



MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION  
Northwest Land Office – Stillwater Unit  
April 2020



## Environmental Assessment Checklist

**Project Name:** MollyWood Timber Sale  
**Proposed Implementation Date:** June 16, 2020  
**Proponent:** Stillwater Unit, Northwest Land Office, Montana DNRC  
**County:** Flathead

### Type and Purpose of Action

**Description of Proposed Action:**

The Stillwater Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing the MollyWood Timber Sale. The proposed MollyWood Timber Sale is located approximately 6 miles north of Olney, Montana, in the Stillwater State Forest main block, in Flathead County. The proposed timber sale includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	<b>Sections 9, 10, 11, 13, 14, 15, 23, and 24, T33N R24W</b>	<b>1529</b>	<b>576</b>
Public Buildings			
MSU 2 <sup>nd</sup> 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			

Objectives of the project include:

- Contribute 1-3 MMbf (million board feet) to the annual targets of timber-harvest volumes of DNRC and the Northwestern Land Office. DNRC is required by state law (MCA 77-5-221 through 223) to sell approximately 56.9 MMbf of timber annually and continue to produce revenue over time.
- Generate revenue for the appropriate school trust (Common Schools-K-12).
- Improve the long-term productivity of timber stands and reduce the incidence and risk of insect and disease damage through silvicultural treatments designed to reduce stand density and improve forest health, and regenerate stands displaying poor vigor and growth.

- Reduce the risk and severity of wildland fire in stands adjacent to private and public property by reducing fuel loading and stand density through silvicultural treatments.
- Continue to apply silvicultural prescriptions in the MollyWood project area to promote biodiversity as called for in the State Forest Land Management Plan (1996).
- Apply Best Management Practices (BMPs) or meet design criteria that are necessary to promote long-term water quality during logging and road improvement operations.
- Establish areas of regeneration of the desired species mix, keeping or moving stands in DNRC's Desired Future Conditions (DFC's), improve vigor/tree growth, and meet the Habitat Conservation Plan (HCP) commitments and Forest Management Rules in relation to wildlife, fisheries, and water quality.
- Address the removal of trees which could cause outages along Lincoln Electric Cooperative's powerlines.

Proposed activities include:

Action	Quantity
<b>Proposed Harvest Activities</b>	<b># Acres</b>
Commercial Thin	230
Sanitation & Commercial Thin	146
Seed Tree with Reserves	118
Shaded Fuel Break	25
Clearcut With Reserves	43
Fuel Break	5
Sanitation	9
<b>Total Treatment Acres</b>	<b>576</b>
<b>Proposed Forest Improvement Treatment</b>	<b># Acres</b>
Mechanical Pile & Scarify	166
Slash/ Pile & Scarify	155
Plant	64
<b>Proposed Road Activities</b>	<b># Miles</b>
New permanent road construction	0
New temporary road construction and reclamation	1.0
Road maintenance	8.1
Road reconstruction	
Road abandoned	
Road reclaimed	
<b>Other Activities</b>	

<b>Duration of Activities:</b>	40 Months
<b>Implementation Period:</b>	June 2020-October 2023

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), and
- all other applicable state and federal laws.

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## Project Development

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### SCOPING:

- DATE:
  - November 12, 2019
- PUBLIC SCOPED:
  - The scoping notice was posted for 30 days on the DNRC Website:  
<http://dnrc.mt.gov/public-interest/public-notice>
- In November 2019, DNRC solicited public participation for 30 days on the MollyWood Timber Sale Project. The Initial Proposal with maps was sent to approximately 45 individuals, agencies, and other organizations that have expressed interest in DNRC's management activities. A notification was also placed in the Whitefish Pilot and Daily Interlake newspapers.
- AGENCIES SCOPED:
  - MT Fish, Wildlife and Parks
  - USFS Flathead National Forest
  - All Montana Tribal Organizations
- COMMENTS RECEIVED:
  - *How many:* There were seven comments; four received by e-mail, two by letter, and one from face-to-face discussion with an adjacent landowner. One e-mailed comment was sent by Montana Fish, Wildlife and Parks (FWP), and the other an e-mail from DNRC's wildlife biologist relaying concerns stated by another FWP biologist in a telephone call. The others were received from landowners adjacent to the project area.
  - *Concerns:*
    - One comment from the Montana Fish, Wildlife, and Parks noted the project area had the same cover type as an adjacent mule deer wintering area and was concerned how mule deer winter range may be affected.
    - Lincoln Electric Cooperative took interest in having DNRC manage the timber adjacent to powerlines more intensely to mitigate fire danger and outages from extreme weather events.
    - A landowner that uses a creek downstream (its watershed includes the project area) as a domestic water supply, gave concern about identifying and repairing potential sediment sources that may be impacting streams.

- A landowner adjacent to the project area expressed concerns about prescribing clearcut harvest, smoke from fuel hazard reduction burning, and the ability to recreate during times of harvest.
- A landowner adjacent to the project area expressed interest in fuels reduction bordering his land. The landowner was also interested in increasing his viewshed by harvesting timber.
- *Results* (how were concerns addressed):
  - General wildlife and habitat comments and concerns from FWP were incorporated into the effects analysis for Wildlife portion of this document.
  - Timber adjacent to powerlines would be managed more intensely. Trees threatening powerlines would be harvested.
  - General watershed comments and concerns were relayed to DNRC's Hydrologist Marc Vessar and were incorporated into the Soils Disturbance and Productivity, Water Quality and Quantity and Fisheries portions of this document.
  - Some proposed harvest units recommend clearcut with reserves. The purpose for proposing a clearcut with reserves prescription is for the following reasons: fuels reduction around private land, disease such as mistletoe which infects regenerating western larch, aid in meeting desired future conditions, and to continue producing revenue for trusts. Clearcut with reserve treatments would also retain some overstory trees and up to 10% of the area for advanced regeneration "islands" scattered throughout.
  - The State mitigates smoke by following the Montana/Idaho Airshed Group and Department of Environmental Quality (DEQ) commitments. DNRC would also follow regulations Flathead County has for Air Quality. DNRC realizes that inversions hold smoke in the low-lying town of Radnor and would plan burning operations for periods when forecasts anticipate several days of good ventilation. Also, if markets allow, further mitigation of chipping landing piles may be applied.
  - Overall impact on the land will be minimized if harvest occurs during the winter. Snow plowing would be allowed for hauling. Typically snow plowing does not expose road running surface, so winter recreation activities could still occur in the Woods Lake area when not hauling.
  - Recreation may be interrupted for the short-term during operations but would continue to be allowed in the Project Area.
  - Fuels reduction would be accomplished near adjacent properties with homes.

DNRC specialists on the Interdisciplinary Team (ID Team) were consulted. The ID Team considered all the internal and external issues and determined that through project design and various mitigations one action alternative could be developed and reviewed in this EA. The ID Team includes several foresters and DNRC specialists: Leah Breidinger (Wildlife Biologist), Marc Vessar (Hydrologist), and Patrick Rennie (Archeologist).

#### **PROJECT DEVELOPMENT:**

- **Stand Prioritization:** Initial reconnaissance of the area included prioritizing areas that had been previously harvested that needed additional treatments, timber adjacent to powerline right-of-way, and private property, as well as stands that would become overstocked in the coming years.

- Stand health focused on:
  - Areas that had prior timber harvest and were not regenerating with the preferred species composition or stocking level.
  - Stands that are suffering mortality and stagnating. The closed canopy in these stands created an overly dense amount of poor form, shade tolerant tree species in the understory. These circumstances guided foresters to focus on silvicultural treatments to improve stand health and/or keep stands on trajectory to maintain resilience by meeting desired future conditions.
  - Lodgepole stands that had been precommercial thinned in the 1990's have grown to a point where competition-induced mortality would occur in the coming years if not commercially thinned.
- Wildland Urban Interface Fuel Reduction:
  - Fuel loading and stand densities adjacent to private land as well as potential fire starts related to trees falling into powerlines directed foresters to consider fuels reduction treatments near private property and clearing along powerlines.
- Transportation Development
  - Initial reconnaissance of the MollyWood Timber Sale Project Area revealed that the current transportation system of the area needed minimal work done to be brought up to BMP standards.
  - Some stands would require temporary road construction to access the units.
  - Two new highway approaches would be constructed, and one approach brought to current Montana DOT standards to access proposed harvest areas.

## **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 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 <http://dnrc.mt.gov/divisions/trust/forest-management/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.
- **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 Transportation (DOT)-** Three Driveway Approach Permits issued by DOT are required for new road approaches onto Highway 93.

## **ALTERNATIVES CONSIDERED:**

**No-Action Alternative:** Under this alternative, no timber would be harvested and therefore no revenue would be generated from the project area for the Common Schools Trust at this time. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and ongoing management requests may still occur. Natural events, such as plant succession, tree mortality due to insects and diseases, windthrow, down fuel accumulation, in-growth of ladder fuels, and wildfires would continue to occur.

**Action Alternative:** A commercial timber harvest would take place to remove between 2.5 MMbf and 3 MMbf of timber using ground-based methods on 576 acres. Specific harvest unit data is provided in Attachment B- *MollyWood Timber Sale Project Prescription Table*. Using this table with maps in Attachment A will provide additional detail for this project.

New stands of healthy trees would be regenerated on 161 acres through clearcut with reserves and seed tree with reserves treatments.

Approximately 155 acres of the proposed harvest units in the project area have had prior timber harvest (both selective harvest and regeneration harvests). These stands would harvest the overstory under a sanitation prescription to remove the dead and diseased timber as well as trees with low vigor. The understory would be commercial or precommercial thinned and unstocked areas prepped for natural regeneration or planting to meet Desired Future Conditions, meaning western larch and western white pine should be a prominent species represented in these stands.

Stands of lodgepole pine (210 acres) and mixed conifer (20 acres) would be commercially thinned to a 20-25' spacing leaving the highest quality tree in all size classes.

A shaded fuel break prescription on two road systems would be implemented to reduce ladder fuels and provide a safer environment for fire crews in case of a wildfire. This prescription would space crowns at 20 feet apart focusing on retaining larger trees and removing trees in smaller size classes.

Treatment of approximately 11 acres adjacent to private would harvest and commercially thin a dense lodgepole pine stand; the intent would be to reduce the wildfire intensities. This fuel reduction treatment would be following guidelines set forth by "Flathead County Community Wildfire Protection Plan" and rules set by the Hazard Reduction Law (ARM 36.11.224).

Approximately 1.2 miles of harvest would occur along Lincoln Electric powerlines. Treatments would remove trees with a high likelihood of hitting the powerlines during wind events and/or downfall from excess snowload on trees adjacent to the powerline.

There would be grass seed planted after construction and after harvest on disturbed surfaces and road beds as needed. This would be done to minimize establishment of weeds and sediment delivery.

Road maintenance and BMP improvements would be performed on approximately 8.1 miles of existing roads and would include constructing, and then retiring up to 1.0 mile of several segments of temporary roads.

## Impacts on the Physical Environment

Evaluation of the impacts on the No-Action and Action Alternatives including **direct, secondary, and cumulative** impacts on the Physical Environment.

### VEGETATION

#### **Vegetation Existing Conditions:**

Most of the project area has undergone some form of timber management. Active management first occurred in the 1930's to harvest the valuable western redcedar. Throughout the years, harvest prescriptions have differed. Prescriptions assigned to stands have been anywhere from regeneration harvest to improvement cut. Responses to the vegetation and the regeneration following harvest has been highly variable.

Areas that have not been managed or had vegetation disturbance are at their late successional stages. Most of these stands' climax series are dominated by shade-tolerant species in the under and mid-stories.

Through utilization of Montana's Natural Heritage Program Database, nine species of concern were identified to potentially exist within the project area. The primary plant species that have been documented through ground-truthing surveys include: moonworts (*Botrychium sp.*), crested shieldfern (*Dryopteris cristata*), Adder's tongue (*Ophioglossum pusillum*), and beck water-marigold (*Bidens beckii*). Two additional potential species of concern, small yellow lady's-slipper (*Cypripedium parviflorum*) and roundleaf sundew (*Drosera rotundifolia*) were also identified. Crested shieldfern has been verified to exist within the project area, specifically adjacent to Molly Lake. No other rare plant species were identified during field reconnaissance.

Spotted knapweed (*Centaurea maculosa*), orange hawkweed (*Pilosella aurantiaca*), Oxeye daisy (*Leucanthemum vulgare*), and St. John's-wort (*Hypericum perforatum*) are found in and around the proposed project area. Current occurrences are found mainly along existing roads. Incursions of noxious weeds into forested sites have not been observed.

Vegetation	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>No-Action</b>														
Vegetative community	X					X				X				V-1

Vegetation	Impact												Can Impact Be Mitigated?	Comment Number	
	Direct				Secondary				Cumulative						
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High			
Forest Fuels	X				X				X						
Old Growth	X				X				X						
Rare Plants	X				X				X						
Noxious Weeds	X					X				X					V-6
<b>Action</b>															
Vegetative community		X				X				X				Y	V-2
Forest Fuels		X				X				X					V-3
Old Growth		X			X					X					V-4
Rare Plants	X				X				X					Y	V-5
Noxious Weeds		X				X				X				Y	V-6

*Comments*

**V-1:** The No-Action Alternative would not directly affect the vegetative communities through harvest treatments; it would indirectly affect the timber stands with a trend towards more shade tolerant trees, continued mortality, and reduced growth. Cumulatively, other timber sales on the Stillwater Unit have been trending toward advancing timber stands to their DFC.

**V-2:** The Action Alternative would harvest 2.5 to 3 MMbf over 576 acres of treatment area and would be treated with prescriptions including Sanitation Harvest with Commercial Thin, Commercial Thin, Shaded Fuel Break, Seed Tree with Reserves, and Clearcut with Reserves. Proposed harvest units would harvest poor form decadent trees and thin the vigorous trees throughout all size classes in these areas to increase stand health and resilience.

Treatments would result in cover type changes toward DFC in the project area.

The Action Alternative would reduce current mixed conifer, lodgepole pine, and subalpine fir cover types by 65 acres, 72 acres, and 1 acre respectively, transitioning them into 94 acres of western larch/Douglas-fir, 3 acres of Douglas-fir, 31 acres of western white pine, and 9 acres of Ponderosa pine cover types. Western larch, Douglas-fir, and western white pine would be planted to help assure this transition.

Approximately 166 acres would be converted, following regeneration, to the 0-to 39-year age class from stands over 40 years old by implementing Seed Tree with Reserves and Clearcut with Reserves treatments. The remaining 410 acres would remain in the 40-to-149 year age class.

**V-3:** Although the potential for ignition of a wildfire would continue to exist following treatment, the proposed treatments would limit the fire intensity under most circumstances. The proposed treatments would create interconnected openings, resulting in wider spacing of dense stands and trees as well as reducing the amounts of understory trees with boughs that extend to the ground and act as ladder fuels which can carry fires into the crowns of the forest. The success of aerial and ground attacks on wildfires would potentially be improved because fires would most likely burn through and remain in the understory, rather than climbing into the overstory and moving through the upper canopy.

**V-4:** DNRC uses the minimum criteria for number and age of large live trees and stand basal area as described by Green et al. (1992) to identify old-growth stands on State trust lands. In

the project area, there are 86 acres of old growth, of which approximately 34.7 acres, (0.2% of Stillwater Unit's old-growth acres) is proposed for harvest. The Stillwater State Forest currently has 15,423 acres of old-growth, representing 12% of the Stillwater lands. Four additional timber sales are proposing harvest units in old growth. Cumulatively, these proposed sales, including MollyWood Timber Sale, would reduce the amount of old growth to 14,810 acres. Given these treatments, old growth on the Stillwater would be reduced to 11.5%.

**V-5:** No harvest would occur within 250' feet of Molly Lake which is well outside crested shieldfern's ecological foot print. Since most of the rare plants identified reside near wetlands and, as this project has limited harvest treatments in riparian management zones, the risk of impacts to plants and habitat is low. Further protection would be implemented by following the mitigations listed below.

**V-6:** Soil disturbances from road work and logging equipment could increase the amount and distribution of noxious weeds in the project area. Several mitigations listed below would lessen any impacts to the area.

***Vegetation Mitigations:***

- Implement High Standard Hazard Reduction practices for 100' inside unit boundaries on harvest units that are within 1,000 feet of structures.
- If any of the listed sensitive plants are found during this project period, then harvesting operations would be diverted from those locations and further reviewed by DNRC and plant specialists.
- Mitigation measures for noxious weed control include washing equipment before entering the site, sowing grass seed on roads after road maintenance and harvesting (ARM 36.11.445) and applying herbicide on spots of weed outbreaks along roadways including areas behind road closures. This would minimize the spread and continued prevalence of noxious weeds in the project area.
- Additional mitigation measures for noxious weed control include annual weed spraying and monitoring on the Woods Lake Road and associated spurs.

## **SOIL DISTURBANCE AND PRODUCTIVITY**

**Soil Disturbance and Productivity Existing Conditions:** According to the *Soil Survey of Flathead National Forest Area, Montana* (Martinson and Basko 1998) eight landtypes have been identified in the project area (103, 10-5, 23-8, 23-9, 26C-8, 26C-9, 28-7 and 78). All the landtypes are generally considered to have a moderate susceptibility to surface erosion. Harvest units within the project area are located on landtypes 23-8, 26C-8, and 28-7. All landtypes have a low to moderate susceptibility to compaction which can lower the productivity of the soil.

Past harvesting has occurred on most of the project area and proposed harvest area. Approximately three percent of the proposed harvest acres have had timber management activity in the last 20 years, however approximately 66 percent of the project area has been harvested during the last 60 years. During field reconnaissance, visual estimates of impacted area within previously harvested sites is less than 10 percent. This includes skid trails and landings.

Soil Disturbance and Productivity	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>No-Action</b>														
Physical Disturbance (Compaction and Displacement)	X				X					X				
Erosion	X				X					X				
Nutrient Cycling	X				X					X				
Slope Stability	X				X				X					
Soil Productivity	X				X					X				
<b>Action</b>														
Physical Disturbance (Compaction and Displacement)		X				X				X			Y	S-1
Erosion		X				X				X			Y	S-1
Nutrient Cycling		X				X				X			Y	S-2
Slope Stability	X				X				X					
Soil Productivity		X				X				X			Y	S-3

*Comments:*

- S-1 Past monitoring on DNRC timber sales from 1988 to 2011 has shown an average of 11.3 percent soil impacts due to compaction, displacement or severe erosion across all parent materials. Seventeen monitoring sites had soil textures (gravelly silt loam) similar to the areas proposed for harvest in this project. Stratifying the results by soil texture that are similar to the majority of the proposed harvesting shows an average of approximately 14.3 percent of the harvest areas impacted from erosion, displacement or severe compaction on ground-based harvesting operations. (DNRC 2011).
- S-2 Coarse woody debris would be left on-site in volumes recommended to help maintain soil moisture and forest productivity, generally in the 15 to 20 tons per acre range for habitat types found in the harvest locations. Because coarse woody debris would be left on site in amounts similar to other productive stands with similar habitat types, and fine debris removal would be maintained as much as practicable, the risk of measurable adverse direct or indirect impacts to nutrient cycling would be low.
- S-3 By designing the proposed harvesting operations with soil-moisture restrictions, season of use, and method of harvesting, the risk of unacceptable long-term impacts to soil productivity from compaction and displacement and nutrient pool losses would be low.

*Soil Mitigations:*

ARM 36.11.422 (2) and (2)(a) state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure that the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the following BMPs are considered appropriate and, would be implemented during harvesting operations:

- 1) Limit equipment operations to periods when soils are relatively dry, (less than 20 percent), frozen, or snow-covered to minimize soil compaction and rutting, and

- maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- 2) On ground-based units, the logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) would not be used unless impacts can be adequately mitigated. Regardless of use, these trails may be closed with additional drainage installed, where needed, or grass-seeded to stabilize the site and control erosion.
  - 3) Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive displacement or erosion. Based on site review, short, steep slopes may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline, and skidding from more moderate slopes of less than 40 percent.
  - 4) Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrently with operations.
  - 5) Slash disposal: Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent, unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Consider disturbance incurred during skidding operations to, at least, partially provide scarification for regeneration.
  - 6) Retain 15 to 20 tons of large woody debris (depending on habitat type) and a feasible majority of all fine litter following harvesting operations. On units where whole tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

#### **WATER QUALITY AND QUANTITY:**

The risk of measurable cumulative impacts is based upon the low amount of harvest proposed in relation to the 6<sup>th</sup> code watershed. In addition, stream channel stability was reviewed for this project and past projects in the area.

**Water Quality and Quantity Existing Conditions:** The project area is located in the Stillwater River-Hellroaring Creek watershed which is a 6th-code watershed also referred to as a HUC (Hydrologic Unit Code). This HUC encompasses approximately 22,673 acres of land that drains to the Stillwater River and numerous small streams (named and unnamed) that are connected to the Stillwater River either by surface flow or groundwater. Many of the streams have discontinuous surface flow. Precipitation in this HUC ranges from 20 inches in the lower elevations surrounding the Stillwater River to approximately 50 inches near the top of the watershed along Stryker Ridge.

The Rock Creek watershed is a 2,296-acre watershed contained within the Stillwater River-Hellroaring Creek HUC. This stream flows in a general north-to-south direction from Stryker Ridge to the Stillwater River. Field reconnaissance of channel conditions verified previous

analysis reports noting that stream channels in this watershed are quite stable with limited evidence of channel movement (DNRC 2005; DNRC 2007; DNRC 2012).

Water Quality & Quantity	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>No-Action</b>														
Water Quality		X				X				X				WQ-1
Water Quantity	X				X					X				WQ-2
<b>Action</b>														
Water Quality		X				X				X				WQ-1
Water Quantity		X				X				X				WQ-2

*Comments:*

**WQ-1:** Approximately 576 acres would be harvested using conventional ground-based methods, and approximately 348 ECA (Equivalent Clearcut Acres) would be generated from these activities in the Stillwater River-Hellroaring Creek 6th code watershed. This level of harvest would be expected to increase the current annual water yield less than one percent. Approximately 121.8 ECA would be generated from 197 acres of harvest in the Rock Creek watershed which would result in a direct annual water yield increase of 1.0 percent and a cumulative increase of 6.1 percent. This level of increase would be expected to have a low risk of low impacts to channel conditions. The threshold of concern has been set at 12 percent for this watershed.

**WQ-2:** During a review of BMP effectiveness, including stream buffer effectiveness, Raskin et.al. (2006) found that 95 percent of erosion features (disturbed soil) greater than 10 meters (approximately 33 feet) from the stream did not deliver sediment. His findings indicated that the main reasons stream buffers are effective include 1) keeping active erosion sites away from the stream, and 2) stream buffers may intercept and filter runoff from upland sites if the runoff is not concentrated in gullies or similar features (Raskin et al 2006).

Because BMPs would be implemented during timber-harvesting and road maintenance operations, a low risk of low cumulative impacts to water quality and beneficial uses would be expected.

*Water Quality & Quantity Mitigations:* Follow all applicable Forestry BMPs to minimize the risk of sediment delivery to streams.

**FISHERIES:**

Evaluation of the impacts on the No-Action and Action Alternatives include **direct, secondary and cumulative** impacts on fisheries.

**Existing Conditions:** Eastern brook trout are the most abundant species found in streams within the project area although many of the streams area not fish-bearing. Westslope cutthroat trout may be present in the lower reach of Rock Creek which is adjacent to the project area. A thorough discussion of fisheries habitat parameters can be found in the Ewing Central Timber Sale Checklist Environmental Analysis (DNRC 2013).

**No-Action:** No direct or indirect impacts would occur to affected fish species or affected fisheries resources beyond those described in Fisheries Existing Conditions. Cumulative effects (other related past and present factors; other future, related actions and any impacts described in Fisheries Existing Conditions) would continue to occur.

**Action Alternative (see Fisheries table below):**

Fisheries	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>Action</b>														
Sediment		X				X				X			Y	F-1
Flow Regimes		X				X				X			N	F-2
Woody Debris		X				X				X			Y	F-3
Stream Shading		X				X				X			Y	F-3
Stream Temperature		X				X				X			Y	F-3
Connectivity	X				X					X			Y	F-4
Populations	X				X					X			N	F-5

*Comments:*

**F-1:** See *Water Quality and Water Quantity* section above.

**F-2:** See *Water Quality and Water Quantity* section above.

**F-3:** Total Riparian Management Zone (RMZ) harvest proposed is 11.8 acres. As described in the Montana DNRC Forested Trust Lands Habitat Conservation Plan Final EIS (DNRC 2010), a no-harvest zone of 50 feet immediately adjacent to Class 1 streams would be expected to retain a level of stream shading similar to pre-harvest conditions. The RMZ buffers proposed under this alternative would maintain all the trees within 50 feet of Class 1 streams and lakes and remove a maximum of 50 percent of the merchantable trees in the remaining RMZ width. Therefore, stream shading post-project is expected to maintain a low risk of increasing stream temperatures due to timber harvesting. Additionally, the RMZ would continue to provide recruitable woody debris into the stream for fisheries habitat.

**F-4:** Nine stream crossings in the project area were reviewed for fish connectivity. Three of the four sites that provided partial passage are located on Highway 93. Two crossings were reviewed and are considered as non-fish bearing; one crossing needs further review to determine fish presence/absence and the remaining two sites pass all life stages of fish.

**F-5:** The most prevalent species in the project area is the non-native eastern brook trout. No changes to populations or species composition would be expected from this proposal.

*Fisheries Mitigations:* Follow all applicable Forestry BMPs to minimize the risk of sediment delivery to streams.

**References**

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- DNRC 2011. DNRC update to the Compiled Monitoring Report. Includes data from 1988 through 2011. Unpublished. Prepared by J. Schmalenberg, Forest Management Bureau, Missoula, MT.
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## **WILDLIFE**

**Wildlife Existing Conditions:** The Project Area consists primarily of southwest facing slopes ranging from 3,200 to 3,600 feet in elevation. Approximately 51% of the Project Area consists of mature stands (>9 inches dbh and ≥40% canopy cover), 1% of the Project Area consists of recently harvested stands (<10 years) with limited tree cover, and the remaining acres consist of pole and sapling stands. The understory in the mature stands is composed primarily of beargrass, buffaloberry, snowberry, Oregon grape, as well as prince's pine in the cooler stands. High densities of snowshoe hares were observed in the southeast portion of the Project Area adjacent to cedar stands. Pine marten, black bear, grizzly bear, elk, deer, and mountain lion sign was observed in the area as well. Cumulative effects analysis areas (CEAAs) incorporate lands near the Project Area and include an 8,355-acre area (Medium CEAA) for small animals like pileated woodpeckers and a 31,060-acre area (Large CEAA) for animals that travel across larger areas such as lynx. Additional information on CEAAs and analysis methods are available upon request. All impacts would be additive to any proposed or ongoing activities in the CEAAs although DNRC is not aware of any such activities (*USFS 2020*).

**No-Action:** None of the proposed activities would occur. In the short-term, no changes to the amounts, quality, or spatial arrangement of mature forested habitat would occur. In the long-term and in the absence of natural disturbance, habitat availability would increase for species preferring mature connected forests while habitat availability would decrease for species preferring young, open stand types.

**Action Alternative (see Wildlife table below):**

Wildlife	Impact												Can Impact be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>Threatened and Endangered Species</b>														
<b>Grizzly bear</b> <i>(Ursus arctos)</i> Habitat: Recovery areas, security from human activity		X				X				X			Y	WI-1
<b>Canada lynx</b> <i>(Felix lynx)</i> Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone		X				X				X			Y	WI-2
<b>Sensitive Species</b>														
<b>Bald eagle</b> <i>(Haliaeetus leucocephalus)</i> Habitat: Late-successional forest within 1 mile of open water	X				X				X					
<b>Black-backed woodpecker</b> <i>(Picoides arcticus)</i> Habitat: Mature to old burned or beetle-infested forest	X				X				X					
<b>Coeur d'Alene salamander</b> <i>(Plethodon idahoensis)</i> Habitat: Waterfall spray zones, talus near cascading streams	X				X				X					
<b>Columbian sharp-tailed grouse</b> <i>(Tympanuchus Phasianellus columbianus)</i> Habitat: Grassland, shrubland, riparian, agriculture	X				X				X					
<b>Common loon</b>	X				X				X					

Wildlife	Impact												Can Impact be Mitigated?	Comment Number	
	Direct				Secondary				Cumulative						
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High			
<i>(Gavia immer)</i> Habitat: Cold mountain lakes, nest in emergent vegetation															
<b>Fisher</b> <i>(Martes pennanti)</i> Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian		X				X				X				Y	WI-3
<b>Flammulated owl</b> <i>(Otus flammeolus)</i> Habitat: Late-successional ponderosa pine and Douglas-fir forest	X				X					X					
<b>Gray Wolf</b> <i>(Canis lupus)</i> Habitat: Ample big game populations, security from human activities	X				X					X				Y	WI-4
<b>Harlequin duck</b> <i>(Histrionicus histrionicus)</i> Habitat: White-water streams, boulder and cobble substrates	X				X					X					
<b>Northern bog lemming</b> <i>(Synaptomys borealis)</i> Habitat: Sphagnum meadows, bogs, fens with thick moss mats	X				X					X					
<b>Peregrine falcon</b> <i>(Falco peregrinus)</i> Habitat: Cliff features near open foraging areas and/or wetlands	X				X					X					
<b>Pileated woodpecker</b> <i>(Dryocopus pileatus)</i> Habitat: Late-successional ponderosa pine and larch-fir forest			X				X				X			Y	WI-5
<b>Townsend's big-eared bat</b> <i>(Plecotus townsendii)</i> Habitat: Caves, caverns, old mines	X				X					X					
<b>Wolverine</b> <i>(Gulo gulo)</i>	X				X					X					

Wildlife	Impact												Can Impact be Mitigated?	Comment Number	
	Direct				Secondary				Cumulative						
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High			
Habitat: Alpine tundra and high-elevation boreal forests that maintain deep persistent snow into late spring															
<b>Big Game Species</b>															
<b>Elk</b>			X				X			X				Y	WI-6
<b>Whitetail</b>	X				X				X						
<b>Mule Deer</b>			X				X			X				Y	WI-6
<b>Other</b>															
<b>Old-growth</b>			X				X			X				Y	WI-7

*Comments:*

**WI-1 Grizzly bear** – Approximately 446 acres of visual screening would be affected by the proposed activities (36% of existing habitat in the Project Area; 2% in the Large CEAA). Of these acres, approximately 263 acres (22% of habitat in the Project Area; 1% in the Large CEAA) would be treated with seed tree with reserves or clearcut treatments and would not provide visual screening post-harvest. However, post-harvest 62% of the Project Area and 69% of the Large CEAA would provide visual screening for bears, indicating that the availability of screening would not be limited. Approximately 1 mile of temporary road would be constructed, but these roads would be closed post-harvest and road density would not change. Buffaloberry which is a preferred bear food was present in many of the harvest units and may increase after canopy cover is removed considering that it is negatively related to conifer cover (*Denny and Nielsen 2017*). Preferred bear habitat in the Project Area includes riparian habitat associated with Rock Creek, Spring Creek, and other area lakes. These areas likely provide good spring foraging habitat for bears which are often observed in this area. To mitigate for potential adverse effects, timing restrictions would be applied from April 1 – June 15 or June 30 depending upon the location of the harvest unit to provide security for grizzly bears in the spring. Harvest units were designed such that no point within seed tree with reserves and clearcut units would be greater than 600 feet to hiding cover. Additionally, visual screening would be retained between open roads and seed tree and clearcut harvest units to reduce the potential of human-bear conflicts and displacement of bears from important habitat.

**WI-2 Canada lynx** – Approximately 555 acres (40% of existing habitat in the Project Area; 3% of existing habitat in the Large CEAA) would be impacted by the proposed timber sale. Approximately 263 of these acres (19% of existing habitat in the Project Area; 1% of existing habitat in the Large CEAA) would not retain sufficient structure to continue providing suitable habitat for lynx post-harvest. However, depending upon sapling growth rate, the harvest units could become suitable lynx habitat in 10-15 years. The remaining acres would be treated with commercial thin or sanitation treatments and would retain greater densities of conifers. These acres would remain suitable for lynx use, although tree density and habitat quality would be reduced considering that these areas would support fewer snowshoe hares, the primary prey of lynx. Landscape connectivity would be reduced, but corridors would remain including a corridor along Spring and Rock Creeks. Additionally, 72% of the Project Area and 69% of the CEAA would be suitable for lynx use after the timber sale is implemented indicating that habitat would remain well-connected. To reduce adverse effects of the proposed harvest on lynx, habitat

characteristics important to lynx and snowshoe hares would be retained. Dense patches of advanced regeneration would be retained within lynx winter forage habitat. Additionally, coarse woody debris would be retained in accordance with DNRC Forest Management Rules (*ARM 36.11.414*) and retention of downed logs  $\geq 15$ -inch diameter would be emphasized.

**WI-3 Fisher** - Approximately 256 acres of suitable fisher habitat would be affected by the proposed activities (34% of fisher habitat available in the Project Area; 7% of habitat in the Medium CEAA). Approximately 158 of these acres (21% of fisher habitat available in the Project Area; 4% of habitat in the Medium CEAA) would be treated with seed tree with reserves and clearcut treatments and would not be suitable post-harvest due to low amounts of mature conifer cover. Approximately 12 acres of riparian fisher habitat would be harvested. Approximately 41% of the Project Area consists of lodgepole and other forest types not preferred by fishers, somewhat limiting the suitability and connectivity of the area for fishers. However, overall connectivity would remain intact across the Project Area due to the scattered distribution of seed tree and clearcut harvest units and the retention of a wide corridor along Rock Creek. Additionally, 37% of the Project Area and 41% of the Medium CEAA would remain suitable for fisher use post-harvest. The greatest impacts to connectivity would occur near harvest unit 10, which would reduce connectivity running parallel to the slope. To reduce potential adverse effects on fishers, at least 2 large snags and 2 large snag recruitment trees per acre ( $>21$  inches dbh) would be retained (*ARM 36.11.411*). These snags are important habitat features that provide resting and denning sites for fishers (*Olson 2014*).

**WI-4 Gray wolves** - Wolves may use habitat near the Project Area. Disturbance associated with timber sales at den and rendezvous locations can adversely affect wolves; however, timing restrictions would apply if den or rendezvous sites are documented (*ARM 33.11.430(1)(a)(b)*).

**WI-5 Pileated woodpeckers** – The proposed activities would affect 138 acres of suitable pileated woodpecker habitat (38% of habitat available in the Project Area; 7% of habitat in the Medium CEAA). These acres would be treated with seed tree with reserves and clearcut treatments reducing mature canopy cover from 40-70% to 5-15% and causing these stands to become unsuitable for pileated woodpecker use post-harvest. Approximately 15% of the Project Area and 22% of the CEAA would be suitable for pileated woodpecker use after the timber sale was implemented indicating that habitat would remain fragmented and would not be well-connected. To reduce potential adverse effects on pileated woodpeckers, at least 2 large snags and 2 large snag recruitment trees per acre ( $>21$  inches dbh) would be retained and all snags cut for safety reasons would be left in the harvest unit (*ARM 36.11.411*).

**WI-6 Big game** – The proposed activities would reduce thermal cover on potential mule deer and elk winter range (*DFWP 2008*). Recent research indicates that mule deer winter nearby and they may also winter in the Project Area (*E. Lula DFWP personal communication January 2020*) since habitat types, aspect, and elevations of these areas are similar. Approximately 331 acres of thermal cover (42% of thermal cover available in the Project Area; 10% of habitat in the Medium CEAA) would be impacted by the timber sale. After logging, 239 of these acres (31% of thermal cover available in the Project Area; 7% of habitat in the Medium CEAA) would no longer provide suitable thermal cover due to low 5-25% canopy cover in the overstory. The remaining acres are anticipated to retain  $>40\%$  mature canopy cover post-harvest and would continue providing thermal cover, albeit at a reduced habitat quality. Approximately 35% of the Project Area and 37% of the CEAA would continue providing thermal cover after the timber sale is implemented. Some forage plants preferred by mule deer including juniper and snowberry were present in the Project Area and logging may increase the availability of these plants, increasing foraging opportunities when snowpack is low. Logging activities could displace elk and deer for up to 3 years and may displace animals during critical winter periods depending

upon the timing of activities. Snowmobiling and cat skiing activity occurring on the Ewing Road system north of the Project Area may also contribute to cumulative effects relative to displacement and disturbance depending upon which areas are used by wintering animals. Overall connectivity would be reduced; however, habitat corridors along creeks would be retained, allowing wintering animals to move between patches of thermal cover.

### **WI-7 Old-growth -**

The proposed harvest would affect 35 of the 86 acres of old-growth in the Project Area (41% of old-growth in the Project Area). These stands would be treated with seed tree with reserves and commercial thin treatments and post-harvest these stands would not meet old-growth standards (*Green et al. 1992*). An additional 4 acres of old-growth (39 acres total) would be removed in the Medium CEAA due to fragmentation of a small 4-acre stand caused by logging in the Project Area (6% of old-growth impacted in the Medium CEAA; 695 acres of existing old-growth on DNRC-lands in the CEAA). No patches >80 acres would be removed, which provide higher quality habitat for wildlife species that prefer a larger patch size (*Harger 1978*). After the harvest, approximately 3% of the Project Area would be considered old-growth and 8% of the CEAA would be considered old-growth. To reduce adverse impacts on wildlife associated with old-growth at least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh) would be retained and all snags cut for safety reasons would be left in the harvest unit (*ARM 36.11.411*).

#### *Wildlife Mitigations:*

- If a threatened or endangered species is encountered, consult a DNRC biologist immediately. Similarly, if undocumented nesting raptors or wolf dens are encountered within ½ mile of the Project Area, contact a DNRC biologist.
- Contractors will adhere to food storage and sanitation requirements as described in the timber sale contract. Ensure that all attractants such as food, garbage, and petroleum products are stored in a bear-resistant manner.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per *ARM 36.11.444(2)*.
- Close roads and trails to the extent possible after logging is complete to reduce illegal entry into the Project Area.
- Restrict public access at all times on restricted roads that are opened for harvesting activities; signs should be used during active periods and a physical closure must be used during inactive periods (nights, weekends, etc.).
- Retain visual screening between open roads and all seed tree and clearcut harvest units.
- To protect grizzly bears during the spring, prohibit commercial forest management activities from April 1- June 30 in EA Units 1, 2, 3a-3d, 4, 5a, 5b, 6, 8, 15, and 16. Prohibit commercial forest management activities from April 1- June 15 in EA Units 7, 9, 10, 12, 13, and 14. However, note that logging is allowed in the spring period within 100 feet of any open road in the Project Area. No timing restrictions are required for EA Unit 17.
- Retain patches of advanced regeneration of shade-tolerant trees as per *LY-HB4 (USFWS and DNRC 2010)* in all harvest units except for EA Units 3d, 6, 8, 14, and 17 where winter foraging habitat is not present.
- Retain at least 2 snags and 2 snag recruits per acre >21 inches dbh or the next available size class, particularly favoring western larch and Douglas-fir for retention. If snags are cut for safety concerns, they must be left in the harvest unit.
- Retain 15-20 tons per acre of coarse-woody debris and emphasize retention of 15-inch diameter downed logs aiming for at least one 20-foot-long section per acre.

**Wildlife References:**

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Harger, R. 1978. Old-growth forests: managing for wildlife. Missoula, MT.

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USFWS, and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II., U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado and Montana Department of Natural Resources and Conservation, Missoula, MT.

**AIR QUALITY:**

Air Quality	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>No-Action</b>														
Smoke	X				X					X				A-2
Dust	X				X				X					
<b>Action</b>														
Smoke		X				X				X			Y	A-1, A-2
Dust		X				X				X			Y	A-3

*Comments:*

**A-1:** 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 portions of Flathead County. Currently, this project is not within any impact zones.

***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. Within the typical column of biomass burning, the chemical toxics are: Formaldehyde, Acrolein, Acetaldehyde, 1,4 Butadiene, and Polycyclic Organic Matter.

Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana DEQ and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. One specific concern is that the town of Radnor is located in a low area on the landscape and diurnal breezes in the evening tend to cause the smoke to drift down towards Radnor and the heavy smoke is often trapped during weather conditions that cause inversions. Past experiences with burning in this drainage has resulted in smoke trapped under the inversion for many evenings and mornings until the inversion breaks.

DNRC proposes to only burn when ventilation and smoke dispersion are favorable for several days beyond ignition. Piles in this area would be covered with pile-covering paper to assure dry fuels during ignition. Numerous small slash piles, especially in the units proposed for 'cut-to-length' operations, would be constructed and these should burn well while good smoke dispersion is still occurring. Some large landing piles would also be constructed, covered, and burned but these tend to burn for several days following ignition and the smoke created from these would likely get trapped under inversions. Where opportunities exist, DNRC would encourage chipping and grinding of these piles although access is often limited for trucks required to haul chips.

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

**A-2:** Burning that may occur on adjacent properties or from other DNRC projects in combination with the proposed action could potentially increase cumulative impacts to the local airshed. However, because DNRC would burn only on approved days as determined by the Montana DEQ and Montana/Idaho Airshed group, cumulative impacts to air quality due to slash pile burning associated with the proposed action would also be expected to be minimal.

**A-3:** Under the Action Alternative, dust may be generated by log hauling activities during dry conditions; less dust would be generated if harvested during the winter.

***Air Quality Mitigations:***

- Burning activities within the project area would be of brief duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion, as determined by the Montana DEQ and the Montana/Idaho Airshed Group.

- The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. DNRC would also follow Flathead County regulations for Air Quality. Thus, direct, secondary, and cumulative effects to air quality due to slash pile burning associated with the proposed action would be minimal.
- DNRC would cover portions of piles to assure there are dry fuels to effectively ignite the piles and assure increased consumption of the slash.
- DNRC would promote the opportunity to hire a business to chip the slash piles and haul those chips off site. However, not all piles would be accessible for this treatment.

**ARCHAEOLOGICAL SITES / AESTHETICS / DEMANDS ON ENVIRONMENTAL RESOURCES:**

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>No-Action</b>														
Historical or Archaeological Sites	X				X				X					ARCH-1
Aesthetics	X				X				X					
Demands on Environmental Resources of Land, Water, or Energy	X				X				X					
<b>Action</b>														
Historical or Archaeological Sites	X				X				X					ARCH-1
Aesthetics		X				X				X			Y	AEST-1
Demands on Environmental Resources of Land, Water, or Energy	X				X				X					

**Comments:**

**ARCH-1:** Scoping letters were sent to those Tribes that requested to be notified of DNRC timber sales. No response was returned that identified a specific cultural resource issue. A Class I (literature review) level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. The Class I search results revealed that no cultural or paleontological resources have been identified in the APE, but it should be noted that Class III level inventory work has not been conducted there to date.

Because the topographic setting and geology suggest a low to moderate likelihood of the presence of cultural or paleontologic resources, proposed timber harvest activities are expected to have no effect to Antiquities. No additional archaeological investigative work will be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

**AEST-1:** Aesthetic impacts were analyzed using ArcGIS tools, aerial photos, and visiting possible viewpoints. Visual aesthetic impacts from the proposed project would vary depending on the elevation and location of the vantage point, as well as surrounding topography and forest cover.

The gentle topography of the MollyWood Timber Sale project area precludes it from being a high-profile or highly visible area. Approximately 25 acres of harvest adjacent to US Highway 93 would be visible from the highway. Other portions of the harvest area may be visible in the distance from vantage points in the adjacent mountains. Small portions of harvest units would be visible to the private landowners adjacent to the north of the project area. Close-up views into harvest areas would be visible from open roads or by people walking on restricted roads.

At close range, standing within or adjacent to individual harvest units, the visual impact would be highest. Visual impacts would vary by prescription, from increased spacing of trees and small openings in areas of lesser harvest levels, to higher harvest level areas with open areas where individual scattered trees and clumps of trees, stumps and some logging slash would be visible.

Visual impacts would be greatest within the first few years after harvest. Over time, as the harvest areas regenerate, and the trees and brush grow larger, the visual distinction of the harvested areas will be lessened.

During harvest operations, noise may be discernable from private residences in the area causing low to moderate impact.

**Mitigations:**

- Timber sale design would minimize visual impacts by variably spacing both individual and clumps of retention trees in the units, and by retaining varying amounts of leave trees along some unit boundaries and open road systems.

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

- Spring Rock Environmental Assessment (1998), DNRC
- Point of Rocks Environmental Assessment (2005), DNRC
- Duck-to-Dog Environmental Assessment (2007), DNRC
- Mystery Fish Environmental Assessment (2012), DNRC
- Ewing Central Environmental Assessment (2013), DNRC

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## Impacts on the Human Population

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Evaluation of the impacts on the proposed action including **direct, secondary, and cumulative** impacts on the Human Population.

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<b>No-Action</b>														

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number	
	Direct				Secondary				Cumulative						
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High			
Health and Human Safety	X														
Industrial, Commercial and Agricultural Activities and Production	X														
Quantity and Distribution of Employment	X														
Local Tax Base and Tax Revenues	X														
Demand for Government Services	X														
Access to and Quality of Recreational and Wilderness Activities	X														
Density and Distribution of population and housing	X														
Social Structures and Mores	X														
Cultural Uniqueness and Diversity	X														
<b>Action</b>															
Health and Human Safety	X				X				X					Y	HUM-1, 4
Industrial, Commercial and Agricultural Activities and Production	X				X				X						
Quantity and Distribution of Employment	X				X				X						HUM-2
Local Tax Base and Tax Revenues	X				X				X						HUM-2
Demand for Government Services	X				X				X						
Access to and Quality of Recreational and Wilderness Activities		X			X				X					Y	HUM-3
Density and Distribution of population and housing	X				X				X						
Social Structures and Mores	X				X				X						
Cultural Uniqueness and Diversity	X				X				X						

**Comments:**

**HUM-1:** Mitigations have been developed for all log hauling to allow for safe travel on shared use of plowed roads during the winter season (see “Mitigations” below). The disturbance to users’ experience and health and human safety would be expected to be none or very low, and of short duration.

**HUM-2:** Due to the relatively small size of the proposed timber sale, no measurable direct, indirect, or cumulative effects would be likely.

**HUM-3:** General recreation in the project area would continue to be accessible by the public on open roads, and by foot traffic on restricted roads in the project area. Plowing of roads in the winter for access to the timber sale would change the current uses generally exercised on snow-covered roads over the short term causing a low level of effects to recreation.

**HUM-4:** Due to log trucks using an open State road, the disturbance to the users’ experience would be expected to be moderate, but of short duration.

**Mitigations:**

- Signs displaying location of harvest activities and logging would be installed.
- Continue to apply current road restrictions for the public.

**Locally Adopted Environmental Plans and Goals:** *List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.*

- None

**Other Appropriate Social and Economic Circumstances:**

**No-Action Alternative:** The No-Action alternative would not generate any return to the trust at this time.

**Action Alternative:** The timber harvest would generate approximately \$633,667 for the Common Schools Trust (K-12), and approximately \$90,441 in Forest Improvement (FI) fees would be collected for FI projects. This is based on a stumpage rate of \$32.79 per ton, multiplied by the estimated volume of tons. This stumpage rate was derived by comparing attributes of the proposed timber sale with the attributes and results of other DNRC timber sales recently advertised for bid. Costs related to the administration of the timber sale program are only tracked at the Northwestern Land Office (NWLO) 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, and revenue and costs are calculated Statewide and by the NWLO. From 2006 through 2014, revenue-to-cost ratio of the Northwestern Land Office was 2.07. This means that, on average, for every \$1.00 spent in costs, \$2.07 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.

**References**

DNRC 1996. State forest land management plan: final environmental impact statement (and appendixes). Montana Department of Natural Resources and Conservation, Forest Management Bureau, Missoula, Montana.

DNRC. 2010. Montana Department of Natural Resources and Conservation Forested State Trust Lands Habitat Conservation Plan: Final EIS, Volume II, Forest Management Bureau, Missoula, Montana.

**Does the proposed action involve potential risks or adverse effects that are uncertain but extremely harmful if they were to occur?**

No.

**Does the proposed action have impacts that are individually minor, but cumulatively significant or potentially significant?**

No.

### Environmental Assessment Checklist Prepared By:

**Name:** Aaron Shay, Pete Evans, and Mike McMahon

**Title:** Management Foresters and Forest Management Supervisor, Stillwater Unit

**Date:** February 21, 2020

## Finding

### Alternative Selected

Upon Review of the Environmental Assessment Checklist and attachments, I find the Action Alternative, as proposed, meets the intent of the project objectives as stated in **Type and Purpose of Action**.

The lands involved in this project are held by the State of Montana in trust for the support of specific beneficiary institutions and DNRC is required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X Section 11; and, 77-1-212 MCA).

The Action Alternative complies with all pertinent environmental laws, the DNRC SFLMP and HCP, and is based upon a consensus of professional opinion on limits of acceptable environmental impact. We received 6 comments on this project from the public and 1 comment from Montana Fish Wildlife & Parks during the scoping process. Their comments were addressed in the **Project Development** portion of this document.

In summary, I find that the identified adverse impacts will be controlled, mitigated, or avoided by the design of the project to the extent that the impacts are not significant. For these reasons and on behalf of DNRC I have selected the Action Alternative to be implemented on this project.

### Significance of Potential Impacts

After a review of the scoping documents and comments, project file, Forest Management Rules, SFLMP and HCP checklists, and Department policies, standards, and guidelines, I find all the identified resource management concerns have been fully addressed in this Environmental Assessment Checklist and its attachments.

Specific project design features and various recommendations by the resource management specialists will be implemented to ensure that this project will fall within the limits of environmental change. Taken individually and cumulatively, the proposed activities are common practices, and no project activities are being conducted on important unique or fragile sites. I find there will be no significant impacts to the human environments as a result of implementing the Action Alternative.

### Need for Further Environmental Analysis

EIS

More Detailed EA

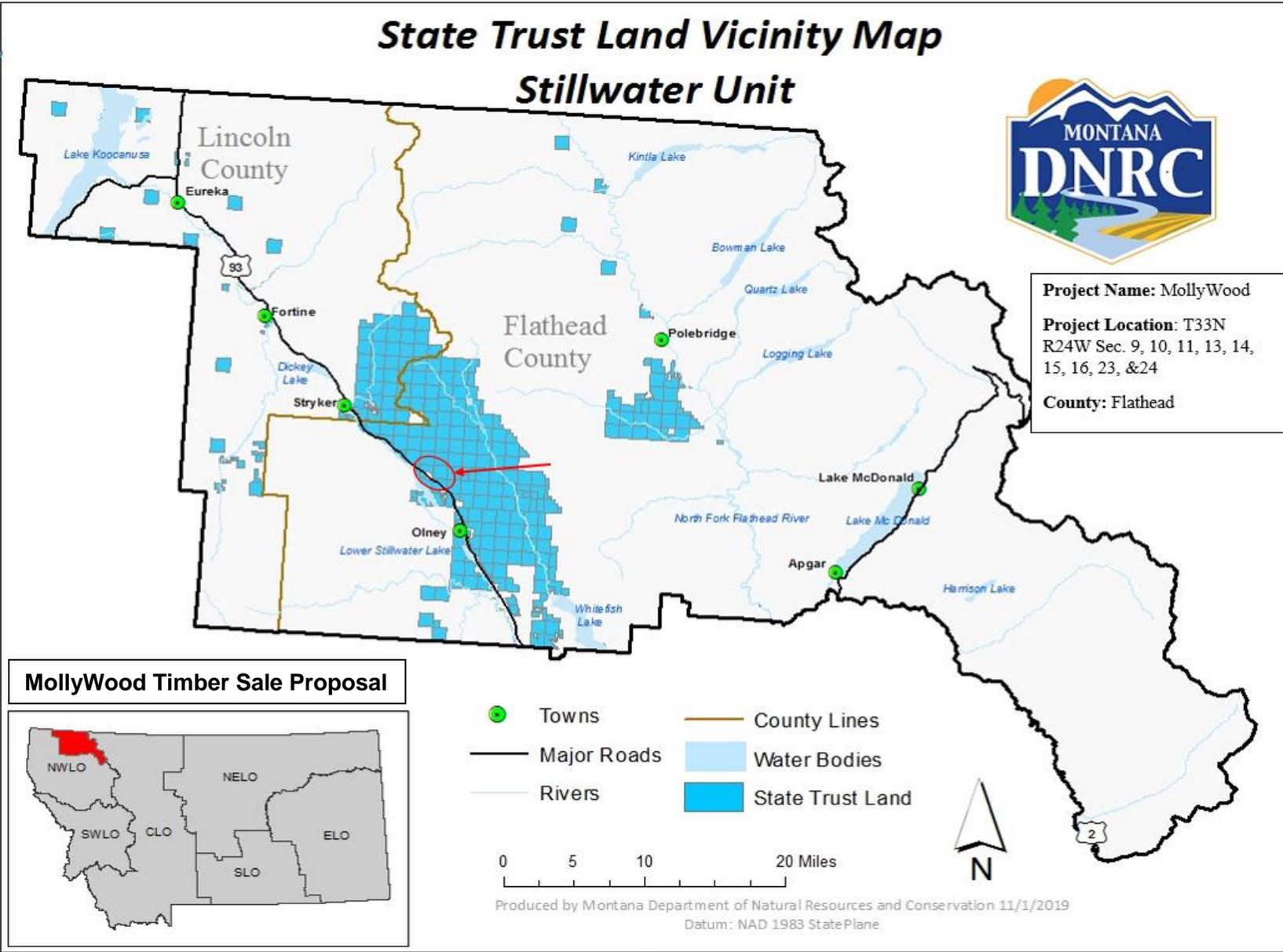
No Further Analysis

### Environmental Assessment Checklist Approved By:

**Name: Dave Ring**  
**Title: Stillwater Unit Manager**  
**Date: April 13, 2020**  
**Signature: /s/ David A. Ring**

## **Attachment A- Maps**

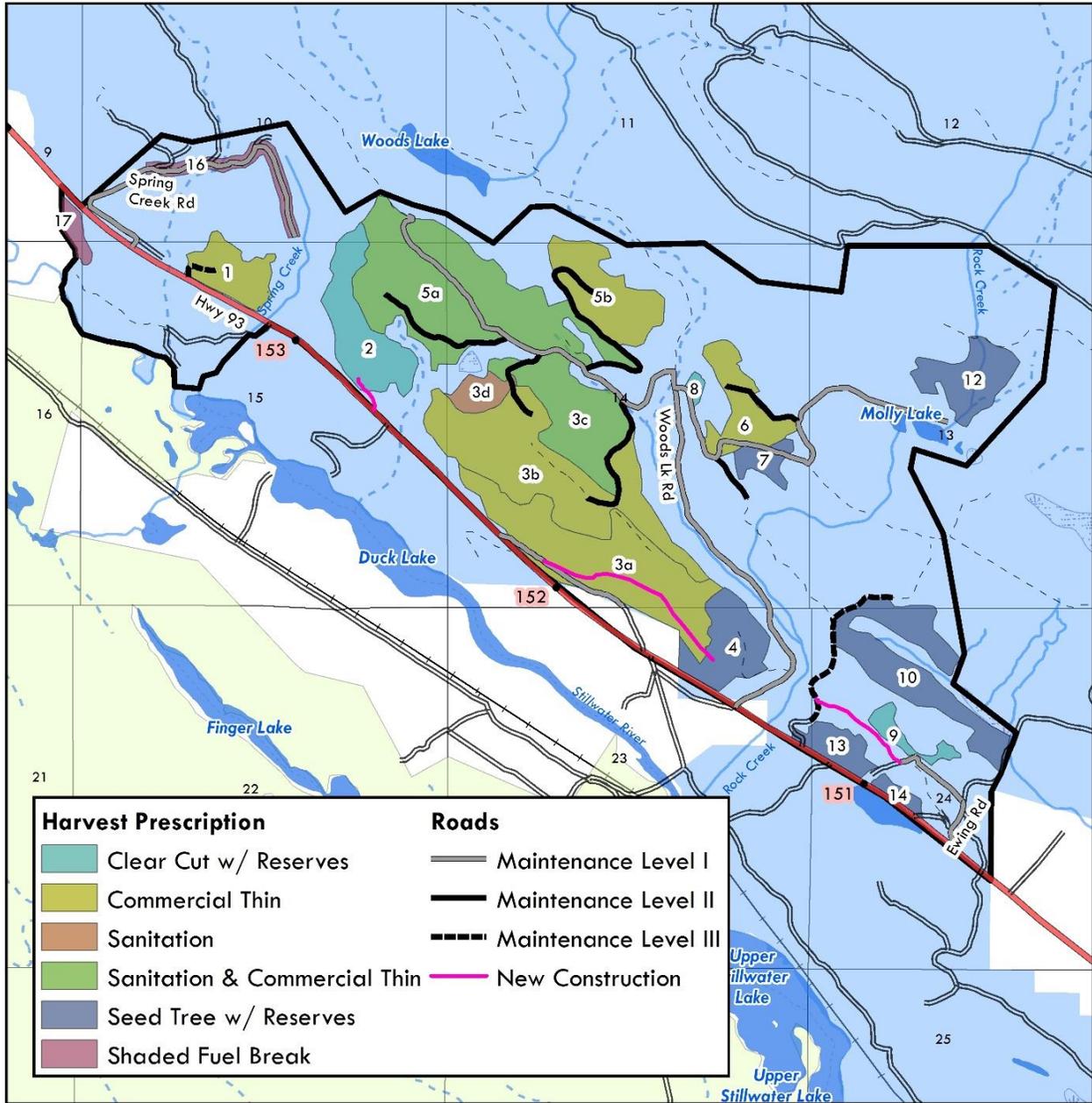
A-1: Timber Sale Vicinity Map



A-2: Timber Sale Harvest Units

## MollyWood Timber Sale

Sec. 9, 10, 11, 13, 14, 15, 16, 23, & 24  
 T33N R24W





Aaron R. Shay



1 in = 2,000 ft

March 2020



**Attachment B: Prescription Table**

**PRESCRIPTION TABLE**

Unit #	Est. acres & Mbf / acre	Cut total & Cut Mbf / ac	Prescription	Particulars involved in units
1	19 acres 4.5 Mbf/ ac	45 Mbf 2.5 Mbf/ ac	Commercial Thin	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- An old highway approach would have to be brought to standard and approximately 100' of road refurbished before hauling.</li> <li>- Old road prism enters into the unit. May be used as designated skid trail (up to 500').</li> <li>- Majority of unit has timber under 15" DBH with scattered large-diameter Western larch towards the northern part of the stand.</li> <li>- Thin the smaller merchantable timber to a 25' spacing while thinning the larger diameter (&gt;18" DBH) to 50'.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> </ul>
2	34 acres 12 Mbf/ ac	375 Mbf 11 Mbf/ ac	Clear Cut with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- A highway approach and approximately 500' of temp road would have to be constructed.</li> <li>- A significant amount of the overstory is dwarf mistletoe stricken western larch. The understory has a heavy stocking of grand fir regeneration.</li> <li>- Retain good form Douglas-fir and western larch.</li> <li>- All western larch showing signs of dwarf mistletoe would be harvested.</li> <li>- Douglas-fir growing on exposed south-west facing slopes would be retained for seed source and shade.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) would remain scattered for wildlife hiding cover throughout the harvest unit. Remaining seedlings/saplings would be slashed only leaving the most vigorous if available.</li> <li>- Machine pile and scarify.</li> <li>- Plant western larch and Douglas-fir.</li> </ul>

<p><b>3a</b></p>	<p>73 acres 7 Mbf/ ac</p>	<p>265 Mbf 3.5 Mbf/ ac</p>	<p>Commercial Thin</p>	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- Commercial Thin* the following species based on form and health                             <ul style="list-style-type: none"> <li>• Douglas-fir</li> <li>• Western larch</li> <li>• Lodgepole pine</li> <li>• Ponderosa pine</li> <li>• Western white pine</li> </ul> </li> <li>Thinning specifications                             <ul style="list-style-type: none"> <li>• Under 15" DBH at a 25' spacing</li> <li>• Over 15" to a 50' spacing</li> <li>• Cut all pulp and merchantable trees in the following list:                                     <ul style="list-style-type: none"> <li>○ Western larch displaying any signs of Dwarf Mistletoe</li> <li>○ Subalpine fir</li> <li>○ Engelmann Spruce</li> <li>○ Grand fir</li> <li>○ Cedar</li> <li>○ Unhealthy Douglas-fir (Specifications in Contract)</li> </ul> </li> </ul> </li> <li>*Based on the above specs, some group openings would be created</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Protect advanced regen for first 100' from open roads for wildlife hiding cover.</li> <li>- There are up to 10 acres of Equipment Restriction Zone (ERZ) due to low lying wet areas, rock, and slopes &gt;45% grade. Hand felling or winter operations are an option.</li> <li>- Harvest unit is adjacent to powerlines and private ground.</li> <li>- There would be a mandatory walk through with the Forest Officer on ground adjacent to private.</li> <li>- Due to the complexity of the felling, coordination would be required with Lincoln Electric.</li> </ul>
<p><b>3b</b></p>	<p>81 acres 7 Mbf/ ac</p>	<p>284 Mbf 3.5 Mbf/ ac</p>	<p>Commercial Thin</p>	<ul style="list-style-type: none"> <li>- Tractor harvest unit; mandatory Cut-to-Length (CTL) equipment.</li> <li>- Even-aged lodgepole is the dominant timber in this unit.</li> <li>- Thin from all size classes to a 20' spacing.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Protect advanced regen for first 100' from open roads for wildlife hiding cover.</li> </ul>

3c	42 acres 6 Mbf/ ac	168 Mbf 4 Mbf/ ac	Sanitation Cut with Commercial Thin	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- This stand has gone through multiple iterations of harvest for the last 80 years. What is left is sparse amounts of low-vigor trees in the overstory.</li> <li>Commercial Thin the following species based on age, form, and health                             <ul style="list-style-type: none"> <li>• Douglas-fir</li> <li>• Western larch</li> <li>• Lodgepole pine</li> <li>• Ponderosa pine</li> <li>• Western white pine</li> </ul> </li> <li>Thinning specifications                             <ul style="list-style-type: none"> <li>• Under 15" DBH at a 25' spacing</li> <li>• Over 15" to a 50' spacing</li> <li>• Cut all pulp and merchantable trees in the following list:                                     <ul style="list-style-type: none"> <li>○ Western larch displaying any signs of dwarf mistletoe</li> <li>○ Subalpine fir</li> <li>○ Engelmann spruce</li> <li>○ Grand fir</li> <li>○ Cedar</li> <li>○ Unhealthy Douglas-fir (specifications in contract)</li> </ul> </li> </ul> </li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Protect advanced regen for first 100' from open roads for wildlife hiding cover.</li> <li>- Slashing post-harvest</li> <li>- Retain vigorous advanced regen of all species favoring western larch and Douglas-fir.</li> <li>- Mechanical pile and scarify for natural regen and planting.</li> </ul>
3d	9 acres 1 Mbf/ ac	4.5 Mbf 0.5 Mbf/ ac	Sanitation Cut	<ul style="list-style-type: none"> <li>- Tractor harvest unit.</li> <li>- This stand was harvested in 2008. The stand did not regenerate.</li> <li>- Remove mistletoe infected western larch but retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Mechanical pile and scarify.</li> <li>- Interplant with Douglas-fir and western larch.</li> </ul>
4	26 acres 11 Mbf/ ac	234 Mbf 9 Mbf/ ac	Seed Tree with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit.</li> <li>- Retain 6-10 seed trees per acre.</li> <li>- Preference on western larch as seed tree. If there are none, leave the highest quality Douglas-fir.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Cut all western larch displaying signs of dwarf mistletoe.</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) would remain scattered for wildlife hiding cover throughout the harvest unit.</li> <li>- Approximately 5 acres of leave trees would be marked emulating a mixed-severity fire disturbance. This area would retain approximately 25 large trees per acre.</li> <li>- Post-harvest, the Unit will no longer meet old-growth standards.</li> <li>- Mechanical pile and scarify.</li> </ul>

5a	104 acres 6 Mbf/ ac	416 Mbf 4 Mbf/ ac	Sanitation Cut with Commercial Thin	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- This stand has gone through multiple iterations of harvest for the last 80 years. What is left is sparse amounts of low vigor trees in the overstory.</li> <li>- The understory will be commercial thinned focusing on removing shade tolerant species.</li> <li>Commercial thin the following species based on form and health               <ul style="list-style-type: none"> <li>• Douglas-fir</li> <li>• Western larch</li> <li>• Lodgepole pine</li> <li>• Ponderosa pine</li> <li>• Western white pine</li> </ul> </li> <li>Thinning specifications               <ul style="list-style-type: none"> <li>• Under 15" DBH at a 25' spacing</li> <li>• Over 15" to a 50' spacing</li> <li>• Cut all pulp and merchantable trees in the following list:                   <ul style="list-style-type: none"> <li>○ Western larch displaying any signs of Dwarf Mistletoe</li> <li>○ Subalpine fir</li> <li>○ Engelmann spruce</li> <li>○ Grand fir</li> <li>○ Cedar</li> <li>○ Unhealthy Douglas-fir (specifications in contract)</li> </ul> </li> </ul> </li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Retain vigorous advanced regen of all species favoring Western larch and Douglas-fir.</li> <li>- Protect advanced regen for first 100' from open roads for wildlife hiding cover</li> <li>- Slash sub-merchantable material.</li> <li>- Mechanical pile and scarify for natural regen and planting.</li> </ul>
5b	33 acres 6.5 Mbf/ ac	132 Mbf 4 Mbf/ ac	Commercial Thin	<ul style="list-style-type: none"> <li>- Tractor harvest unit; mandatory cut to length (CTL) equipment.</li> <li>- Even-aged lodgepole is the dominant timber in this unit.</li> <li>- Thin from all size classes to a 20' spacing.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Protect advanced regen for first 100' from open roads for wildlife hiding cover.</li> </ul>
6	24 acres 7 Mbf/ ac	120 Mbf 5 Mbf/ ac	Commercial Thin	<ul style="list-style-type: none"> <li>- Tractor harvest unit; mandatory CTL equipment.</li> <li>- Even-aged Lodgepole is the dominant timber in this unit.</li> <li>- Thin from all size classes to a 20' spacing.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> </ul>

<b>7</b>	8 acres 13 Mbf/ ac	96 Mbf 12 Mbf/ ac	Seed Tree with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- This stand has a high level of decadence. Diseases in all tree species makes it necessary to harvest the stand before it loses economic value. It is estimated that there will be over 35% defect.</li> <li>- Retain 6-10 seed trees per acre.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Retain all vigorous Douglas-fir in all size classes. Large Douglas-fir snag recruits would be used as a seed source.</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) would remain scattered for wildlife hiding cover throughout the harvest unit.</li> <li>- Mechanical pile and scarify.</li> <li>- Interplant western larch and western white pine.</li> </ul>
<b>8</b>	2 acres 7.5 Mbf/ ac	14 Mbf 7 Mbf/ ac	Clearcut with Reserves (Post & Pole)	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- Harvest only lodgepole. Retain all other tree species.</li> <li>- Protect seedlings and saplings in all species where possible.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre if available.</li> <li>- Natural regeneration.</li> </ul>
<b>9</b>	7 acres 6 Mbf/ ac	35 Mbf 5 Mbf/ ac	Clearcut with Reserves (Post & Pole)	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- Harvest only Lodgepole. Retain all other tree species.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre if available.</li> <li>- Protect seedlings and sapling in all species where possible.</li> <li>- Natural regeneration.</li> </ul>
<b>10</b>	45 acres 11 Mbf/ ac	360 Mbf 8 Mbf/ ac	Seed Tree with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit.</li> <li>- Retain 6-8 TPA with preference to western larch then healthy Douglas-fir.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Retain cull Western red cedar.</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) will remain scattered for wildlife hiding cover throughout the harvest unit.</li> <li>- Mechanical pile and scarify.</li> <li>- Interplant western larch.</li> </ul>
<b>12</b>	23 acres 11 Mbf/ ac	184 Mbf 8 Mbf/ ac	Seed Tree with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- Approximately 0.4 miles of road would be reclaimed post-harvest. Road prism exists but not indicated on Stillwater Block Transportation Plan.</li> <li>- Retain 4-6 TPA with preference to Western larch then healthy Douglas-fir.</li> <li>- Retain all vigorous Douglas-fir in all size classes.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre. Preference to large Western Red Cedar and Western Hemlock</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) will remain scattered for wildlife hiding cover throughout the harvest unit.</li> <li>- Mechanical pile and scarify</li> <li>- Interplant western larch.</li> </ul>

<b>13</b>	12 acres 10 Mbf/ ac	84 Mbf 7 Mbf/ ac	Seed Tree with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- In the southern half of the unit, the clipper operator may have to pack bundles of trees approximately 150' to ridge for skidding. If purchaser requests, a designated skid trail could be utilized for ~750' instead of packing trees to ridge.</li> <li>- Operations would be adjacent to powerlines and Highway 93; harvest trees that could reach powerline.</li> <li>- Retain 6-8 TPA with preference to western larch then healthy Douglas-fir.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Retain regen and advanced regen for the first 100' from the highway.</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) would remain scattered for wildlife hiding cover throughout the harvest unit.</li> <li>- Mechanical pile and scarify.</li> </ul>
<b>14</b>	4 acres 7 Mbf/ ac	16 Mbf 4 Mbf/ ac	Seed Tree with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit.</li> <li>- Operations would be adjacent to powerlines and Highway 93; harvest trees that could reach powerline</li> <li>- Retain 6-8 TPA with preference to western larch then healthy Douglas-fir,</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>- Retain regen and advanced regen for the first 100' from the highway.</li> <li>- Isolated "islands" of advanced regeneration (up to 1/10th acre) would remain scattered for wildlife hiding cover throughout the harvest unit.</li> <li>- Mechanical pile and scarify.</li> <li>- Ridge trail will be reclaimed post-harvest.</li> </ul>
<b>15</b>	11 acres 8 Mbf/ ac	44 Mbf 4 Mbf/ ac	Shaded Fuel Break	<ul style="list-style-type: none"> <li>- Tractor harvest unit</li> <li>- Retain larger-diameter trees at a 20-foot crown spacing,</li> <li>- Harvest/slash ingrowth trees,</li> <li>- Unit does not exceed 100' from the road.</li> </ul>
<b>16</b>	14 acres 6 Mbf/ ac	42 Mbf 3 Mbf/ ac	Shaded Fuel Break	<ul style="list-style-type: none"> <li>- Tractor harvest unit.</li> <li>- Retain larger-diameter trees at a 20-foot crown spacing,</li> <li>- Harvest/slash ingrowth trees.</li> <li>- Unit does not exceed 100' from the road.</li> </ul>
<b>17</b>	5 acres 8 Mbf/ ac	30 Mbf 6 Mbf/ ac	Clear Cut with Reserves	<ul style="list-style-type: none"> <li>- Tractor harvest unit.</li> <li>- A highway approach and approximately 500' of temp road would have to be constructed.</li> <li>- Operations adjacent to powerlines; remove trees threatening powerlines.</li> <li>- Most of this unit is a mature even-aged lodgepole pine stand.</li> <li>- Harvest most whitewood trees while retaining good form Douglas-fir.</li> <li>- Space all remaining trees in all size classes to a 30' crown spacing.</li> <li>- Retain a minimum of 2 snag recruits &gt;21" DBH and 2 of the largest snags per acre.</li> <li>-pile and scarify for natural regeneration</li> </ul>