2) no changes in open roads or motorized access for the general public would be expected and only

negligible increases in non-motorized access would occur that would alter hunter access; and 3) negligible changes in big game survival would be anticipated.

Wildlife Mitigations

- A DNRC biologist would be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.

- Motorized public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs would be used during active periods and a physical closure (gate, barriers, equipment, etc.) would be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.

- Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.

- Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while on duty.

- Food, garbage, and other attractants would be stored in a bear-resistant manner.

- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir, in units in lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.

- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.

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Attachment D-Soils

DeBorgia-Deer Timber Sale – Soils

Analysis Prepared By: Jeff Collins, Hydrologist/Soil Scientist DNRC

Introduction

The following analysis would describe the existing soil conditions and the anticipated effects to soil resources within the DeBorgia-Deer Gulch project area. Direct, indirect, and cumulative effects to soil resources of both the No-Action and Action Alternatives would be analyzed.

Issues

There is a concern that forest management activities may result in increased erosion and reduced soil productivity where excessive disturbance from compaction, displacement, or loss of nutrients occurs, depending on the extent and degree of harvest related soil effects.

Regulatory Framework

The following plans, rules, and practices have guided this projects planning and/or would be implemented during project activities:
All applicable Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes, but is not limited to silviculture considerations for sustained forest growth (ARM 36.11.420) and biodiversity. As required by ARM 36.11.410 and 36.11.414, adequate vegetative debris shall be left on site to support nutrient conservation whole tree skidding shall be discouraged unless mitigation measures are taken to retain a portion of (fine litter) nutrients on site. The proportions of vegetative materials retained are based on the range of comparable levels determined by Graham et al (1994).

Analysis Methods & Analysis Areas

The methods for disclosing impacts for this analysis include using general soil descriptions and management limitations and then qualitatively assess the risk of negative effects to soil productivity from compaction, displacement and erosion from each alternative.

The soils analysis included an evaluation of Lolo N.F. Landtype and St. Regis Soil Survey data, air photos, past harvest designs and on-site field reviews by DNRC hydrologist/soil scientist. For the purposes of this analysis, minor soils of 5% or less of the area were grouped based on slope, soil properties and interpretations. Field reviews were conducted to verify the soil properties and current conditions to assess past and predicted effects based on DNRC soil monitoring results from over 80 DNRC postharvest monitoring projects (DNRC, 2006, 2011). The soil analysis considered soil management interpretations and the physical effects to soils from the area and degree of harvest disturbance associated with skidding and roads. The analysis for soil nutrients considers the area of disturbed surface and the fine litter and coarse woody debris available to supply organic materials to the soil. While the anticipated impacts from each alternative would disclose the direct/indirect effects, the cumulative impacts would be the result of previous and proposed activities.

Direct, Indirect and Cumulative Effects Analysis Areas: The analysis area for geology and soil resources includes the proposed harvest units and locations of existing roads and the new and temporary roads proposed for construction on the road R/W across ownerships and within state parcels of Sections 35 & 36, T19N, R30W and Sections 19, 30, 31, T19N, R29W that are within 5 miles of Deborgia, Montana.

Existing Conditions

The proposed harvest areas are located on the mountain sideslopes and ridges within the DeBorgia-Deer Creek watershed. The bedrock geology in the project area includes Pre-Cambrian age meta-sedimentary quartzites and argillites that are mainly well fractured and soils on mountain sideslopes have high rock contents that makes the materials stable, resistant to erosion and high water infiltration properties the exceed precipitation rates. Within the project area, state parcels elevation ranges from 3050 to 4400ft.

Bedrock outcrops occur on steeper sideslopes and ridges, and generally rippable. Balanced road cut/fills are practical up to 55% where slope steepness increases the quantity of material excavated. Bedrock is well fractured and should be rippable for road construction. Material quality is generally good, yet steep cutbanks are subject to rock ravel and can be slow to revegetate on southerly aspect. No especially unusual or unique geologic features occur in the project area. There are several locations with suitable materials for road, gravel pit development, although no sites are proposed with this project. No harvest areas or road locations are located on areas of slope instability and slope stability would be dismissed from further analysis.

The soils analysis refers to Landtype units (LSI-Codes) that are mapped as a combination of landform, soils and vegetation derived from the Lolo National Forest Land-system Inventory (1989) and are displayed on Landtype/Soil Map S-1. The properties and management interpretations described in attached summary Table ST1. Within the project area, map unit boundaries were verified and revised based on field observations.

The access road for Section 35 and W ½ of 36, T19N, R30W begins on private land in Section 26, T19N, R30W, at the railroad grade near the St. Regis River and climbs a dry gravelly, alluvial fan 13UB up to the north boundary of the state parcel within section 35. The well graded gravels in the 13UB fan deposits are the site of an old gravel pit and material quality is good and erosion is low on the existing access roads.

Within the project areas of Section 35 and W ½ of 36, T19N, R30W, elevation ranges from 3200 to 3800 ft. The predominant Landtypes are 30QC & 30QD moderate to steep (30-55%) mountain sideslopes with moderate to deep very gravelly soils forming on (Q) quartzite fractured bedrock. Surface soils are reddish brown volcanic ash influenced silt loams that are deeper on north aspects and have higher moisture, nutrient retention that improves site growth and regeneration success. Where the volcanic ash soils occur in over 4” depths, potential site growth and seedling establish is improved.

The very gravelly subsoils are well drained are resilient and have moderate bare soil erosion risk. Soil moisture and nutrient retention concentrated in the surface soils and low in the coarse rocky subsoils. C phase is dry site mixed conifers and D phase is moist site, with moderate to high site productivity supporting Western White Pine and mixed conifers. Slopes up to 45% are well suited to tractor operations. Primary soil management concerns are avoiding excessive disturbance during harvest that may expose gravel subsoils or lead to erosion. Erosion risk can be effectively controlled with standard drainage practices and implementation of BMP’s. The soils are easy to plant, but do have competitive vegetation that would likely encroach in 2 years.

The DNRC project areas of the east ½ of Section 36 T19N, R30W, an 80 acre parcel in Section 31, T19N, R29W and a 160 acre parcel in Section 30 T19N, R29W are mainly Landtypes 64 QB/QC/QD on steep mountain sideslopes. The slopes of 40-75% limit harvest to cable operations, except for small included bench areas of less than 45% that can be suitable for tractor harvest. The Landtype B phase is dry site Ponderosa

Pine/Douglas-fir that is droughty. The C phase is dry site mixed conifers and D phase is a moist site, with moderate to high site productivity supporting Western White Pine and mixed conifers. Slopes up to 45% are well suited to tractor operations. Primary soil management concerns are avoiding excessive disturbance during harvest that may displace shallow surface soils and expose gravel quartzite subsoils or lead to erosion. Conifers are subject to stress on these very well drained rocky soils and may have more common root rot incidence (Filip 1989). The soils are easy to plant, but do have existing competitive vegetation that would likely encroach in 2-3 years after harvests.

Northeast of DeBorgia, the 240 acre state parcel in Section 19 T19N, R29W is strongly influenced by the meltwaters of Glacial Lake Missoula up to an elevation of about 4200 ft. that formed washed sand and gravel deposits and silt rich layered lakebed deposits. The primary Landtypes are 24JB and 15JB that form the moderate 20-45% midslopes. Slopes of 25-45% are well suited to ground based skidding operations. Included areas are south and west aspects with shallower surface soils over mixed finer textured subsoils. On the south and west aspects competition for moisture from understory vegetation and high solar insolation can constrain conifer growth and regeneration. Soils are deeper and more productive on the north aspects, footslopes and swales. Ridges and convex slopes tend to have higher gravel contents and shallower depth. The fine textured subsoils would remain wet later into the spring and are more prone to rutting than the 30Q and 64Q landtypes.

Narrow bands of stream bed alluvium form gravelly deposits adjacent to McGee Creek, the unnamed tributary in the east ½ of Section 35 and along intermittent tributary streams within the project parcels. There is a broader alluvial bottom along Deer Creek that is formed of open graded cobbles and gravels that are very well drained, and mainly FS ownership. Sediment delivery is concern on the finer textured soils within and adjacent to riparian areas yet can be mitigated by implementation of SMZ/RMZ buffer areas and Best Management Practices (BMP's).

Effects of Past Management

Previous harvest was very limited to minor selective salvage and post and rail harvest over 50 years ago. Several of the parcels were recently acquired in the DNRC-Lolo N.F. land exchange of 2012. There is < ¼ mile of existing road in the proposed project sections and no developed road system. In 2007, 12 acres was seed tree harvested and a one acre existing gravel pit was grass seeded. Minor selective harvest occurred before 1960 and the historic harvest effects have largely recovered with vegetation and trees are overstocked especially on north aspects. A few major skid trails and landing sites are still apparent and harvest effects are estimated to be less than 5% of the previous harvest units, based on field review.

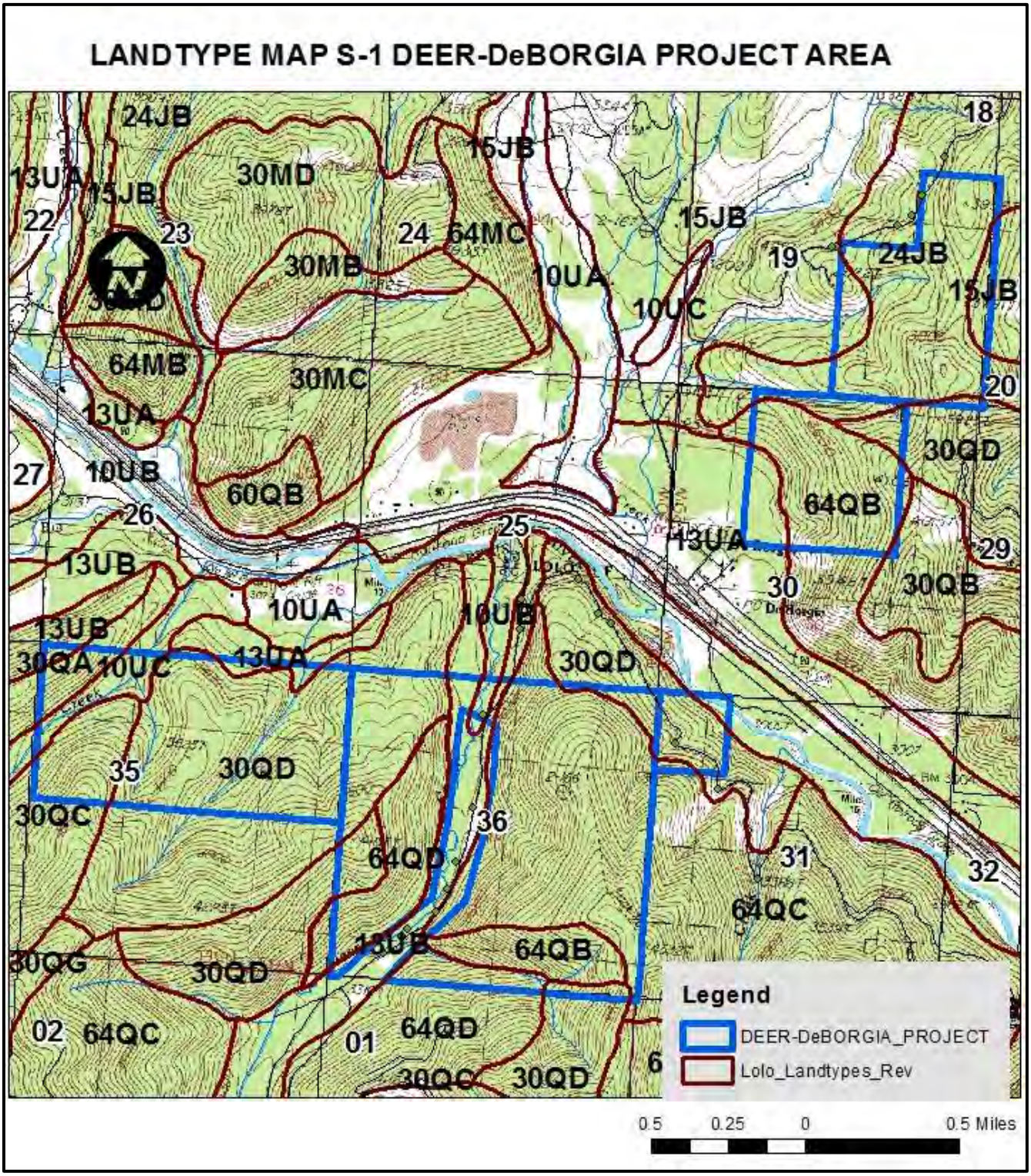
LANDTYPE MAP S-1 DEER-DeBORGIA PROJECT AREA
24JB
13UA
15JB
30MD
22
23
24
64MC
30MB
15JB
10UA
10UC
19
24JB
15JB
18
64MB
30MC
13UA
20
27
10UB
60QB
30QD
26
25
64QB
13UA
29
13UB
30
30QB
10UA
10UB
13UB
30QA
10UC
13UA
30QD
35
30QD
30QC
36
64QD
31
32
64QC
30QG
30QD
13UB
64QB
02
64QC
01
64QD
6
30QC
30QD
Legend
DEER-DeBORGIA_PROJECT
Lolo_Landtypes_Rev
0.5
0.25
0
0.5 Miles

Table ST-1 LANDTYPE INTERPRETATIONS from LOLO N.F. Survey 1989

Map Unit	Landtype Map Unit Name	Soil Description	Erosion Potential	Displace hazard	Compact Hazard	Notes
10 UB UC	Stream Bottoms 0-10% Slopes Vegetation is **B** Non-Forest Riparian & **C** Cool Forest Riparian	Deep Loamy Alluvium & Volcanic ash Surface	Low to Moderate	Mod to high	Mod. To High if wet	Check widths for SMZ, RMZ, WMZ where appropriate.
13 UA UB	Alluvial Terraces 0-45% Slopes Vegetation is **A** Dry mixed conifer & **B** Moist Mixed conifer	Deep Well drained soils of coarse gravelly sand & cobble, Some small wet habitats in swales	Low to Moderate	Moderate Shallow surface	Low-Mod. Possible Gravel Source	A Lower timber prod. Dry site slows regen. Unit B is mod. Timber prod. Terraces are well suited for tractor operations.
15 JB	Valley Fill Toeslopes and Alluvial fans 5-35 %	Deep Fine texture soil of valley fill & Lake Missoula Silts w/ Volcanic ash Surface	Mod to high	Mod, Ruts when wet	High if wet	Moist Mixed Conifer S Aspect droughty.
24 JB	Mountain Footslopes 5-45 % N,E,W Aspects	Deep Fine Texture soils of Lake Missoula silts & colluvium	Mod to high on slopes >40%	Mod to high on slopes >45%	Mod.	Deep soils
30 QC	Mod-Relief Mountain Sideslopes 35-55 % Colluvium from Q=Quartzite on N, E,W Aspects	Deep Loamy colluvium/ till& Volcanic ash Surface	Moderate	Mod to high on slopes >45%	Mod.	Mod to deep soils, S Aspect droughty. Limit ground skid to slopes less than 45%
30 QD	Mod- Steep Mountain Sideslopes 35-55 % Colluvium from Q=Quartzite on Northerly Aspects	Deep Loamy colluvium/ till& Volcanic ash Surface	Moderate	Mod to high on slopes >45%	Mod.	Mod to deep soils, S Aspect droughty. Limit ground skid to slopes less than 45%
64 QB QC	Steep Mountain Sideslopes 40 to 65 % Colluvium from Q=Quartzite/argillite Vegetation is **B** dry Doug.-Fir, S. Aspect **C** is Dry Mixed Conifer	Surface 6-10" over Extreme Gravelly Loam Subsoils	Mod to high on slopes >45% Close drain spacing	High on slopes >45%	Low Mod	Shallow soils, well fractured, road construction may hit rock. Limit ground skid to slopes less than 45%. Road construction may require ¾ or full bench construction.
64 QD	Steep Mountain Sideslopes 40 to 65 % Colluvium from Q=Quartzite/argillite Vegetation is Moist mixed conifers on Northerly Aspects.	Volcanic ash Surface 6-12" over Extreme Gravelly Loam Subsoils	Mod to high on slopes >45% Close drain spacing	High on slopes >45%	Low Mod	Shallow soils, well fractured, road construction may hit rock. Limit ground skid to slopes less than 45%. Road construction may require ¾ or full bench construction.

Example **10-UA** (**10**)Refers to the Landform, in this case a stream bottom (**U**) refers to the Geology, Undifferentiated (**A**) refers to the Vegetation Phase A-Dry to G-Wet. Other = (J) Fine textured Lake Missoula, (Q) Quartzite

Nutrient Cycling & Soil Productivity

There are moderate to high levels of existing downed course woody debris across the proposed harvest areas due to minor previous harvest and insect and disease mortality. Existing conditions are representative of woody debris levels on similar vegetation types measured by Graham et al. (1994). The tree mortality from insects and disease has resulted in downed white pine and Lodgepole logs and many trees shedding their needles, which helps return organic matter and nutrients to the soil. Root rot pockets may be a partial result of increased vegetative stress on droughty sites and shallow soils (Filip 1989), or on areas of partial thinning where high stocking levels of Douglas-fir are retained. Infection is more frequent on poor sites with low moisture, and poor fertility than on good sites. Retaining vegetative litter and woody debris helps to control

erosion on disturbed sites, provides media for healthy soil fungi, acts as mulch for water retention and conservation of soil nutrients important to tree growth. It is desirable to maintain moderate levels of litter and old and new coarse woody debris (>3" dia.) at ~10-15 tons/acre on the harvest units. Retention of well distributed forest cover provides protection from high solar insolation and can help reduce drought stress to improve conifer regeneration.

Environmental Effects on Soils

No Action Alternative: Direct, Indirect, and Cumulative Effects
The No-Action Alternative is expected to result in similar direct or indirect effects to soils as described under existing conditions. Erosion would continue on roads that do not have adequate drainage.

Action Alternative: Direct and Indirect Effects on Soils
Implementation of the Action Alternative is a combination of salvage harvest of dead, dying and high-risk trees and regeneration harvest to reduce competition and improve growth of diverse tree species that are more resistant to root rot. Approximately 866 acres of timber harvest is proposed that would be completed over several years. Tree planting, grass seeding roads and noxious weed management would also occur. The proposed project could construct 7 miles of new road and complete repairs and maintenance on up to 9 miles of road to meet BMP's.

Primary soil concerns with harvest operations are potential for excessive surface disturbance that could remove the shallow volcanic ash surface soils and expose the less productive subsoils, and increase risk of erosion. To maintain soil productivity, and promote conifer regeneration, BMP's and the listed mitigation measures would be implemented to minimize the area and degree of soil effects associated with harvest operations. Implementation of BMP's and the recommended mitigation measures, has been shown to effectively limit detrimental soil impacts to less than 15% of the harvest units based on DNRC soil monitoring on comparable sites (DNRC 2006, 2011) and recent harvest on nearby sites. The estimated area that may be detrimentally impacted is displayed in table ST-2.

Table ST-2 Summary Effects of Action Alternative on Soil Resources

Soil Disturbance and Productivity	Estimated Impacts								Can Impact Be Mitigated?
	Direct & Secondary				Cumulative				
	No	Low	Mod	High	No	Low	Mod	High	
Action									
Physical Disturbance (Compaction and Displacement)			X			X			Yes
Erosion		X				X			Yes
Nutrient Cycling		X				X			Yes
Slope Stability	X				X				
Soil Productivity		X				X			

All new roads are located on stable terrain and would be constructed to meet Best Management Practices. There is no road system currently throughout the state lands proposed for management. The 7 miles of new road construction would change the land use of the added roads to transportation and disturb up to 28 acres of land as noted in table ST -3. The actual area disturbed varies with road width, slope steepness and extent of temporary roads that would be reclaimed. The proposed roads cross segments of shallow soils and fractured

bedrock, and rock raveling is expected that would require periodic maintenance. The high rock/coarse fragment soils are excessively well drained and durable to road traffic with implementation of standard road drainage features. On existing roads, road maintenance and site specific road reconstruction requirements would be implemented to improve road drainage and control erosion. All new roads would be grass seeded with site adapted grass to speed revegetation and control erosion and weeds.

Table ST-3 Estimated Detrimental Soil Disturbance for the Action Alternative

Area of Analysis	Total Area (Acres)	Disturbance Rate (%)	Estimated Impacted Area (Acres)
Harvest Units (including landings)	485-acres Cable 381-acres Tractor	Cable up to 8% Tractor up to15%	Cable 38.8 acres Tractor 57 acres
Roads 7 miles	28	< 1% of project parcels	28
Estimated Total Impacted Acres from harvest is up to 95.8 acres= 11% of 866 harvest acres Combined harvest and road impacts of up to 123.8 acres = 9% of the 1294 acres in the State Lands Project Parcels.			
* Actual area impacted is expected to be less with use of planned skid trails to optimize timber skidding and avoid excessive disturbance.			

We expect that by implementing BMP's and protecting at least ~80% of a harvest area in non-detrimental soil impacts, soil properties important to soil productivity would be maintained (DNRC 2006), and the projected impacts are below that range. Cable operations on steeper slopes reduce ground disturbance and impacts. The estimates of existing impacts are approximately <5% and localized to footslopes where selective salvage harvest occurred over 40 years ago and impacts have largely ameliorated. Impacts from the proposed harvest operations are 54.5 acres= 6.2% of 866 harvest acres. The combined harvest and roads are estimated to impact up to 6% of 1294 parcel acres.

Contract administration would monitor on-going operations to control soil disturbance to avoid excessive impacts and meet silvicultural goals to reduce competition. The improved tree spacing would improve growth of retained trees, due to reduced competition for soil moisture and nutrients, and promoting diverse species more tolerant of root rot, as discussed in the vegetation section. Partial cutting and thinning in Douglas-fir stands with Armillaria ostoyae rot may increase spread of the disease and any Douglas-fir leave trees would be increasingly at risk to mortality. Western larch and ponderosa pine are resistant (although not immune) to Armillaria ostoyae. For all these reasons, there would be low to moderate risk of direct and indirect effects to geology or soil resources as a result of the proposed action.

Nutrient Cycling & Soil Productivity

Considering nutrient cycling, the level of tree mortality has already caused many needles and fine litter to fall to the forest floor. A substantial proportion of plant available nutrients are retained in the forest floor duff and surface mineral soils. Forest duff and litter provide a mulching cover that retains surface moisture. A substantial portion of fine foliage that has not already fallen would be expected to break off during logging operations. The proposed harvest and slash treatments is expected to reduce 15 to 20% of the existing coarse and fine woody debris, based on the planned 50% canopy harvest and retaining a proportion of fine materials.

On all proposed harvest areas a portion of old and new course woody debris (CWD >3" dia.) at ~5-10 tons/acre and fine litter (similar to historic ranges) would be retained as noted in attached mitigations..

Cumulative Effects of the Action Alternative on Soil productivity
Cumulative effects to soils can occur from repeated ground skidding entries into the harvest area and additional road construction, depending on the area included. The total of area in new roads and harvest effects would be up to 6% of the 1294 parcel acres. Only limited selective harvest has occurred in the project area and soils impacts of less than 5% of the harvest acres have largely ameliorated, thus there is low potential for additive cumulative effects to soils with the proposed actions.

There would be short to mid-term reductions in fine litter on high priority fuels reduction treatment zones near residences and open roads. Cumulatively over the rotation of the forest stands, the combination of fine litter and coarse woody debris would be expected to maintain surface organic matter that provides media for healthy soil fungi and conserves soil nutrients and moisture important to tree growth and supports long term productivity. Improved tree spacing would reduce competition for nutrients and soil moisture, enhance growth of retained trees, and promote regeneration of conifers as noted in the vegetation section.

Soils Mitigations

The analysis and levels of effects to Soil resources with the Action Alternative are based on implementation of the following mitigation measures.

* DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented across the area.

* Limit harvest equipment and hauling 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.

* On tractor harvest units the logger and sale administrator would agree to a general skidding plan prior to equipment operations to limit trails to 15% or less of the harvest unit. Feller-bunchers may work on slopes up to 45% as long as displacement and turning is minimized to prevent excessive disturbance. Slopes over 45% would be cable harvested to reduce soil impacts and improve harvest efficiency.

* Whole tree skidding can reduce slash hazard, but also remove a portion of nutrients from growing sites. Target fine slash and woody debris levels are to retain 5-15 tons/acre well distributed on site while meeting the requirements of the slash law. On sites with lower basal area, retain large woody debris as feasible since it may not be possible to retain 5 tons/acre and the emphasis would be on providing additional CWD in the future. Slash may be placed on main skid trails to protect soils and reduce erosion potential.

* Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

* Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation. If cut-slope or fill-slope slumps occurred on new roads they would be stabilized to control erosion as part of the harvest project.

* New road construction, including drainage features should be completed prior to freezing conditions. Road cutslopes are to be constructed at relatively stable angles as noted in contract.

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Attachment E-Water and Fisheries Resources

DeBorgia Timber Sale – Water & Fisheries Resources Analysis

Analysis Prepared By: Jeff Collins, Hydrologist/Soil Scientist, DNRC

Introduction

The following analysis would disclose anticipated effects to water and fishery resources within the DeBorgia project area. The sections on issues & concerns, regulations and mitigations have been combined for water and fishery resources. Direct, indirect, and cumulative effects to water and fisheries resources of both the No-Action and Action Alternatives would be analyzed.

Water & Fisheries Resources Issues

WATER RESOURCES:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to water resources:

- Water Quality - There is a concern that the proposed action may cause impacts to water quality and quantity from timber management, road construction and road use.

- Cumulative Watershed Effects- There is a concern that the proposed timber harvest may cause or contribute to cumulative watershed impacts as a result of potential increased runoff and sedimentation.

FISHERIES RESOURCES *(including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to fisheries resources:

- Cold Water Fisheries- There is a concern the proposed forest management actions may have effects to fisheries due to sedimentation.

Issues and Concerns dismissed from further analysis

- *There is concern impacts to Riparian Large Woody Debris and Stream Shading may occur as a result of the proposed project.*

This issue was dismissed from further analysis because DNRC would designate Riparian Management Zone (RMZs) width of 100 feet buffer along Class 1 streams based on stand potential tree height, and no harvest would occur in SMZ's or the wider RMZ width adjacent to Class 1 fisheries streams and rivers. Consequently, there is not expected to be any detrimental effect on large woody debris or stream shading, which may also affect stream temperatures, and these concerns would be dismissed from further analysis.

The St Regis River was listed for stream temperature from shade removal and roadside effects. No harvest is proposed within ½ mile on the north side of the river and over 600 feet on the south side of the river. There is very low risk of effects to the St. Regis River. Consequently, there is not expected to be any detrimental effect

on large woody debris or stream shading, which may also affect stream temperatures on the St. Regis River or any of the streams within the analysis area, and these concerns would be dismissed from further analysis.

- *Forest Management Activities may impact the Idaho Giant Salamander.*

The Idaho Giant Salamander (Dicamptodon aterrimus) has been found in riparian areas of tributary streams in the St. Regis drainage and have a S2 State Rank (S2 is at risk, because of very limited and/or potentially declining population numbers, range and/or habitat) The Idaho Giant Salamander adults are seldom seen and inhabit riparian areas of moist coniferous forests where they may be found under logs, bark, or rocks (2015 MT Animal Field Guide). Larvae are usually found in swift, cold mountain streams, but may occasionally be found in lakes or ponds (Reichel and Flath 1995). DNRC would designate Riparian Management Zone (RMZs) width of 100 feet buffer along Class 1 streams based on stand potential tree height, and no harvest would occur in SMZ's or the wider RMZ width adjacent to Class 1 fisheries streams and rivers that are potential Idaho Giant Salamander habitat. Consequently, there is low risk of injury to salamanders or detrimental effects to their riparian habitat and this concern would be dismissed from further analysis.

- *New stream crossings may affect Fish Connectivity.*

No new stream crossings are proposed on Class 1 fish bearing streams and no existing crossings on the proposed haul routes limit fish habitat connectivity, thus there would be no effects to fish habitat connectivity.

Regulations, Laws, Rules & Agreements that Apply to Water & Fisheries Resources

The following plans, rules, and practices have guided this projects planning and/or would be implemented during project activities:

Montana Surface Water Quality Regulations
The St. Regis River and its tributary streams in the project analysis areas are classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.623). The water quality standards for protecting beneficial uses in B-1 classified watersheds are described in ARM 17.30.623. The B-1 classification is for multiple use waters suitable for; domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, agricultural, and industrial uses. Other criteria for B-1 waters include; no increases are allowed above naturally occurring concentrations of sediment, which would prove detrimental to fish or wildlife and a maximum 1 degree Fahrenheit increase above naturally occurring water temperature is allowed within the range of 32 to 66 degrees Fahrenheit.

Naturally occurring includes conditions or materials present from runoff or percolation on developed land, where all reasonable land, soil, and water conservation practices have been applied. Reasonable conservation practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices BMP's through its Non-point Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities. Stream temperatures are discussed in the fisheries section. DNRC provides further protection of water quality and sensitive fish through implementation of the Streamside Management Zone (SMZ) Laws and Forest Management Rules.

Water Quality Limited Waterbodies and Beneficial Uses
The Clean Water Act requires development of Total Maximum Daily Loads (TMDL's) that would provide conditions that can support all beneficial uses. A TMDL is a pollutant budget to identify the maximum allowable amounts of specific pollutants (i.e. sediment, nutrients, metals, temperature) that a water body can assimilate without causing water quality standards to be exceeded. A TMDL for sediments and nutrients was completed for the St. Regis River in 2008.

The St. Regis River from the headwaters to the mouth @ the Clark Fork River and Twelve-mile Creek are listed on the State's 303(d) list of impaired waterbodies (DEQ 2014) for not supporting aquatic life, yet support all other beneficial uses. *Source assessments identify transportation (highway/road/bridge runoff), timber harvest, bank erosion, temperature and suburban activities as the primary sources of human caused pollutants in the St. Regis Watershed. Restoration strategies focus on implementing road management BMPs; timber harvest BMPs; providing stream corridor shade and sediment buffers; suburban development BMPs; and other land, soil, and water conservation practices that relate to near stream channel and vegetation conditions* (St. Regis TMDL 2008). The restoration strategies listed in the TMDL are voluntary. Highways were a primary concern as a sediment source.

The St. Regis River tributary streams in the project area include Deer Creek, E. Twin Creek and McGee Creek are not listed as impaired and fully support all beneficial uses.

Beneficial Uses- Downstream beneficial uses include aquatic life, drinking water, recreation, agriculture and industry. There are no water rights on the DNRC parcel proposed for harvest. The project sections are not located in municipal watersheds.

The 1996 303(d) List reported Deer Creek was threatened for coldwater fisheries uses and the probable cause of impairment was thermal modifications. Probable sources of impairment included agriculture and irrigated crop production. In 2006, Deer Creek was determined to be fully supporting all of its designated beneficial uses.

Montana Streamside Management Zone (SMZ) Law
All rules and regulations pertaining to the SMZ Law would be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35%. As stated in SMZ ARM 36.11.302(ii), where the slope of the SMZ decreases to 15% or less to form a bench that is 50 to100 ft. from the ordinary high water mark and at least 30 ft. wide, the SMZ boundary is located at the edge of the bench nearest the stream. An SMZ width of 50 feet is required when the slope is less than 35%.

DNRC Forest Management Rules and Habitat Conservation Plan
All applicable State Forest Land Management rules and regulations regarding watershed and fisheries management would be followed. This includes, but is not limited to rules listed for water quality (ARM 36.11.422), cumulative effects (36.11.423) Riparian Management Zones (RMZ) (ARM 36.11.425), Fisheries (ARM 36.11.427) and Conservation Strategies outlined in the DNRC Habitat Conservation Plan (HCP 2011) for endangered and sensitive species to minimize impacts to fish populations and habitat where applicable. As part of ARM 36.11.427(3)(a)(i) and (iv) and ARM 36.11.436, DNRC is committed to designing forest management activities to protect and maintain bull trout, westslope cutthroat trout and all other sensitive fish and aquatic species as noted in the fisheries assessment. DNRC is a cooperator and signator of the Conservation Strategies and Restoration Plans for Bull Trout and Westslope cutthroat trout. The surface waters in the analysis areas are classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.610). Additional details on these regulations, water quality standards, and beneficial uses please refer to the Water Resources analysis for this project.

Deer Creek, E. Twin Creek, McGee Creek and the St. Regis River are Class 1 fish bearing streams. Bull trout habitat is identified only in the St. Regis River. No new crossings of fish bearing streams are proposed. Section 36, T19N, R30W is the only HCP section in the project area, but the HCP requirements would be applied to all state parcels for this action. The HCP requires no-harvest within 80 feet of a class 1 fisheries stream and the proposed harvest boundary of no-harvest within the SMZ or RMZ of class 1 streams provides an even wider buffer of protection, than required for minimum effective protection as determined in the HCP analysis.

Water Resources Analysis Methods and Areas

A watershed analysis and field survey was completed by a DNRC hydrologist for the proposed project to determine direct, indirect and cumulative effects to water quality. The water quality evaluation included a review of existing inventories for water resources (NRIS 2014), road inventories, reference to previous DNRC projects, and comparisons of aerial photos combined with GIS analysis to estimate the area of past timber harvest and vegetative recovery. Several field reviews were completed for the proposed harvest units, condition of access roads and associated streams and the observations, information and data were integrated into the watershed analysis and design of project mitigations.

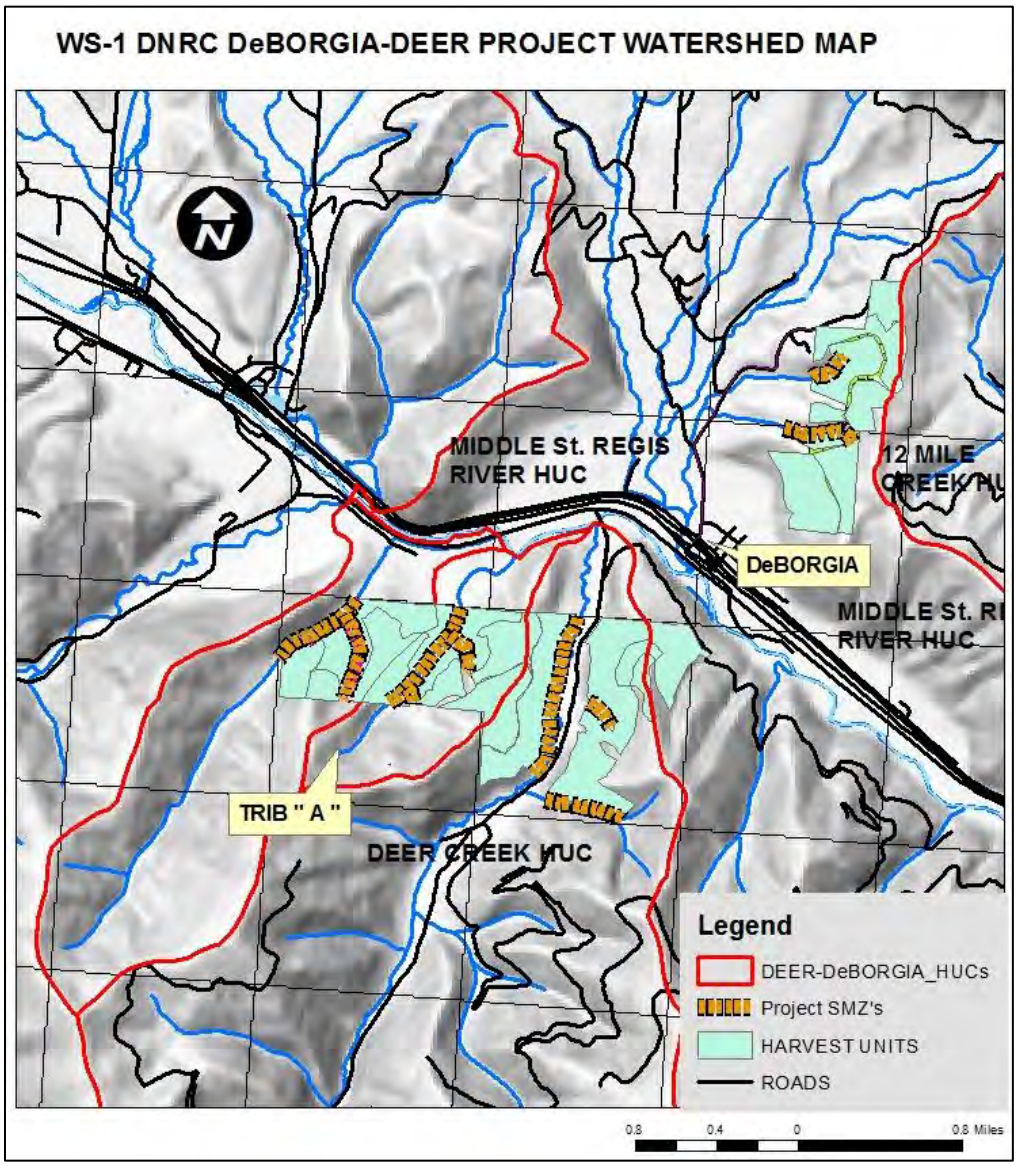
Sediment delivery: The analysis areas for sediment delivery are limited to the harvest units and roads used for hauling and would focus on the streams described as affected watersheds. Refer to the hydrology map WS-1 for analysis areas that encompass the proposed harvest units and road haul routes. A road inventory was completed for sediment sources and to design mitigation measures. The analysis includes in-channel and upland sources of sediment that could result from this project. In-channel areas include the stream channels adjacent to and directly downstream of harvest areas. Upland sources include harvest units and roads that may contribute sediment delivery as a result of this project. The measurement criteria for this sediment analysis are 1) miles of new road construction and road improvements and 2) potential for sediment delivery to streams.
Water Yield: Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of past, current or foreseeable future disturbances, both natural (fire) and human-caused. Past, current, and known future planned activities have been taken into account for the cumulative effects analysis.

The analysis for cumulative effects to water yield considers the area of harvest units and access roads within the project drainages described as the affected watersheds. A DNRC hydrologist completed a coarse filter qualitative assessment of watershed conditions and cumulative effects as outlined in the Forest Management Rules (ARM 36.11.423) and the commitments described in the HCP concerning watershed management. Based on extensive past logging in the area, a more detailed assessment of sediment sources and stream channel conditions was also completed. The measurement criteria for the water yield analysis are the potential for increases to surface runoff water yield and affects to stream flow would be described qualitatively considering the distribution and timing of peak flows.

State Trust Land Areas Dismissed from Further Analysis

About 24 acres of proposed tractor harvest within the 12 Mile Creek watershed (6th HUC 170102040808 that is 38,326 acres in size) would be dismissed from further analysis for this project based on the following:

- This small harvest area is along a dry ridge within a 240 acre parcel of Section 19, 19N, R30 W24 (refer to Water Resources map WS-1).
- The proposed harvest is minor in area and is located over ½ mile from 12 Mile Creek, where no disturbance would occur.
- There are no surface waters or drainage features in the proposed harvest area, or on the access road to this unit, and there is low potential for any direct, indirect or cumulative impacts to off-site runoff, sediment delivery or water quality from this small harvest area.



Affected Watersheds

The proposed harvest areas are located within Montana Public Buildings trust parcels in Sections 19 and 30 of T19N, R29W. Sections 35 & 36 of T19N, R30W and section 31 of T19N R29W and are under Common Schools trust. These lands are within 5 miles of DeBorgia, Montana. The proposed harvest units are located mainly in the Middle St. Regis Watershed (6th HUC 1701020407, that is 12,808 acres in size) and within the Deer Creek watershed (6th HUC 170102040806, that is 10,687 acres in size).

The Middle St. Regis drainage (HUC 170102040807) is 12,808 acres in size and includes the St. Regis River from DeBorgia downstream to St. Regis and its named tributaries, the Twin Creeks drainage to the north of DeBorgia and the McGee Creek drainage to the southwest of DeBorgia. The project sections north of the St. Regis River are located within an unnamed tributary to Twin Creek and 24 acres of proposed harvest is located within the Rock Creek drainage. The state land parcels in Section 30 and NWNE Section 31, T19N, R29W are face drainages to the Middle St. Regis River.

The average precipitation ranges for the Middle St Regis Watershed are from 25'/year near the DeBorgia to 60"/year in the headwaters @ 6100ft. elevation, and drainage average is a moderate 35"/year that is mainly snowfall. The state project parcels are located in the lower parts of the drainage where the average precipitation is moderate at 30 in/year and elevation range is 3220 to 3600 ft. Precipitation occurs mainly as snow, and spring runoff is flashy due in part to considerable shallow rocky soils and steep gradients. The analysis area supports a mixed forest of Lodgepole pine, Douglas-fir, ponderosa pine, western larch, western white pine, Lodgepole pine, grand fir and spruce.

The Deer Creek drainage (HUC 170102040806) is 10,687 acres in size and 8.5 miles in length, flowing south from its headwaters near Ward Peak (elev. 7305 ft.) to the confluence with the St. Regis River near DeBorgia (elev. 3020 ft.). Deer Creek's named tributaries include Cromie Creek and Up-Up Creek. All of the DNRC proposed project lands are within the lower 2 miles of the Deer Creek drainage. Precipitation occurs mainly as snow, and spring runoff is flashy due in part to considerable shallow rocky soils and steep gradients. The analysis area supports a mixed forest of Lodgepole pine, Douglas-fir, ponderosa pine, western larch, western white pine, Lodgepole pine, grand fir and spruce.

Table WS-1 Land Ownership in the Project Drainages

HUC Drainages	Lolo National Forest	State of Montana	Private Lands	Total Acres
Middle St. Regis	7667ac. = 59.9	780ac. = 6%	4361 = 34.1%	12808
Deer Creek	10180ac.= 95.2%	425ac. = 3.9%	80ac. = 0.7 %	10687

Existing Conditions- Water Resources

Existing Conditions- Water Quality and Sediment Delivery

Past management activities in the project area include timber harvest, road construction, fire suppression, mining, limited grazing, and recreation. Streams in the project area were reviewed for channel stability and sediment sources. Deer Creek, Twin Creek and McGee Creek are not 303d listed impaired streams and all beneficial uses are currently supported, including fish and aquatic life. Yet there are cumulative effects to water quality within the project drainages that include, past timber harvest, old mining exploration, highways and forest roads, some of which are on poor road locations and crossing sites. Overall water quality in the analysis area drainages are considered good, based on sediment surveys and recent stream channel stability assessments that were completed within and directly below the project sites.

The timber stands are dominated by mixed conifer forests that were largely initiated by fires. Historic harvests occurred in the area mainly from 1950-2000. There was minor selective harvest on state lands, over 40 years ago. Some impacts may have occurred on adjacent lands associated with logging and road use practices in the prior to BMP adoption in 1988.

Sediments

A sediment source survey was completed for the haul routes. There is less than .7 miles of haul road on state lands, and that road complies with BMP's and no sediment sources were identified. Material quality is good throughout the project area. Existing road density is low on state lands and is displayed in Table WS-2.

Table WS-2 Estimate for Comparison of Existing Road density within Analysis Areas					
Analysis Area Drainages	Analysis Areas in Square Miles	Total Road Miles in Analysis Areas- All Ownerships	Road Miles per Square Mile within Analysis Area	State Lands Parcels Area Sq. Miles	Existing Road Miles/Sq. Miles on State Trust Lands
Middle St Regis	20	53.9	2.7	1.2	.06
Deer Creek	16.7	34.0	2	0.7	0.25
Estimates of road miles were based on ARC database files and may not include all historic roads that are abandoned and overgrown.					

Deer Creek Section 36 T19N, R30W and a 40 acre parcel in NWNW Section 31T19N, R29W would be accessed by the main Deer Creek road #236 that is in good condition and complies with BMP's. Access to the SE corner of Section 36 follows the Up-Up Road which has had deferred maintenance and there are a few obstructed ditch relief culverts and road grading that is required, but no direct sediment sources were identified. There is an old abandoned mining road in the SW corner of section 36 that is overgrown with 15-20 ft. trees in the roadbed and has a poor crossing site. The road cannot be accessed, and would be allowed to stabilize as an abandoned road.

On the south side of the Middle St. Regis drainage, the haul route to Section 35, T19N, R30W is a private access road that crosses an old gravel pit and no sediment sources were identified. There are two streams in this parcel, McGee Creek that flows through the NW corner and an unnamed Class 2 tributary "A" that has flows through the middle of the parcel. McGee Creek has perennial flow and is a fisheries stream. There are no roads within the state parcel. There is an old road that is vegetated and a timber bridge on private land downstream of the state parcel. McGee Creek channel stability is rated as good.

Tributary "A" has perennial flow in the headwaters, but the stream goes subsurface at the base of an alluvial fan and the stream does not connect to the St. Regis River and does not support fish. Stream channel stability is good to excellent on Tributary "A".

North of DeBorgia, the proposed haul route would utilize 1.5 miles of existing, graveled and native surface roads from the townsite to the north corner of the state parcel in Section 19 and provide access to the 160 acre parcel in Section 30, T19N, R19W. The state parcels are drained by two unnamed, intermittent tributaries of Twin Creek. The streams do not support fish. There are two stream crossings on private lands that have minor sedimentation from inadequate road surface drainage and require maintenance grading.

Additional sites were identified that that have dispersed road sediments from inadequate road surface drainage to meet BMP's. Maintenance needed include cleaning of ditch relief culvert inlets and repairs or maintenance grading of road surface drainage features.

Water Yield

Estimates of water yield increase are based on the amount of vegetative cover from natural disturbance, such as fire and mortality or from timber harvest, roads or land clearing. Changes of water yield are a function of precipitation, total area roaded and harvested, the % crown cover removal in harvest areas and the amount of vegetative recovery that has occurred in the harvest areas since the forest management treatment. Increases in water yield over total forested conditions can affect stream channel stability, depending on the stream morphology.

Water yield is not considered constrained in the St. Regis or Deer Creek drainages based on the 2008 TMDL Report (appendix L), field reviews, review of aerial photos, and good stream channel stability on the project sites. To assess potential water yield effects, DNRC compared changes in harvest area based on 2005 and 2013 aerial photos and stream channel conditions within proposed harvest areas and directly downstream of those locations. There has been only minor harvest and thinning in that time frame since the 2008 report. Historic forest cover likely varied from 65-80% of the drainages depending on the extent of natural openings due to fire and mortality.

For this project DNRC determined (per ARM 36.11.423) there was a moderate allowable threshold for increased water yield of 10%, for the Middle St. Regis watershed due to the TMDL listing. The drainage is likely more tolerant of water yield increases considering the rocky and resilient Belt parent materials in the area.

In the Middle St. Regis drainage, the existing water yield increase from management is estimated to be 7.0%, or less considering recovery since the 2008 TMDL report, and no measurable harvest changes since then, except for minor thinning and regrowth. The St. Regis sub-drainage of Twin Creek was also modeled at a less than 1% water yield increase from timber harvests n forest sites.

In the Deer Creek drainage, the existing water yield increase from management is estimated to be 3.2% or less considering recovery. The combined effects of timber harvest and fires have likely not been detrimental to the St. Regis River or tributaries in the project drainages

Stream channel conditions were reviewed below the proposed harvest areas using the USFS Stream Reach Inventory and Channel Stability Evaluation Procedure (Pfankuch, 1978) and the evaluation was good on all sites in 2014. Past riparian harvest has occurred on private lands along McGee Creek yet channel morphology is rated as good and stable with extensive vegetation growth along the channel. Based on the limited recent harvest, water yield comparisons, and stream assessments, water yield has had low impact on channel stability on the project section reaches.

Environmental Effects

No Action Alternative: Direct, Indirect, and Cumulative Effects

The No-Action Alternative is expected to result in similar direct or indirect effects to water quality or quantity as described under existing conditions. Segments of the existing haul road do not meet BMP's for drainage, and there are low to moderate cumulative effects to sediment from roads. Sedimentation on segments of existing roads with inadequate surface drainage would continue to impact water quality unless remedial actions are taken, and would be completed over time based on priorities with limited funds.

The combination of root diseases and insect mortality are leading to declining forest cover and vigor as noted in the vegetation analysis, and the reduced canopy would be expected to have a minor increase in runoff. Continued insect mortality or extreme wildfire may increase runoff and water yield relative to increasing canopy loss. There are low to moderate cumulative effects to water yield and sediments due to past harvest and fire, on adjacent lands. Estimated water yield is below allowable thresholds and past harvest stands have regenerated with many stands overstocked and near hydrologic recovery.

Action Alternative: Direct and Indirect Effects

Land management activities such as timber harvest and road construction could impact water quality primarily by accelerating sediment delivery to local stream channels. The primary risk to water quality is sediment

delivery at stream crossings. Potential change in water yield is addressed under cumulative effects. The summary effects of the Action Alternative on water quality and quantity are noted in Table WS-4.

Implementation of the Action Alternative is a combination of salvage harvest of dead, dying and high-risk trees to reduce competition, and group selection to promote regeneration of diverse conifer species more tolerant of root rot and improved tree growth. Approximately 866 acres would be harvested using a combination of cable logging and ground based skidding. Extensive planning was completed to optimize use of existing roads and minimize the extent of new roads.

Approximately 7 miles of new road would be constructed to establish a road system, where there is no current road access. Road maintenance and improvements would be completed on 9 miles of existing roads to meet BMP's and control sedimentation concurrent with operations. Two stream crossings would be installed on an unnamed tributary "A" in Section 35, T19N, R30W implementing all BMP's to protect water quality. All access routes on state lands would be gated or closed to public and year round use, which would reduce road damages and sedimentation. A complete list of mitigations is attached.

Sediments
There is low potential for off-site erosion from the harvest areas based on the buffer distances to streams, high rock content soils and rapid water infiltration rates that exceed most runoff events.

Harvest units and operations are planned to minimize disturbances to silvicultural goals with use of cable harvest practices on steeper sideslopes that limit disturbance to prevent excessive erosion. A RMZ buffer width of 100 feet was determined for McGee Creek, Deer Creek and all Class 1 stream segments. Depending on slope, SMZ's vary from 50 feet -100 feet from a stream. No harvest is proposed in RMZ's or SMZ's within this project in order to maintain effective buffers to any potential sediment. Sediment trapping field research (Lakel et. al.) on the effectiveness of stream buffers, found that > 97% of watershed erosion was trapped by vegetation prior to entering streams for SMZ's of 25ft or more. Harvest would take place on class 3 Streamside Management Zones. Trees marked to cut were concentrated to the outer edge of the SMZ to ensure protection along streams.

All new roads were located on mid to upper stable sideslopes away from surface waters and planned to minimize stream crossings. New proposed roads are located over 1000 feet upslope from Deer Creek and the St. Regis River and over 700 feet from McGee Creek. The installation of 2 stream crossings on Tributary "A" would have a temporary increase in sediment during construction. DNRC turbidity sampling on streams below construction sites, found short duration sediment spikes occurred and quickly declined the same day as operations. Tributary "A" goes subsurface and is not connected to other waters, thus any short term turbidity would not affect water quality in other waters within the larger Middle St. Regis watershed. All requirements of the 124 stream permit, BMP's and erosion control measures would be implemented, at the proposed culvert sites to minimize erosion and sediments.

All new roads would be grass seeded with site adapted grass to speed revegetation and control erosion and weeds. On the existing haul roads, road maintenance and site specific road reconstruction requirements include culvert cleaning, additional rock armor and sediment control at crossings would be implemented to improve road drainage and reduce potential sediments on existing stream crossing sites.

In summary,(Refer to Table WS-3) there would be reductions in sediments for site specific road repairs and maintenance that would result in long term reductions in sedimentation and overall low to moderate direct and in-direct downstream effects on water quality in these resilient streams.

Table WS-3 Summary Effects of the Action Alternative on Water Quality and Quantity								
Water Quality & Quantity	Resource Impact							
	Direct & Secondary				Cumulative			
	No	Low	Mod	High	No	Low	Mod	High
Action								
Water Quality		X	X			X		
Water Quantity			X			X	X	

Cumulative effects & Water Yield

There is low risk of additive cumulative effect to water quality or water yield for the proposed alternative based on no riparian harvest, repair and stabilization of sediment sources, minor estimated water yield increases, stable parent material of high rock contents, and resilient stream channel morphology. The proposed harvest and thinning would occur on up to 854 acres, in two treatments.

Increased mortality from root rot and insects are leading to declining forest cover and vigor as noted in the vegetation analysis, and the reduced canopy would be expected to cause a low increase in runoff.

There is low potential for surface runoff or measurable water yield increases from the proposed partial harvest, compared to no-action, based on the following reasons. The combination of removal of dead and dying trees that represent 20% to 30% of the stand volume, would not measurably contribute to continued interception or transpiration. The project areas include multi-story forest stands that are generally well regenerated and overstocked with young trees. The proposed combination of selective and seed tree harvest would remove stagnant trees and promote codominant and understory trees that use water more efficiently.

The potential increase of water yield is estimated to be less than 1.5% of the Middle St. Regis drainage that could result in a total of 8.5% increase with existing conditions and would not likely be measurable and less than the 10% allowable water yield. The potential increase of water yield would be less than 1.5 % of the Deer Creek drainage that could result in a total of 3.7% increase with existing conditions and less than the 10% allowable water yield, and there would be low risk of cumulative effects. The minor change in water yield is unlikely to be perceptible to the stream channel stability or channel forms in or directly below the project sections. Over time, the expected improved growth of retained trees and regeneration of more disease tolerant trees should improve stand cover and vigor and moderate any water yield effects.

New road construction would increase road density slightly in order to establish a road system to access the state lands, but has low risk of cumulative effects based on the dispersed nature of the roads, planning to minimize roads and location of roads well away from water.

Table WS-4 Estimate for Comparison of Change in Road density within Analysis Areas			
Analysis Area Drainages & Area in Sq. Miles	Existing Road Miles/Sq. Miles- All Ownerships	New Proposed Road	Road Miles per Square Mile with new roads All Ownerships
Middle St Regis 20 sq. miles	2.7	4.7 miles	2.9
Deer Creek 16.7 sq. miles	2	2.3 miles	2.2

Fisheries Analysis Methods and Areas

This analysis would consider the presence of fish and potential effects of sedimentation on fisheries resources. Presence or absence would be based on MTFWP MFISH data as of 2014, and field reviews of the potentially affected streams and road crossing sites on the proposed haul routes. Sediment delivery would follow the same analysis as in the water resources report. Sediment delivery sources are concerns at stream crossings, access roads within the riparian area and on locations that are downslope of harvest areas or areas of soil disturbance.

The analysis would tier to the regulations, guidelines and methods outlined above in the water resources analysis of this report. Cumulative impacts are those collective impacts on the human environment of the proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (75-1-220, MCA).

The potential cumulative impacts to fisheries resources in the analysis areas are determined by assessing the collective anticipated direct and indirect impacts, other related existing actions, and future actions affecting the fisheries resources. The analysis would focus on Deer Creek and McGee Creek that are Class 1 fish bearing streams that may be affected by the proposed actions. Project parcels in the Henderson Hill area of Twin Creek are Class 2 streams and are not fish bearing streams, and any potential impacts would be limited to potential sediment increases downstream of the project sites. The cumulative effects analysis area for sediment delivery is limited to the proposed harvest units and roads used for hauling as displayed in the water resources analysis. This includes in-channel and upland sources of sediment that could result from the project.

Existing Conditions- Fisheries

McGee Creek and Deer Creek are not listed as impaired streams and all beneficial uses are currently supported, including fish and aquatic life. Deer Creek and McGee Creek are known fishery streams. Deer Creek is 8.5 miles in length and includes the tributaries of Cromie Creek and Up-Up Creek. Deer Creek flows through the project section 36, T15N, R29W from 0.5 stream miles to 1.7 miles above the Deer Creek confluence with the St. Regis River. Deer Creek has common to abundant westslope cutthroat trout up to the headwaters at 10.5 mile and no bull trout based on sampling. The Deer Creek access road haul route is generally well located away from the stream. The road systems cross generally high gravel/rock content soils that have low to moderate erosion and road use. Yet there are effects to sediments and water quality within the project drainages that include timber harvest, historic mining exploration, forest roads and some poor road crossings that do not meet BMP's on adjacent lands.

McGee Creek is 2.6 miles in length and the state land is in the lower mile. McGee Creek supports westslope cutthroat trout and no Bull trout recorded from past sampling (MFISH 2015). Mixed amphibians are also known in the area. There is only about ¼ mile of existing road in Lower McGee Creek and it is located away and is not a sediment source, except for one crossing, an old timber stringer bridge where the log stringers remain. The crossing is well vegetated with >50% canopy cover (dogwood, alder, conifers) and there is minor channel scour, but the channel rates as good stability.

Fishery Resources - Environmental Effects

No Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the No-Action Alternative would result in no additive fisheries resource impacts in the project area and effects would remain similar to those described in the existing conditions sections of this environmental assessment.

Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the Action Alternative is a combination of improvement and salvage harvest of dead, dying and high-risk trees and thinning to reduce competition and improve growth of diverse tree species. The proposed harvest is moderate intensity harvest and thinning of 866 acres and maintains all riparian buffers. No harvest would occur within the SMZ's or RMZ's of McGee or Deer Creek. The proposed harvest above Deer Creek would be low impact cable harvest uphill to reduce sediment potential and the proposed road is over 1000 feet from the stream at the nearest point, and adjacent harvest is mainly planned for low impact cable harvest. Similarly, proposed harvest above McGee Creek would be low impact cable harvest uphill and the proposed road is over 700 feet from the stream at the nearest point. All harvest operations are designed to minimize surface disturbance and potential for erosion and sediment delivery by implementing adequate stream and wetland buffers.

Approximately 7 miles of new road would be constructed on dry sites with 2 new stream crossings on an intermittent, non-fish bearing stream. No new road crossings would be constructed on Class 1 fish bearing streams. On existing roads, road maintenance, site specific road reconstruction requirements and all BMP's would be implemented to improve road drainage and control erosion. Site specific road reconstruction requirements include culvert cleaning, additional rock armor and sediment control at crossings to reduce potential sediments.

All new roads would be grass seeded with site adapted grass to speed revegetation to control erosion and sedimentation. Road maintenance and repairs would likely result in short duration, low levels of sedimentation that would quickly subside and result in a long term reduction in existing sediments compared to no-action. In summary there would be low potential for off-site sediment delivery to McGee or Deer Creek from new road construction and harvest. There would be reductions in sediments for site specific road repairs and maintenance that would result in long term reductions in sedimentation and overall low to moderate direct and in-direct downstream effects on water quality in these resilient streams.

The proposed project has overall low potential for additive direct, indirect or cumulative impacts to fisheries based on the following: no harvest adjacent to Class 1 fishery streams, moderate harvest with cable harvest away from streams, stream channel conditions are stable and resilient, road construction on dry sites with no new stream crossings of fish bearing streams, sediments from road repair would be short duration and quickly subside to lower levels than no-action, implementation of BMP's, applicable rules and attached mitigations.

Water & Fishery Resource Mitigations

The analysis and levels of effects to Water and Fishery resources are based on implementation of the following mitigation measures.

- DNRC would implement all applicable Best Management Practices (BMP's), Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest,

road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented on the applicable parcels.

- DNRC would locate, clearly mark and maintain suitable water resource protection boundaries including Streamside Management Zones (SMZ's) and Wetland Management Zones (WMZ's) adjacent to streams and wetlands consistent with State Forest Land Management Rules.

- Mitigations to reduce soil impacts and control erosion on skid trails and cable corridors would be implemented to protect water quality including limiting harvest and hauling 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.

- Existing and new roads would be maintained concurrently in association with the harvest and road use activities. Road improvements would include surface blading, rock armor culvert inlets, and installation of road drainage features to prevent surface erosion and sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

- All culvert replacements would be completed in accordance with all BMP's and FWP 124 stream permit requirements. Site specific erosion control measures, including slash filters, would be implemented during culvert replacements and perennial flows would be diverted from the culvert during construction.

- New road construction, including drainage features should be completed in the summer or fall prior to freeze-up or periods of expected high rainfall.

- All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce erosion/sediment from roads.

Water & Fishery References

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Missoula Unit
3206 Maverick Lane
Missoula, MT 59804

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