Environmental Assessment Checklist

Project Name: Glen Mud Forest Management Project
Proposed Implementation Date: 6/20/2024
Proponent: Stillwater Unit, Northwest Land Office, Montana DNRC
County: Lincoln

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 **Glen Mud Forest Management Project**. The project is located 4.5 miles east of Eureka, MT (refer to Attachments vicinity map A-1 and project map A-2), and includes the following sections:

Table 1 – Project Trust Beneficiaries

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	**T36N R26W S16, 36**	**1,280**	**758**

Objectives of the project include:

- Capture economic value of dead and dying trees and promote the regeneration of healthier, more resilient trees.
- To contribute to the Montana DNRC's Sustained Yield.
- Generate revenue for the Common Schools Trust.
- Promote biodiversity on State ownership by managing for appropriate or desired stand structures and species compositions based on ecological characteristics such as topography, habitat type, disturbance regime, and unique characteristics.
- Create fuel breaks within the Wildland Urban Interface, especially near adjacent private land.
- Remove trees which could cause outages along Lincoln Electric Cooperative powerlines.

Proposed activities include:

Table 2 – Project Actions

Action	Quantity
Proposed Harvest Activities	# Acres
Clearcut	0.0
Seed Tree	0.0
Shelterwood	346.6
Selection	64.8
Old Growth Maintenance/Restoration	15.8
Commercial Thinning	255.5
Over Story Removal	9.6
Salvage	30.2
Sanitation	1.6
Total Treatment Acres	**724.0**
Proposed Forest Improvement Treatment	# Acres
Pre-commercial Thinning	32.6
Site preparation/scarification	386.0
Planting	0.0
Proposed Road Activities	# Miles
New permanent road construction	0.0
New temporary road construction	0.0
Road maintenance	8.2
Road reconstruction	0.0
Road abandoned	0.0
Road reclaimed	0.6
Other Activities	N/A

Duration of Activities:	June 16 – March 31 annually
Implementation Period:	June 2024 – Nov 2028

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.

Project Development

SCOPING:

- DATE:
  - April 26, 2022 – May 26, 2022
- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: https://dnrc.mt.gov/News/scoping-notices
  - Adjacent Landowners, Statewide scoping list, Tobacco Valley News
- AGENCIES SCOPED:
  - Montana Fish, Wildlife and Parks
  - US Forest Service, Kootenai National Forest
  - Montana Indigenous Tribal Organizations
- COMMENTS:
  - Project leader received six comments: one letter, three emails, two phone calls. One phone call was made to follow up on a received email. See table below for scoping comments and DNRC responses and where issues were analyzed for in the EA.

Table 3 – Scoping Comments Table

Issue/Concern	Result	Impacted Resources
Three local residents voiced concern about the overuse of clearcut and seed tree prescriptions.	This project is planned as an intermediate harvest and not as a regeneration harvest. The only units in which clearcut harvest prescriptions would be used are small areas (<5 acres) where evidence of insect and/or diseases are present.	- Aesthetics - Vegetation - Recreation
Two local residents requested that the state retain a 50-foot "no-cut buffer" along adjacent boundary lines.	Where unit boundaries included property lines, a minimal (5- to 10-foot) buffer would be included to prevent timber trespass.	- Aesthetics - Vegetation
One local resident inquired whether private property access roads would be shut down during the project.	Access easement roads on state property would not be closed during harvest operations, although delays may be caused by equipment operations.	- Human Population
A biologist from MT FWP requested retention of thermal cover to protect ungulate species present in the project area.	A patch of trees with a closed canopy layer would be retained in the project area to maintain thermal cover and wildlife security.	- Vegetation - Wildlife
One local resident inquired about how wildlife species would be affected by timber harvesting in the area.	All operations would be conducted to comply with the HCP, SFLMP, and ARMs. Wildlife Biologists, Hydrologists, and Fisheries Biologists	- Wildlife

	would be consulted in all phases of project planning, development, and implementation.	
A fisheries biologist from MT DNRC expressed concern that an existing culvert (CMP) on Mud Creek does not currently meet the requirements for all life-stages for fish as outlined in the HCP.	Fisheries biologist worked with USFWS to determine that this CMP replacement was not necessary at this time and will not be included in this project.	- Fisheries

DNRC specialists on the Interdisciplinary Team (ID Team) were consulted. The ID Team considered all the internal and external issues and determined that one action alternative could be developed and reviewed in this EA. The development of the project is described below and displays how concerns were addressed.

The ID Team includes several foresters and DNRC specialists:

- Victoria Forristal (Wildlife Biologist),
- Josh Harris (Hydrologist),
- Tony Nelson (Hydrologist),
- Patrick Rennie (Archeologist),
- Mike Anderson (Fisheries Biologist),
- Amy Gannon (Conservation Specialist).

Project Development:

- **Stand Prioritization**

  The following types of forest conditions focused foresters on considering treatments to improve stand health and stocking densities. These include:
  - Overstocked stands with poor tree vigor, health, and growth.
  - Areas of advanced insects/disease issues (stem rots/bark beetles).
  - Stands within the project area that contain heavy fuel loadings of both live and dead material.
- **Transportation Development**

  The ID team identified opportunities to update the transportation plan within the project area to reduce unauthorized off-road use/user created trails, meet safety standards / BMPs, and improve access for fire suppression activities is a main objective of the project.

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 https://dnrc.mt.gov/TrustLand/about/planning-and-reports.

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 2010). As a member, DNRC must submit a list of planned burns to the Airshed Group's Smoke Monitoring Unit describing the type of burn to be conducted, the size of the burn in acres, the estimated fuel loading in tons/acre, and the location and elevation of each burn site. The Smoke Monitoring Unit provides timely restriction messages by airshed. DNRC is required to abide by those restrictions and burn only when granted approval by the Smoke Monitoring Unit when forecasted conditions are conducive to good smoke dispersion.

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. Such activities include:

- Rehabilitation of unauthorized stream crossing site on Mud Creek

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 approximately 4.8-5.8 MMbf of timber using ground-based harvesting methods on 735 acres. Pre-commercial thinning of adequately regenerated stands would occur on 32.6 acres. Specific harvest unit data is provided in Attachment B – Glen Mud Forest Management Project Prescription Table. Using this table with the maps A-1 State Trust Lands Vicinity Map, and A-2, and A-3 Glen Mud Forest Management Project Harvest Maps, will provide additional detail for this project.

The following silvicultural prescriptions would be applied in the project area:

- Commercial Thin (255.5 acres) – Enhance growth and health of the existing stands.
- Shelterwood (346.6 acres) – Generate a new age class of seedlings while retaining sufficient overstory to provide shade.
- Overstory Removal (9.6 acres) – Remove upper canopy layer to promote growth of existing understory trees.
- Sanitation (1.6 acres) - remove dead and dying trees along roadside
- Old Growth Maintenance (15.8 acres) – Reduce stand density by targeting/removing shade tolerant species to promote resource use by remaining trees. Mimics effects of mixed-severity fire.
- Individual Tree Selection (64.8 acres) – Maintain a multi-aged structure by removing some trees in all size classes.
- Insect/Disease Salvage (30.2 acres) – Remove dead, damaged, and dying trees to recover economic value and reduce spread of existing infections/infestations.

In addition to the proposed harvest treatments, post-harvest actions will be required to successfully regenerate new stands and reduce fuel loading.

- Dispersed skidding or mechanical site preparation would create seedbeds for natural regeneration on 386.0 acres treated with shelterwood or salvage prescriptions.
- Weed spraying would occur on all associated roads with the proposed Glen Mud Forest Management Project.
- Road maintenance and BMP improvements would be performed on 8.2 miles of existing roads.
- High hazard fuels reduction would be implemented on 31 acres.

Recent State projects in the vicinity include the Glen Mud Barnaby Timber Sale (DNRC 2018) and the Glen Mud Salvage (DNRC 2020). The U.S. Forest Service has recently proposed the Glen Sinclair Fuels Management Project (USDA 2024) in the immediately adjacent area.

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:

The project area is dominated by Douglas-fir and western larch/Douglas-fir cover types. The desired future condition (DFC) for most of the project area directs management to promote seral species. Western larch/Douglas-fir is the DFC for most of the area, except for harvest unit 9 which has a desired cover type of Ponderosa Pine. The proposed treatments would move stands towards DFC by

removing low vigor Douglas-fir and reducing Douglas-fir stocking levels and improving resource availability releasing co-dominant and intermediate Western Larch.

Douglas-fir Beetle and Flatheaded wood borer are present within the project area and have caused pockets of mortality in Douglas-fir and western larch up to 7 acres in size scattered throughout the sale area. Several armillaria root rot pockets have been identified in Glen Lake section.

Table 4 – Project Unit Specifics

Harvest Unit	Habitat Group	Fire Regime	Current Cover Type	Age Class (years)	DFC	RX	Acres
1	Moderately cool and moist (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/Douglas Fir	Shelterwood Harvest	45.6
1 B	Moderately cool and moist (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/Douglas Fir	Shelterwood Harvest	31.9
1 E	Moderately warm and dry (westside)	Low-to-mixed	Douglas Fir	Old Growth	Western Larch/Douglas Fir	Old Growth Management	15.8
2	Moderately warm and dry (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/Douglas Fir	Shelterwood Harvest	57.1
3	Moderately cool and moist (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/Douglas Fir	Shelterwood Harvest	128.1
4	Moderately warm and dry (westside)	Low-to-mixed	Douglas Fir	40-99	Western Larch/Douglas Fir	Shelterwood Harvest	56.2
5	Moderately warm and dry (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/Douglas Fir	Shelterwood Harvest	84.8

6	Moderately warm and dry (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/ Douglas Fir	Selection	7.7
7	Moderately cool and moist (westside)	Low-to-mixed	Western Larch/Douglas Fir	100-149	Western Larch/Douglas Fir	Commercial Thinning	183.3
7s	Cool and moist (westside)	Low-to-mixed	Mixed conifer	150-199	Western Larch/Douglas Fir	Salvage	19.2
8s	Moderately cool and moist (westside)	Low-to-mixed	Western Larch/Douglas	100-149	Western Larch/Douglas Fir	Salvage	3.2
8	Moderately cool and moist (westside)	Low-to-mixed	Western Larch/Douglas Fir	100-149	Western Larch/Douglas Fir	Commercial Thinning	40.3
9	Moderately warm and dry (westside)	Low-to-mixed	Western Larch/Douglas Fir	100-149	Ponderosa Pine	Overstory Removal	9.6
10	Moderately cool and moist (westside)	Low-to-mixed	Western Larch/Douglas Fir	100-149	Western Larch/Douglas Fir	Salvage Harvest	7.7
11	Moderately cool and moist (westside)	Low-to-mixed	Douglas Fir	100-149	Western Larch/Douglas Fir	Selection	31.9
12	Moderately cool and moist (westside)	Low-to-mixed	Western Larch/Douglas Fir	100-149	Western Larch/Douglas Fir	Selection	1.6

Fire Hazard/Fuels: Forest fuels are generally arranged in two primary manners in the project area.

- In decadent areas of increased fuel loading, pockets of dead and/or dying Douglas-fir (DF) are present throughout the upper canopy. The lower canopies are dominated by DF seedlings and saplings of low and moderate vigor. Dense thickets of dead and overcrowded DF seedlings have increased the vertical continuity of ladder fuels.

- In stands managed in the past two decades, most fuels are not continuous horizontally or vertically. Multiple canopy layers of DF, ponderosa pine (PP), and western larch (WL) are generally vigorous and have not shown evidence of impacts from insect or disease outbreaks.
- Fire group types that occur in this project include fire group 6 moist Douglas-fir which typically has variable to mixed severity fires, fire group 7 cool habitat types dominated by lodgepole pine which typically have infrequent to stand replacing fire severities, and fire group 9 moist lower subalpine which typically infrequent to mixed severity fires.

Insects and Diseases: Consultation with Forest Pest Management Program specialist identified root disease and insect infestations in the project area. The presence of armillaria was confirmed by the presence of mycelial fans in DF, and wood borers (*Phaenops drummondi*) and Douglas-fir beetles (*Dendroctonus pseudotsugae*) were identified within 2 miles of the project area.

Sensitive/Rare Plants: No threatened or endangered plant species were encountered or identified in the project area during field reconnaissance. Though some species of concern may still occur in the area, they were not observed during reconnaissance or fieldwork. 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.

Noxious Weeds: In the project area, the following noxious weeds have been observed: spotted knapweed *(Centaurea stoube)*, Canada thistle *(Cirsium arvense)*, oxeye daisy (L*eucanthemum vulgare)*, orange hawkweed *(Hieracium aurantiacum)*, dalmatian toadflax *(Linaria dalmatica)*, houndstongue *(Cynoglossum officinale)*, and St. Johnswort *(Hypericum perforatum)*.

Alternative Impacts (see Vegetation table below):

Table 5 – Vegetation Table

Vegetation	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Current Cover/DFCs	x				x				x					
Age Class	x				x				x					
Old Growth	x				x				x					
Fire/Fuels	x					x				x				
Insects/Disease	x				x				x					
Rare Plants	x				x				x					
Noxious Weeds	x				x				x					
Action														
Current Cover/DFCs		x				x				x			**yes**	**v-1**
Age Class		x				x				x			**yes**	**v-1**
Old Growth		x				x			x				**yes**	**v-2**
Fire/Fuels		x				x				x			**yes**	**v-3**

Vegetation	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Insects/Disease		x				x				x			yes	v-4
Rare Plants	x				x				x				yes	v-5
Noxious Weeds		x				x				x			yes	v-6

V-1: VEGETATIVE COMMUNITY – This proposal includes timber harvest on 735 acres to remove between 4.8-5.8 MMBF. These are the proposed treatments of the action alternative:

- 10 acres of mixed ponderosa and Douglas Fir stand would be treated with an overstory removal. The treatment would remove over mature Douglas Fir in the overstory, while leaving mature Ponderosa Pine in the overstory better suited to the rocky/dry Southwest aspect. The stands age class would be altered to less than 39 years old, the stand being dominated by vigorous young Ponderosa and Doulas Fir saplings and seedlings.
- 8 acres of powerline right of way will be treated with a hazard tree selection harvest to remove potentially hazardous trees that are tall enough to hit the powerlines and lean in the direction of Lincoln Electric Cooperative lines.
- 32 acres would be salvage-logged. The treatment would remove dead and dying Douglas-fir and western larch. Older low vigor Douglas-fir and western larch would be removed, moving these stands from 100-150 to 40-99 age class.
- 685 acres would be altered to comply with desired future conditions. In the units where shelterwood, commercial thinning, individual selection and old growth maintenance are proposed, no change to age class would occur since trees from all canopy layers would be both retained and removed.

V-2: OLD GROWTH – MT DNRC proposes to treat 16 acres of verified Old Growth Forest stands within the project area with an old growth maintenance silvicultural prescription. This treatment would retain the stands old growth attributes according to the Green et. al. criteria for Westside Old Growth Type 4, including retention of large live trees, snags, and coarse woody debris. The treatment would target the removal of shade tolerant species and low-vigor Douglas-fir and Western larch, create small (1 to 3-acre) canopy gaps for seral regeneration and reduce tree density to improve vigor and growth. Insect and disease pockets will also be targeted for removal within the stand.

Cumulatively there are 14,422.2 acres of old-growth on the Stillwater Unit and following this and other planned harvest activities on the Unit, there would be an estimated 14,402.2 acres of old-growth, representing 11.18% of the area under jurisdiction of the Stillwater Unit. No acres would be removed from Old Growth status.

V-3: FOREST FUELS - Dense multi-storied stands exist throughout the project area which contain ladder fuels due to the existing blowdown and understory ingrowth. These ladder fuels could increase fire intensity and activity, potentially allowing a wildfire to spread into the overstory canopy. These

areas have been identified for treatment to reduce some of the danger to nearby residents. Following the shelterwood treatment and slash hazard reduction proposed in Units 1 and 2, the potential for stand replacing wildfire would be reduced (see vegetation mitigations below).
Forest Fuels Mitigations:

- Units with a boundary within 1,000 feet of a residence would be treated to comply with High Hazard Fuel Reduction standards.
- Existing blowdown and slash would be trampled with equipment to promote decay.
- Post-harvest thinning would reduce horizontal and vertical continuity.

V-4: INSECTS and DISEASES – The project will decrease the number of trees per acre which will reduce competition for soil water and nutrients among leave trees. Treatments will also aim to remove stagnated low vigor dominates while promoting the most vigorous intermediate and co-dominate trees in the stand.

V-5: RARE PLANTS- No Rare plants have been Identified within the project area during surveys. If listed rare/sensitive plants are found during this project period, then harvesting operations would be diverted from the plants and further reviewed by DNRC and plant specialists.

V-6: NOXIOUS WEEDS - Noxious weeds are present along open and closed roads within the project area. Further soil disturbance and logging equipment activity could increase the amount and distribution of noxious weeds in the project area although with implementation of vegetation mitigations listed below the increase in populations and location would be lessened.
Noxious Weeds mitigations:
To limit weed establishment and propagation, the following measures would be implemented:

- Require all tracked or wheeled equipment to be cleaned of noxious weeds prior to beginning project operations.
- Control the spread of noxious weeds with pre– and post- emergent herbicide treatments on established weed populations.
- Require prompt vegetation seeding of all disturbed roadside sites. Roads used and closed as part of this proposal would be reseeded and reshaped to prevent motorized use.

SOIL DISTURBANCE AND PRODUCTIVITY:

Soil Disturbance and Productivity Existing Conditions: Timber harvesting in the proposed project area has been ongoing since the 1950s. Less than 15% of soils are impacted from past entries where ground-based yarding was done.

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		
No-Action														
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**					
Action														
Physical Disturbance (Compaction and Displacement)		**X**				**X**				**X**			**Y**	**S-1**
Erosion		**X**				**X**				**X**			**Y**	**S-2**
Nutrient Cycling	**X**				**X**				**X**					
Slope Stability	**X**				**X**				**X**					
Soil Productivity		**X**				**X**				**X**			**Y**	**S-3**

Comments:

S-1: Based on DNRC soil monitoring on similar soils with a similar harvest intensity, approximately 15.9% of area may be in an impacted condition (DNRC, 2006). This level is below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the *SFLMP*, and well within the 20-percent impacted area established as a level of concern in the *SFLMP (DNRC 1996)*. This level translates to a low risk of low direct, secondary and cumulative impacts to soil physical disturbance. In addition, approximately 0.35 miles of existing low standard road would be de-constructed and rehabilitated, reducing the area of impacted soils in the southwest portion of the Mud Creek parcel.

S-2: Low impacts to soil erosion are possible due to exposure of bare soil during yarding and skidding operations. Risk of erosion would be mitigated by implementing all applicable BMPs to harvesting activities.

S-3: Soil productivity would be impacted by the use of ground-based machinery to yard timber. As stated in comment S-1, levels of ground disturbance are expected to be less than 15.9% with roads included, which is well below the range analyzed for in the EXPECTED FUTURE CONDITIONS section of the SFLMP, and well within the 20-percent impacted area established as a level of concern in the SFLMP (DNRC 1996). This level translates to a low risk of low direct, secondary and cumulative impacts to soil productivity.

Soil Mitigations:

- Limit equipment operations to periods when soils are relative-ly dry, (less than 20 percent), frozen, or snow-covered to minimize soil compaction and rutting and maintain drain-age features. Check soil moisture conditions prior to equipment start-up.
- The logger and sale administrator would agree to a skidding plan prior to equipment opera-tions. 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.
- Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive displacement or erosion.
- Maintain skid trails at 20 percent or less of the harvest unit acreage. Provide for drainage on skid trails and roads concurrently with operations.
- Leave 12-25 tons of coarse woody debris per acre in harvest units.
- 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 45 percent unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jack-pot burning on the steeper slopes.
- Compliance with Forestry Best Management Practices (BMP's), Streamside Management Zone (SMZ) laws, Montana DNRC Forested Trust Lands HCP and applicable DNRC Forest Management Administrative Rules.

WATER QUALITY AND QUANTITY:

Potential cumulative effects to water quality and quantity were deemed low due to the limited area of proposed harvest activity and no proposed riparian harvesting.

Water Quality and Quantity Existing Conditions: Past activities in and around the proposed project area include timber management, agriculture, and home site development. These activities have led to reductions in forest canopy cover, and construction of roads. In 2017, the Gibraltar Fire burned a substantial amount of acreage in the upper Mud Creek watershed, above DNRC ownership. This loss of canopy cover may lead to increases in water quantity depending on weather and how the watershed reacts.

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		
No-Action														
Water Quality	X				X				X					
Water Quantity	X				X				X					
Action														
Water Quality		X				X				X			Y	WQ-1
Water Quantity		X				X				X			Y	WQ-2

Comments:

WQ-1: All requirements found in ARM 36.11.301-313, and ARM 36.11.421-427 would be implemented, where applicable. In addition, all applicable forest management BMPs would be implemented. In addition, 0.35 miles of existing low standard road would be de-constructed in the Mud Creek section, reducing the risk of sediment delivery. These measures would minimize any potential risk of sediment delivery to a stream or draw and leave a low risk of direct, secondary or cumulative impacts to water quality.

WQ-2: There is a very low risk of the proposed project affecting water quantity. Vegetation removal can impact water use and snowpack distribution in harvested areas. The proposed project would harvest timber from approximately 767 acres. In an approximately 17,511-acre watershed with wetlands and ponds to store and ameliorate changes in flow, the proposed harvest represents approximately 6% of the watershed area in harvesting. This presents a very low risk of measurable impacts to water quantity from the proposed harvesting.

Water Quality & Quantity Mitigations:

- Avoid use of ground-based equipment in the bottoms of draws to reduce risk of scour, compaction or routing of surface runoff in draws.

- Implement all applicable BMPs, HCP commitments, and SMZ Law rules.

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.

FISHERIES:

Fisheries Existing Conditions:

Existing fisheries populations in the project area are found in Table F-1 (DNRC 2024, MFWP 2024). Fisheries habitat in the immediate project area is limited to Mud Creek in S36 and Sinclair Creek in S16. Mud Creek is a first-order tributary to Therriault Creek. Stream discharge is largely captured by the Glen Lake just downstream from the western boundary of S36, minimizing downstream connection to Therriault Creek and subsequently the Tobacco River. Mud Creek flows east-west for approximately 0.75 miles entering S36, the stream then loses channel definition and scour for approximately 500 feet through a wet meadow. Stream flow reinitiates approximately 500 feet upstream from the existing forest road crossing on Mud Creek. No fish were observed during field surveys upstream from the subsidence of discharge. Project activities potentially impacting Sinclair Creek would be limited to timber hauling on county roads, during which basic maintenance would be applied to mitigate impacts of timber haul.

Road maintenance would occur on up to 8.2 miles of road in the project area, and timber hauling would occur on 6 perennial stream crossings on the haul route. Of the existing road in the project area, 92 percent currently meet Forestry BMPs. One existing crossing on Mud Creek limits fish passage during periods of low flow but provides passage during periods of moderate to high flow for adult fish. One unimproved ford is present in the lower reach of Mud Creek in S36 which is likely contributing sediment at levels exceeding the natural range.

Riparian timber stands in the project area include 44.5 acres, all of which is in saw-timber size class. The upper portion of Mud Creek was impacted during the Gibraltar Fire in 2017, burning approximately 5 percent of the total RMZ acreage, with 2 percent burning at stand replacement levels.

Table 8 - Fisheries populations present in the proposed Glen Mud Forest Management Projects project area.

Watershed	Species	Origin	Occupied Stream Miles		Fish Passage Barriers
			Watershed	Project Area	
Therriault Creek	Westslope cutthroat trout	Native	11.3	0.0	0
	Bull trout		11.3	0.0	0
	Mountain whitefish		1.6	0.0	0
	Sculpin spp.		8.1	0.0	0
	Longnose dace		1.1	0.0	0
	Eastern brook trout	Introduced	13.6	0.0	0
	Rainbow trout		9.0	0.0	0
	Rainbow x Westslope hybrid		11.3	1.1	1
Sinclair Creek	Westslope cutthroat	Native	0.0	0.0	0
	Bull trout		9.8	0.0	0
	Mountain whitefish		9.8	0.0	0
	Rainbow trout	Introduced	9.8	0.0	0
	Eastern brook trout		9.8	0.0	0

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):

Table 9 – Fisheries Table

Fisheries	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Sediment			X			X					X			F-1
Flow Regimes	X				X				X					
Woody Debris	X				X				X					
Stream Shading		X				X				X				F-2
Stream Temperature	X					X				X				F-2
Connectivity				X				X				X		F-3
Populations				X				X				X		F-4
Action														
Sediment		X			X					X			Y	F-5
Flow Regimes	X				X				X				N/A	
Woody Debris		X				X				X			Y	F-6
Stream Shading		X				X				X				F-6
Stream Temperature	X					X				X			Y	F-6
Connectivity				X				X				X	Y	F-3

Fisheries	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Populations				X				X				X	N	F-4

Fisheries Comments and Mitigations:

F-1: Sediment delivery is occurring at the unimproved ford in lower Mud Creek in S36.

F-2: Stream shade is likely reduced in the upper portion of Mud Creek due to burn severity during the Gibraltar Fire. This may be impacting stream temperature in the upper watershed. Recovery of riparian vegetation following disturbance has been shown to increase shade, and subsequently reduce warm stream temperatures within 10 – 15 years post-disturbance (DNRC 2022).

F-3: Fisheries connectivity is currently limited in Mud Creek at multiple locations. The stream is largely captured by the Glen Lake ditch downstream from S36, isolating the lower 3.7 miles from the confluence with Therriault Creek upstream to the ditch. The upper portion of Mud Creek has one road crossing CMP that provides fish passage during moderate discharge events to adult fish. The reach of Mud Creek between the Glen Lake ditch and the road crossing in S36 is approximately 0.8 miles, and the stream is intermittent approximately 500 feet upstream from the road crossing. Based on all of these factors, there are high existing impacts to fisheries connectivity. Given the hybridization observed in this stream, along with the intermittency upstream from the crossing and ditch capture downstream from S36, DNRC will invoke an allowance under the HCP for this crossing and leave it in place until a new structure is needed to maintain hydrological BMPs.

F-4: Native Westslope cutthroat and Bull trout would have historically occupied project area streams. Based on the current distribution and overlap between native and introduced species in the project area, there are high existing direct, indirect, and cumulative impacts to fisheries populations due to competition, predation, and hybridization (Leary et al. 1993, Kanda et al. 2002, Rieman et al. 2006). Project related activities would not result in any additional impacts to fisheries populations, with impacts remaining the same for both the No Action and Action Alternative.

F-5: All requirements found in ARM 36.11.301-313, and ARM 36.11.421-427 would be implemented, where applicable. In addition, all applicable forest management BMPs would be implemented. These measures would minimize any potential risk of sediment delivery to a stream or draw and leave a low risk of direct, secondary, or cumulative impacts to water quality. Improvement of surface drainage at the unimproved ford would result in a benefit to fisheries habitat through sediment reduction, reducing the moderate existing impact to a low overall impact.

F-6: Riparian timber harvest would follow HCP retention requirements in the managed portion of the RMZ. No harvest would occur within 50 feet of Mud Creek, and 50% of the merchantable timber would be retained from 51 feet to SPTH. Application of this variable harvest buffer is expected to minimize the risk of stream shade reductions resulting in significant changes to the thermal regime in Mud Creek.

Recruitment of large wood is not anticipated to be impacted based on harvest prescriptions, with the majority of LWD contribution occurring within 50 feet of the stream channel (Johnston et al. 2011).

Literature Cited:

DNRC. 2021*. Forested State Trust Lands Habitat Conservation Plan 5 - year monitoring report. 2017–2021.*

DNRC. 2022. *State Forest Land Management Plan Implementation Monitoring Report Fiscal Years 2017–2021*.

Johnston, N. T., S. A. Bird, D. L. Hogan, and E. A. MacIsaac. 2011. *Mechanisms and source distances for the input of large woody debris to forested streams in British Columbia, Canada*. Canadian Journal of Forest Research. 41(11): 2231–2246.

Kanda, N., R. F. Leary, and F. W. Allendorf. 2002. *Evidence of introgressive hybridization between bull trout and brook trout*. Transactions of the American Fisheries Society. 131: 772 – 782.

Leary, R. F., F. W. Allendorf, and S. H. Forbes. 1993. *Conservation genetics of bull trout in the Columbia and Klamath River drainages. Conservation Biology*. 7: 856 – 865.

Rieman, B. E., J. T. Peterson, and D. L. Myers. 2006. *Have brook trout (Salvelinus fontinalis) displaced bull trout (Salvelinus confluentus) along longitudinal gradients in central Idaho streams*. Canadian Journal of Fisheries and Aquatic Sciences. 63: 63 – 78.

Wildlife:

Wildlife Existing Conditions: The Project Area consists of two parcels separated by approximately 3 miles. The Project Area is 1,280 acres and is included in DNRC's Habitat Conservation Plan (*USFWS and DNRC 2010*). The Glen Lake parcel (T36N, R26W, section 16) is bordered on three sides by private residential developments. This parcel has approximately 1.7 miles of well-traveled open road running through it and approximately 1.5 miles of overhead powerlines that are primarily adjacent to the road corridor. The Glen Lake parcel is in close proximity to occupied homes and open roads; non-motorized recreational use of the parcel is moderate. There is evidence of firewood gathering and there is a low level of snowmobile use on this parcel. The Mud Creek section (T36N, R26W, section 36) is abutted by low-density houses on two sides and does not contain any open roads. Public non-motorized use is considerably lower than recreation levels in the Glen Lake parcel. Both parcels have short stretches of unauthorized road that are used by the public.

The Project Area contains 726 acres of mature forest stands (trees ≥9" dbh with ≥40% canopy closure), of which 28 acres are considered old-growth forest using Green et al (1992) standards. Approximately 185 acres in the Project Area consist of more open forest with trees ≥9" dbh, and 359 acres consist of recently harvested areas or younger, regenerating stands. The open road corridor encompasses approximately 10 acres in the Glen Lake parcel. Overhead powerlines run parallel to Sinclair Road and

there is an additional 0.1 mile powerline corridor from Sinclair Road to the northern boundary of the parcel. Over the last 30 years, 466 acres within the Project Area have been harvested under the Glen Mud Timber Sale and Mud Creek Limited Access Permit (*DNRC 2018*), and the Mud Creek II Timber Sale (*DNRC 1997*) some of these acres were treated twice during that time. Insects and disease are accelerating tree mortality in patches throughout the Project Area.

Cumulative effects analysis areas (CEAA) encompass lands near the Project Area and include the 12,430-acre Small CEAA for animals with smaller home ranges like pileated woodpeckers and flammulated owls, and a 52,898-acre Large CEAA for animals that travel across larger areas such as grizzly bears and big game. Ownership in the Large CEAA consists of 2.4% DNRC, 54.8% USDA Forest Service, and 42.4% private land. In 2017, the Gibralter Ridge wildfire burned approximately burned approximately 1,353 acres of the Small CEAA and 6,155 acres of the Large CEAA. Additional information on cumulative effects analysis areas and analysis methods are available upon request. Overall, the Project Area contains of variety of habitat conditions for native wildlife species.

No-Action Alternative: None of the proposed activities would occur. Forest insects and disease will likely continue to cause reduced growth and mortality in some trees. Openings in the forest may occur where susceptible trees die. An increase in stand-replacement wildfire risk would be anticipated as down wood accumulates. In the long-term, armillaria would persist at the site and habitat suitability for mature forest-associated species would remain similar or decline compared to current conditions.

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		
Threatened and Endangered Species														
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity		**X**				**X**				**X**			**Y**	**WI-1**
Lynx (*Felis lynx*) Habitat: SF hab. types, dense sapling, old forest, deep snow zone		**X**				**X**				**X**			**Y**	**WI-2**
Wolverine (*Gulo gulo*) Habitat: high elevation areas that retain high snow levels in late spring	**X**				**X**				**X**					**WI-3**
Yellow-billed cuckoo (*Coccyzus americanus*) Habitat: open cottonwood riparian forest with dense brush	**X**				**X**				**X**					**WI-3**

understories (Lake and Flathead counties)														
Sensitive Species														
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest within 1 mile of open water	**X**				**X**				**X**					**WI-4**
Black-backed woodpecker *(Picoides arcticus)* Habitat: Mature to old burned or beetle-infested forest	**X**				**X**				**X**					**WI-3**
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	**X**				**X**				**X**					**WI-3**
Fisher *(Martes pennanti)* Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian		**X**				**X**				**X**			**Y**	**WI-5**
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest		**X**				**X**				**X**			**Y**	**WI-6**
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	**X**				**X**				**X**					**WI-3**
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest			**X**				**X**			**X**			**Y**	**WI-7**
Fringed myotis (*Myotis thysanodes*)	**X**				**X**				**X**					**WI-3**

Habitat: low elevation ponderosa pine, Douglas-fir and riparian forest with diverse roost sites including outcrops, caves, mines														
Hoary bat (*Lasiurus cinereus*) Habitat: coniferous and deciduous forests and roost on foliage in trees, under bark, in snags, bridges		**X**				**X**				**X**			**Y**	**WI-8**
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	**X**				**X**				**X**					**WI-3**
Big Game Species														
Elk			**X**				**X**			**X**			**Y**	**WI-9**
Whitetail			**X**				**X**			**X**			**Y**	**WI-9**
Mule Deer			**X**				**X**			**X**			**Y**	**WI-9**
Moose		**X**				**X**				**X**			**Y**	**WI-9**
Other														
Mature Forest			**X**				**X**			**X**			**Y**	**WI-10**
Old Growth		**X**				**X**				**X**			**Y**	**WI-10**

Comments:

WI-1 Grizzly bear – The Project Area is comprised of 1,280 acres in grizzly bear non-recovery occupied habitat (*USFWS 1993, Wittinger 2002*). The proposed activities would alter approximately 757 acres (71.7% of available hiding cover in the Project Area) of grizzly bear hiding cover. Shelterwood, sanitation, and salvage prescriptions would remove hiding cover on 387 acres (37.1% of available hiding cover) in the Project Area. However, rolling topography and the retention of some regenerating conifers would continue to provide limited cover in some of these units. Commercial thin, old growth maintenance, overstory removal, individual tree selection and pre-commercial thinning treatments would reduce available hiding cover on an additional 361 acres (34.6% of available hiding cover). Retention of some sub-merchantable trees would increase the effectiveness of cover in these areas. Post-harvest, 656 acres, or 63.0%, of available hiding cover would remain in the Project Area. No new open roads would be built, but motorized use of existing open and restricted roads within the Project Area would increase during project implementation. Approximately 0.08 miles of unauthorized open road and 0.27 miles of restricted road would be obliterated, which would reduce illegal motorized use in these areas. Visual screening along existing open roads would be maintained where it is available. Any grizzly bears using the Project Area could be temporarily displaced by the proposed activities for up to three years. However, appreciable use of the Glen Lake parcel is not anticipated due to the number of surrounding home sites and lack of preferred bear habitats. To provide security for grizzly bears in the

spring, harvest activity timing restrictions would be applied from April 1 – June 15. The proposed harvest would reduce hiding cover in the Large CEAA from 63.8% to 63.0%; 33,352 acres of well-connected hiding cover would remain. Continued use of the area by grizzly bears is anticipated. Impacts to hiding cover and increased disturbance under the Action Alternative would be additive to recent and ongoing USDA Forest Service projects (Gibralter Ridge fire salvage, Galton Vegetation Management project), DNRC Glen Mud Timber Sale & Mud Creek Limited Access Permit and the 2017 Gibralter Ridge wildfire. However, the greatest risks to bears within the CEAA would remain human habitations and associated attractants that bring bears into conflict with people.

WI-2. Canada Lynx – Approximately 404 acres, or 59.5%, of available suitable lynx habitat would be impacted by the proposed harvest activities. Of these acres, 217 acres, or 32.0% of available habitat, would be treated with harvest prescriptions that would not retain enough conifer canopy cover to continue providing suitable lynx habitat post-harvest. Approximately 187 acres, or 27.5% of available habitat, would receive treatments that would reduce some habitat attributes but would overall continue to provide suitable lynx habitat. To ensure that forest structural attributes preferred by snowshoe hares remain following harvest, some dense patches of advanced regeneration would be retained within portions of lynx winter forage habitat within commercial harvest units. In pre-commercial thinning units, some small, shade tolerant trees would also be retained. Additionally, 12 to 25 tons/acre of coarse woody debris would be retained in accordance with DNRC Forest Management Rules (*ARM 36.11.414, except along boundaries with private property)* and retention of downed logs ≥15-inch diameter would be emphasized. The proposed activities could temporarily displace any lynx that might be using the area. Lynx habitat connectivity within the Project Area would be reduced, particularly in the Glen Lake section. However, appreciable use of the Glen Lake parcel is not expected due to surrounding home sites, interspersed unsuitable habitat types, reduced connectivity, and lower snow loads compared to more preferred habitat. Use of the Mud Creek parcel by lynx is more likely and habitat connectivity would overall be maintained in this parcel, however recent wildfire in adjacent lands has removed much of the suitable habitat in this part of the Large CEAA. Connectivity and habitat availability would be expected to improve over the next 10 years as these burned stands regenerate with conifers. After the proposed activities, suitable lynx habitat would be reduced from 60.5% to 60.1% of the Large CEAA, and 31,810 acres of suitable lynx habitat would remain. Disturbance/displacement and habitat alteration by the proposed DNRC activities would be additive to recent and ongoing USDA Forest Service projects (Gibralter Ridge fire salvage, Galton Vegetation Management project), DNRC Glen Mud Timber Sale & Mud Creek Limited Access Permit and the 2017 Gibralter Ridge wildfire.

WI-3. This species was evaluated, and it was determined that the Project Area lies outside of the normal distribution for the species, and/or suitable habitat was not found to be present.

WI-4. Bald Eagle – The Glen Lake and the Mud Creek parcels both fall within the home ranges of bald eagle territories (*MTNHP 2023*). The nest sites of the Glen Lake eagle pair and the Grave Creek Eagle pair are both nest over 1.5 miles from the proposed harvest. Homes and open roads are situated between the nest sites and the DNRC parcels. Appreciable use of the parcels by bald eagles would not be expected due to the lack of preferred habitat (e.g. lakes, meadows). Additionally, the number of home sites and open roads near the nests would suggest that these eagles are likely habituated to human disturbance in areas they are likely to forage.

WI-5. Fisher – The proposed activities would remove 112 acres, or 70.6%, of suitable fisher habitat available in the Project Area. Post-harvest, these acres would not be suitable for fisher use due to low canopy cover and low retention of mature trees. Connectivity of fisher habitat would be reduced in the Project Area, however a corridor along Mud Creek would remain intact through section 36. No new open roads would be built, but motorized use of existing open and restricted roads within the Project Area would increase during project implementation. Approximately 0.08 miles of unauthorized open road, and 0.27 miles of restricted road would be reclaimed, which would reduce access and the associated mortality risk from trapping. 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. In the Small CEAA, fisher habitat would be reduced by 3.2%, and 3,208 acres of suitable habitat would remain post-harvest. Considering the limited availability of large tracts of mature stands in the surrounding area, lack of fisher observations within the last 30 years (*MTNHP 2023, Krohner 2022*), and prevalence of dry ponderosa pine forest types, which are avoided by fishers (*Olson et al. 2014*), the likelihood of fishers using the Project Area or Small CEAA is low.

WI-6. Flammulated Owls – The proposed timber harvest would treat approximately 303 acres, or 78.9%, of available flammulated owl cover types in the Project Area. The proposed activities would remove 153 acres, or 39.9%, of potentially suitable habitat because stands would be too open for flammulated owl use post-harvest. However, harvest prescriptions on 140 acres (36.6 % of potentially suitable habitat) would reduce tree density, favor mature seral species and create more open conditions within the stand potentially beneficial to flammulated owls. To retain potential nesting trees for flammulated owls, at least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh) would be retained (*ARM 36.11.411*). The proposed harvest would treat 15.3% of the available flammulated owl cover types in the Small CEAA, and post-harvest 1,823 acres of flammulated owl cover types would remain. Most habitat patches within the Small CEAA are small and fragmented by unforested areas and private development where large snags for nesting are likely limited due to widespread firewood gathering on private property.

WI-7. Pileated Woodpecker – The proposed activities would affect 512 acres (66.8%) of available pileated woodpecker habitat in the Project Area. Approximately 458 of these acres (59.7% of available habitat in Project Area) would be treated with prescriptions that would reduce mature canopy closure to less than 40%, making these stands unsuitable for nesting pileated woodpeckers post-harvest. The other 54 treated acres would remain suitable habitat, but at a reduced quality due to the removal of mature trees. In total, 309 acres, or 24.1%, of the Project Area would remain as suitable habitat post-harvest. To reduce potential adverse effects on pileated woodpeckers, at least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh, or largest size class available) would be retained and all snags cut for safety reasons would be left in the harvest unit (*ARM 36.11.411*). Additionally, 12 to 25 tons/per acre of downed wood would be retained, with an emphasis on logs >15" diameter. The proposed activities would reduce pileated woodpecker habitat in the Small CEAA from 39.4% to 35.4%, and 4,402 acres would remain as moderately connected blocks of suitable habitat. Continued use of suitable habitat by pileated woodpeckers in the Small CEAA would be anticipated. Habitat alterations due to the proposed action would be additive to recent and ongoing USDA Forest Service projects (Gibralter Ridge fire salvage, Galton Vegetation Management project), DNRC Glen Mud Timber Sale &

Mud Creek Limited Access Permit and the 2017 Gibralter Ridge wildfire that burned approximately 1,353 acres of the Small CEAA.

WI-8. Hoary bat – The proposed activities would affect approximately 757 acres of potential hoary bat habitat. Hoary bats typically roost in tree foliage (*Bachen et al. 2020*) and if present they could be temporarily displaced by timber harvesting. Potential disturbance would only be expected from late May through September, when hoary bats are in Montana. After the conclusion of activities, continued use of harvested areas by hoary bats would be anticipated. At least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh, or largest size class available) would be retained in harvested areas and could provide roosting habitat.

WI-9. Big Game – The Project Area provides winter range habitat for white-tailed deer, mule deer, moose, and elk (*DFWP 2008*). The proposed harvest would impact 757 of these acres. High quality thermal cover for big game occurs where canopy closure is ≥60% and conifer branches are ≥19.7 feet (6 meters) tall. Marginal quality thermal cover includes areas where canopy closure is 40-60% and conifers are ≥6 meters tall. The proposed activities would remove 464 acres (66.5%) of high thermal cover and 238 acres (18.6%) of marginal thermal cover in the Project Area. The proposed treatments would result in canopy cover that would have little capacity to provide effective thermal cover and snow intercept post-harvest. Retaining healthy advanced regeneration and saplings where present would provide additional cover and increase thermal cover/snow intercept. Post-harvest, 234 acres of high-quality thermal cover and 62 acres of marginal thermal cover (total of 296 acres or 23.1% of the Project Area) would remain in the Project Area. This includes a 21-acre (1.6% of the Project Area) thermal cover retention patch comprised primarily of Douglas-fir in section 16. This patch would continue to provide thermal cover/snow intercept and habitat connectivity for big game. Overall, the Project Area would support some ungulate use during the winter, but the capacity of this habitat would be lowered due to reductions in thermal cover. Connectivity to thermal cover on adjacent lands would be reduced as large patches of mature forest would be removed. In the Large CEAA, high thermal cover/snow intercept would be reduced from 31.9% to 31.0%, and marginal thermal cover would be reduced from 19.3% to 18.8% as a result of the proposed activities.

Approximately 748 acres, or 71.7%, of hiding cover in the Project Area would be altered by the proposed harvest. Hiding cover would be removed on 387 acres and reduced on another 361 acres in the Project Area. Post-harvest, 656 acres (51.2% of Project Area) of hiding cover would remain in the Project Area. Retaining some regenerating conifers and sub-merchantable trees within the harvest units would increase the amount of available hiding cover, and rolling topography would continue to provide some cover and reduce sight distances. No new open roads would be built and visual screening along existing roads would be maintained where it is available. Grace Lane, a 0.08 miles unauthorized open road in section 16, and a restricted 0.27 miles of road in the southwest corner of section 36 would be obliterated during the proposed activities. This would reduce illegal public motorized access in these areas. Overall, the reduction in hiding cover could result in decreased security and increased mortality risk to big game species due to hunting, particularly in the Glen Lake parcel where open roads facilitate hunter access. The proposed activities would reduce hiding cover in the Large CEAA from 63.8% to 63.0%, with 33,352 acres of well-connected hiding cover remaining.

Impacts to hiding cover, security, and thermal cover/snow intercept under the Action Alternative would be additive to recent and ongoing USDA Forest Service & DNRC forest management projects,

development and fragmentation of private lands, and recent wildfire. Measurable big game population changes at the scale of the Large CEAA would not be expected because of the Action Alternative.

WI-10. Mature Forest /Old-growth–

The proposed action would alter approximately 526 acres of mature forest (72.4% of mature forest within the Project Area) with a reasonably closed canopy (≥40% canopy closure). Proposed activities would remove 469 acres, or 64.6%, of available mature forest within the Project Area. Canopy closure of mature trees on these acres would range from approximately 5-35%, and these stands would no longer be suitable for wildlife species preferring dense forest with more shaded canopies. However, habitat suitability for species utilizing younger stands and open forest with widely scattered mature trees would increase. Approximately 57 acres would be treated with prescriptions that would maintain mature forest attributes post-harvest. This includes 16 acres (56.4% of old growth in the Project Area) that would receive an old growth maintenance treatment and continue to meet old-growth standards post-harvest (*Green et al. 1992*). After the proposed activities, 257 acres (20.1% of Project Area) of mature forest, including 28 acres of old-growth forest, would remain in the Project Area and would continue to be suitable for wildlife that prefers closed canopy mature forest. No old-growth forest would be removed by proposed harvesting but old-growth habitat in the Project Area would remain uncommon (2.2% of Project Area) and isolated. The proposed activities would remove approximately 11.5% of existing mature forest in the Small CEAA and mature forest would remain on 3,324, or 29.2%, of Small CEAA. Connectivity of mature forest in the Project Area and the Small CEAA would be reduced, as large patches of mature forest would be removed by harvesting, particularly in section 16. Abundance and connectivity of old-growth forest within the Small CEAA is unknown except on DNRC lands. The proposed changes would be additive to recent and ongoing activities on private, USDA Forest Service and DNRC lands, as well as removal of mature forest by the 2017 Gibralter Ridge wildfire.

Wildlife Mitigations:

1. 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.
2. 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.
3. Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per *ARM 36.11.444(2)*.
4. Prohibit all harvesting-related motorized activities more than 100 feet from open roads from April 1 – June 15 per GB-NR3 (*USFWS and DNRC 2010*).
5. Retain visual screening along open roads to the greatest extent practicable.
6. No point in a unit with <25 TPA can be more than 600 feet to hiding cover or a topographic break, GB-NR4 (*USFWS and DNRC 2010*).
7. Retain small shade tolerant trees in pre-commercial thin units, LY-HB4 (*USFWS and DNRC 2010*).
8. Within commercial harvest units, retain patches of advanced regeneration of shade-tolerant trees as per LY-HB4 (*USFWS and DNRC 2010*).

9. Effectively close restricted roads and skid trails in the Project Area via a combination of gates, kelly humps, rocks, and stumps. Maintain public motorized restrictions on restricted and roads during and after harvest activities.
10. Retain at least 2 snags and 2 snag recruits per acre >21 inches dbh or the next largest available size class, particularly favoring ponderosa pine, western larch and Douglas-fir for retention. If snags are cut for safety concerns, they must be left in the harvest unit.
11. Retain 12-25 tons/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 LY-HB2 (*USFWS and DNRC 2010*).

Literature:

Bachen, D.A., A. McEwan, B. Burkholder, S. Blum, and B. Maxell. 2020. Accounts of Bat Species Found in Montana. Report to Montana Department of Environmental Quality. Montana Natural Heritage Program, Helena, Montana. 58 p.

DFWP. 2008. Maps of moose, elk, mule deer, and white-tailed deer distribution in Montana. *In* Individual GIS data layers. Available online at: https://gis-mtfwp.opendata.arcgis.com/

DNRC. 2018. Glen Mud Timber Sale Project Checklist Environmental Assessment. Montana Department of Natural Resources and Conservation; Stillwater Unit, Olney, MT.

DNRC. 1997. Mud Creek II Environmental Assessment. Montana Department of Natural Resources and Conservation; Stillwater Unit, Olney, MT.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old Growth Forest Types of the Northern Region. R-1 SES. USDA Forest Service, Northern Region, Missoula MT 60pp.

Krohner, J. M., Lukacs, P. M., Inman, R., Sauder, J. D., Gude, J. A., Mosby, C., Coltrane, J. A., Mowry, R. A. and J. J. Millspaugh. 2022. Finding fishers: determining fisher occupancy in the Northern Rocky Mountains. The Journal of Wildlife Management, 86(2): 1-20.

MTNHP. 2023. Natural Heritage Map Viewer. Montana Natural Heritage Program. Retrieved on November 1, 2023, from http://mtnhp.org/MapViewer.

Olson, L. E., J. D. Sauder, N. M. Albrecht, R. S. Vinkey, S. A. Cushman, and M. K. Schwartz. 2014. Modeling the effects of dispersal and patch size on predicted fisher (*Pekania [Martes] pennanti*) distribution in the U.S. Rocky Mountains. Biological Conservation 169:89-98.

USFWS. 1993. Grizzly bear recovery plan. Report on file at Missoula, MT. 181pp.

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.

Wittinger, W.T. 2002. Grizzly bear distribution outside of recovery zones. Unpublished memorandum on file at USFS, Region 1, Missoula, Montana.

AIR QUALITY:

Table 11 – Air Quality Table

Air Quality	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Smoke	**x**				**x**				**x**					
Dust	**x**				**x**				**x**					
Action														
Smoke		**x**				**x**				**x**			**Y**	**A-1, A-2**
Dust		**x**				**x**				**x**			**Y**	**A-3**

Comments:

A-1: This project is not within an impact zone as described by the Montana/Idaho Airshed Group. Under the Action Alternative, some slash piles consisting of tree limbs, tops, and other vegetative debris would be created throughout the project area during harvesting and site preparation. These slash piles would ultimately be burned after harvesting and site preparation operations have been completed.

A-2: Burning that may occur on adjacent properties in combination with the proposed action could potentially increase cumulative impacts to the local airshed. Thus, 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.

Air Quality Mitigations:

- Only burn on days approved by the Montana/Idaho Airshed Group and DEQ.
- Conduct test-burn to verify good smoke dispersion.
- Dust abatement (magnesium chloride or calcium chloride) may be applied on some road segments, depending on the seasonal conditions, proximity to private residences, and level of public traffic.

ARCHAEOLOGICAL SITES / AESTHETICS / DEMANDS ON ENVIRONMENTAL RESOURCES:

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 site 24LN764 (historic

cabin remains) may be in the APE in the SWSE1/4 or SESW1/4 of Section 36, but this site can be avoided with project related impacts. Much of the APE was inventoried to Class III levels for previous timber sales.

Table 12 – Archeology and Aesthetic Table

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		
No-Action														
Historical or Archaeological Sites	x				x				x					
Aesthetics	x				x				x					
Demands on Environmental Resources of Land, Water, or Energy	x				x				x					
Action														
Historical or Archaeological Sites	x				x				x					Arch - 1
Aesthetics		x								x				Aest - 1
Demands on Environmental Resources of Land, Water, or Energy	x				x				x					

Comments:

Arch -1: 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: Units 1, 1B, and 2 are visible from the well-traveled open road, Sinclair Creek Road. Evidence of logging would be present but diminishing each year. As discussed in the first issue and comment in *Table 3 – Scoping Comments Table*. This project is planned as an intermediate harvest and not as a regeneration harvest. The only units in which clearcut harvest prescriptions would be used are small areas (<5 acres) where evidence of insect and/or diseases are present. This would reduce the overall impact on aesthetics in this project area.

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.*

- Glen Sinclair Fuels Management Project (USDA Forest Service 2024)
- Glen Mud Salvage (MT DNRC 2020)
- Glen Mud Barnaby Timber Sale (MT DNRC 2018)
- Gibraltar Ridge Fire Salvage (USDA Forest Service 2018)
- Galton Vegetation Management Final EIS (USDA Forest Service 2016)

Impacts on the Human Population

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

Table 13 –Human Impacts Table

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		
No-Action														
Health and Human Safety	X				X				X					
Industrial, Commercial and Agricultural Activities and Production	X				X				X					
Quantity and Distribution of Employment	X				X				X					
Local Tax Base and Tax Revenues	X				X				X					
Demand for Government Services	X				X				X					
Access To and Quality of Recreational and Wilderness Activities	X				X				X					
Density and Distribution of population and housing	X				X				X					
Social Structures and Mores	X				X				X					
Cultural Uniqueness and Diversity	X				X				X					
Action														
Health and Human Safety		X				X				X			Y	H-1
Industrial, Commercial and Agricultural	X				X				X					H-2

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		
Activities and Production														
Quantity and Distribution of Employment	X				X				X					H-3
Local Tax Base and Tax Revenues	X				X				X					
Demand for Government Services	X				X				X					
Access To and Quality of Recreational and Wilderness Activities	X				X				X					
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:

H-1: No unusual safety considerations are associated with the proposed project. Because of the relatively small size of the proposed project, and mitigation measures that would be taken, health and safety risks posed by the project would be minimal. Log truck traffic would be active within the project area and along the Sinclair Creek Road increasing the potential of traffic accidents. An estimated 10 logs trucks per day as well as administrative traffic would be anticipated Monday through Friday.

H-2: A consistent flow of timber contributes towards meeting the current and future demand for raw material resources to operate value-added timber products manufacturing facilities. Due to the relatively small size of the proposed timber sale, no measurable direct, indirect, or cumulative effects would be likely.

H-3: Employment in the logging industry is common in the area and this project would in a small part contribute to local employment and the status quo of logging community regulations.

Mitigations:

- Log Hauling and Timber Harvest Safety signs would be posted in accordance with MT DNRC contract standards and specifications.

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:

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay.

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

Action: The timber harvest would generate additional revenue for the Common Schools Trust. The estimated return to the trust for the proposed harvest is $900,796.00 based on an estimated harvest of 5.4 million board feet (35,996 tons) and an overall stumpage value of $25.95 per ton. 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.

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay.

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.

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?
NONE

Does the proposed action have impacts that are individually minor, but cumulatively significant or potentially significant?
NONE

Environmental Assessment Checklist Prepared By:

Name: Matthew R. Lufholm
Title: Forest Management Supervisor
Date: 3/26/2024

Finding

Alternative Selected

Upon Review of the Checklist EA and attachments, I find the Action Alternative, as proposed, meets the intent of the project objectives as stated in Section I – 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. This Action Alternative also addresses the public comments received during the public scoping process. 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 that all the identified resource management concerns have been fully addressed in this Checklist EA 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. 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.

Need for Further Environmental Analysis

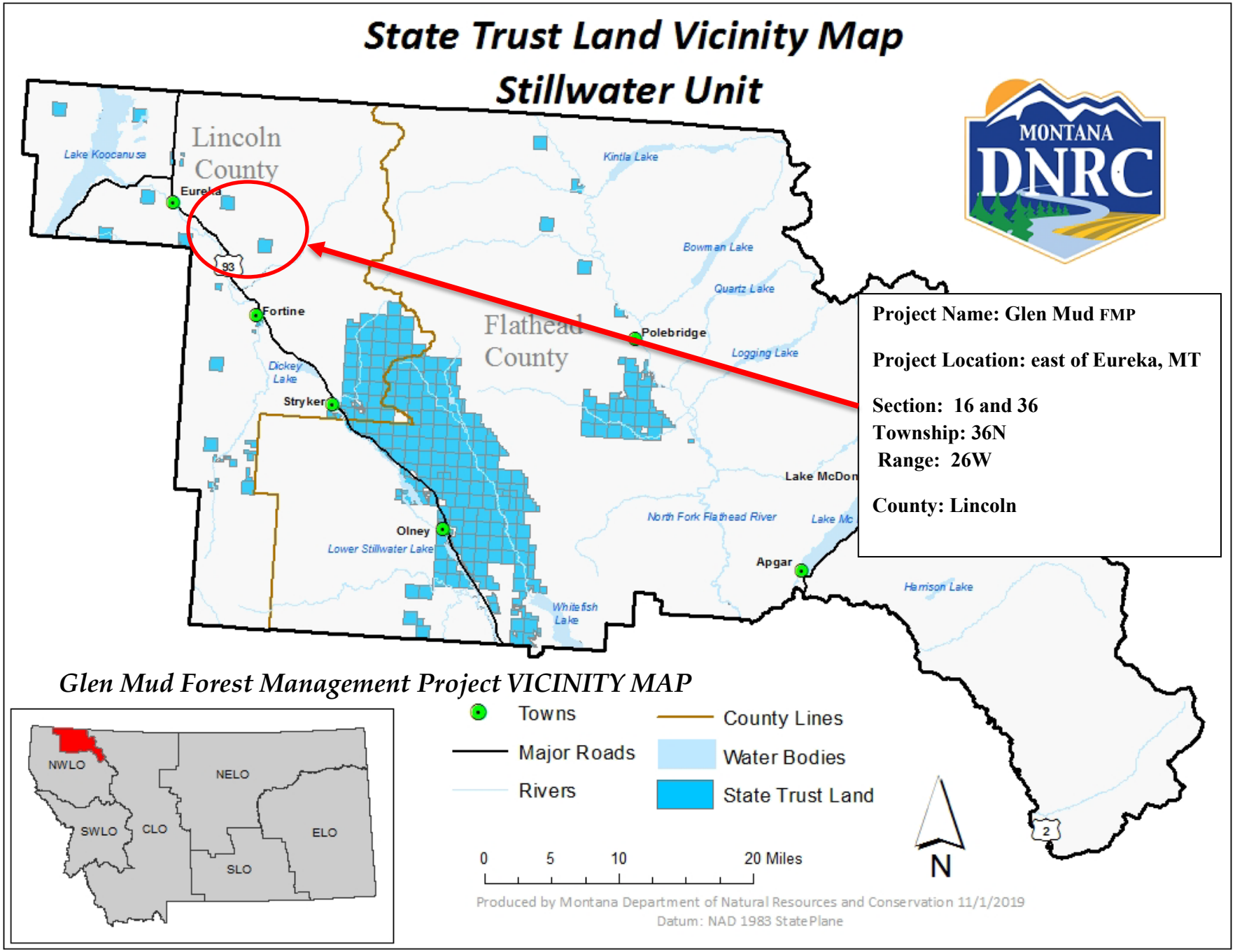
☐	EIS	☐	More Detailed EA	☒	No Further Analysis

Environmental Assessment Checklist Approved By:

Name: Dave Ring
Title: Stillwater Unit Manager
Date: March 22, 2024
Signature: /s/ David A. Ring

Attachment A
Glen Mud Forest Management Project Maps

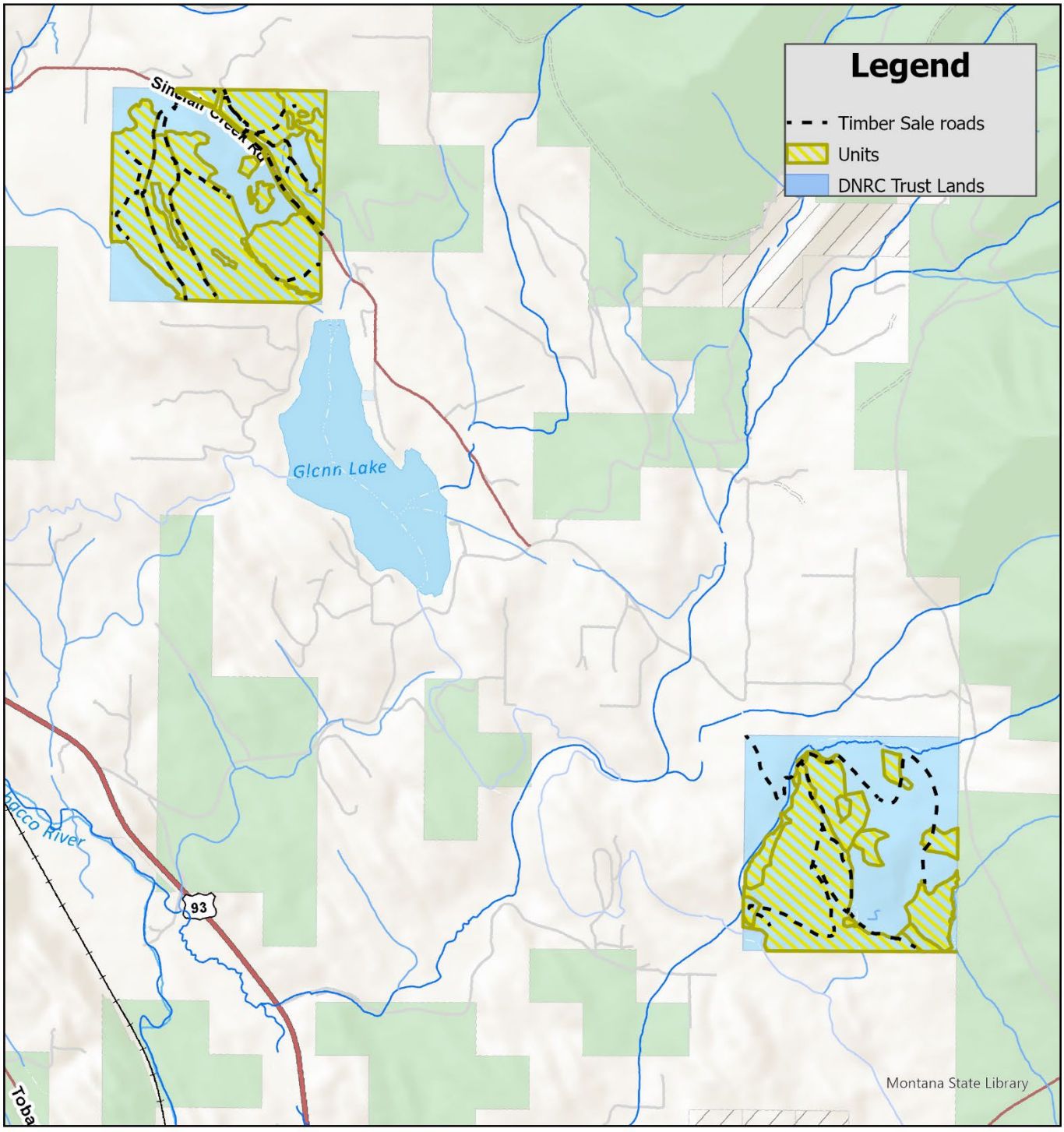
A-1: Timber Sale Vicinity Map



Glen Mud Forest Management Project

Sections 16 & 36
T36N R26W

Glen and Mud Sections



March 11, 2024

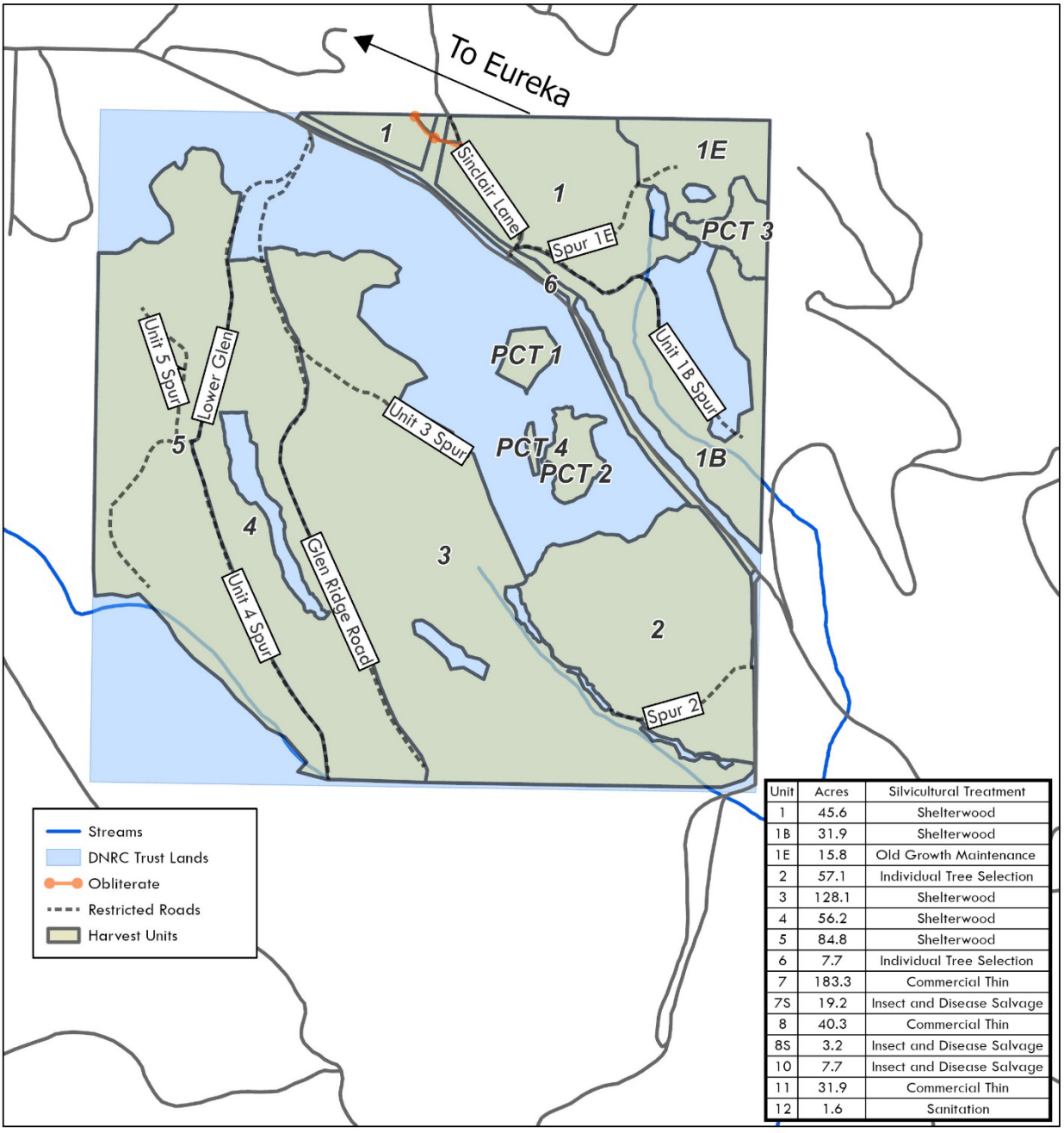
0 0.5 1 2 Miles

Cullen O'Brien

Glen Mud Forest Management Project

Sections 16
T36N R26W

Glen Lake Section



Unit	Acres	Silvicultural Treatment
1	45.6	Shelterwood
1B	31.9	Shelterwood
1E	15.8	Old Growth Maintenance
2	57.1	Individual Tree Selection
3	128.1	Shelterwood
4	56.2	Shelterwood
5	84.8	Shelterwood
6	7.7	Individual Tree Selection
7	183.3	Commercial Thin
7S	19.2	Insect and Disease Salvage
8	40.3	Commercial Thin
8S	3.2	Insect and Disease Salvage
10	7.7	Insect and Disease Salvage
11	31.9	Commercial Thin
12	1.6	Sanitation

January 25, 2023

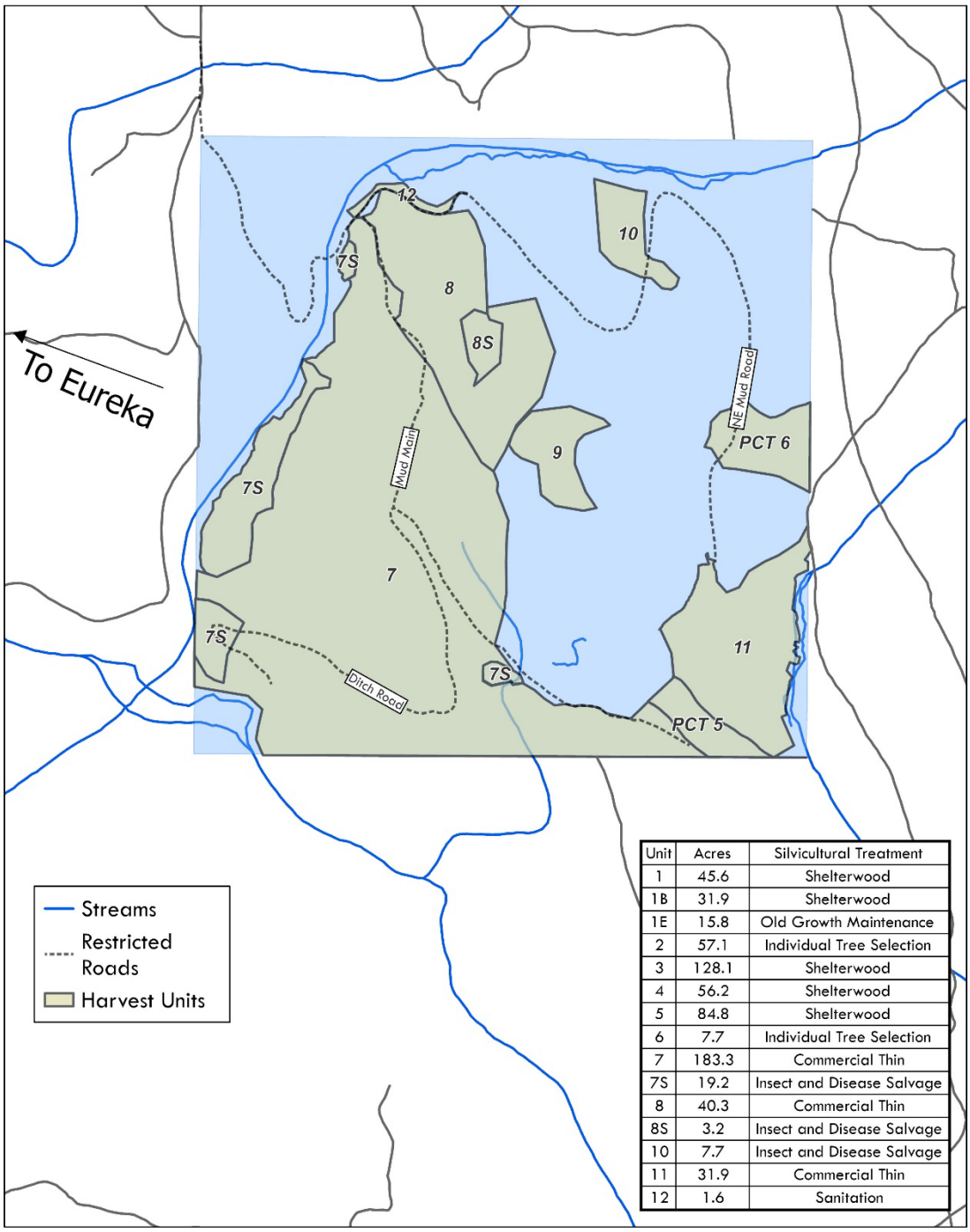
0 0.13 0.25 0.5 Miles

Cullen O'Brien

Glen Mud Forest Management Project

Sections 36
T36N R26W

Mud Creek



Unit	Acres	Silvicultural Treatment
1	45.6	Shelterwood
1B	31.9	Shelterwood
1E	15.8	Old Growth Maintenance
2	57.1	Individual Tree Selection
3	128.1	Shelterwood
4	56.2	Shelterwood
5	84.8	Shelterwood
6	7.7	Individual Tree Selection
7	183.3	Commercial Thin
7S	19.2	Insect and Disease Salvage
8	40.3	Commercial Thin
8S	3.2	Insect and Disease Salvage
10	7.7	Insect and Disease Salvage
11	31.9	Commercial Thin
12	1.6	Sanitation

January 25, 2023

0 0.13 0.25 0.5 Miles

Cullen O'Brien

Attachment B
Glen Mud Forest Management Project Prescription Table

Attachment B - Glen Mud Forest Management Project Prescription Table

Unit #	Est. Acres	Prescription	Particulars involved in unit(s)
1	46 acres	Shelterwood	-Tractor harvest unit. -Root rot pockets within the Unit -Rely on natural regeneration. -Favoring WL, 42' foot spacing -Retain a minimum of 2 snag recruits >21" DBH where possible and 2 of the largest snags per acre. -Residential hazard reduction within the WUI -Mechanical pile and scarify. -100 foot buffer on open road
1B	32 acres	Shelterwood	-Tractor harvest unit - Favoring WL, 42' spacing - Retain a minimum of 2 snag recruits >21" DBH where possible and 2 of the largest snags per acre. -100 foot buffer on open road
1E	16 acres	Old Growth Maintenance	-Tractor harvest unit - Retain a minimum of 2 snag recruits >21" DBH where possible and 2 of the largest snags per acre. - Douglas fir beetle/flatheaded wood borer activity present in stand
2	58 acres	Shelterwood	-Tractor harvest unit. -Marked to leave/cut favoring WL -Armillaria root rot pockets identified within stand ` -Retain a minimum of 2 snag recruits >21" DBH where possible and 2 of the largest snags per acre. -Mechanical pile and scarify -Rely on natural regeneration
3	128 acres	Shelterwood	-Tractor harvest unit. -Favoring WL 50'-30' spacing -Retain a minimum of 2 snag recruits >21" DBH and 2 of the largest snags per acre. -Landings need to avoid areas of advanced regeneration -Rely on natural regeneration -Machine pile and scarify
4	56 acres	Shelterwood	-Tractor harvest unit. -Favoring WL 50'-30' spacing -Retain a minimum of 2 snag recruits >21" DBH and 2 of the largest snags per acre. -Landings need to avoid areas of advanced regeneration -Rely on natural regeneration -Machine pile and scarify

Unit #	Est. Acres	Prescription	Particulars involved in unit(s)
5	85 acres	Shelterwood	Tractor harvest unit. -Favoring WL/DF 50'-30' spacing -Retain a minimum of 2 snag recruits >21" DBH and 2 of the largest snags per acre. -Landings need to avoid areas of advanced regeneration -Rely on natural regeneration -Machine pile and scarify
6	8 acres	Individual Selection	-Tractor harvest unit. -Marked to cut, removing trees leaning towards power lines - avoid damaging regeneration
7	182 acres	Commercial thin	-Tractor harvest unit. -Favoring WL/DF 38'-33' spacing with ¼ acre regeneration openings -Retain a minimum of 2 snag recruits >21" DBH and 2 of the largest snags per acre. -Landings need to avoid areas of advanced regeneration -Rely on natural regeneration -Machine pile and scarify
7s	21	Insect Salvage	-Tractor harvest unit -removing beetle infested trees, red needle dead, and low vigor trees -85'-75' spacing favoring WL
8	40 acres	Commercial thin	-Tractor harvest unit. -Favoring WL/DF 38'-33' spacing with ¼ acres regeneration openings -Retain a minimum of 2 snag recruits >21" DBH and 2 of the largest snags per acre. -Landings need to avoid areas of advanced regeneration -Rely on natural regeneration -Machine pile and scarify some of the unit
8s	4 acres	Insect Salvage	-Tractor harvest unit -removing beetle infested trees, red needle dead, and low vigor trees -85'-75' spacing favoring WL

Unit #	Est. Acres	Prescription	Particulars involved in unit(s)
9	10 acres	Overstory removal	-Tractor harvest unit -Remove low vigor DF in the overstory -stand has been successfully regenerated with PP and DF
10	8 acres	Insect salvage	-Tractor harvest unit - removing beetle infested trees, red needle dead, and low vigor trees -85'-75' spacing favoring WL
11	32 acres	Individual selection	-Tractor harvest unit -Marked leave/cut favoring intermediate WL
12	2 acres	Individual selection	-remove dead and dying trees along roadside

AF = Alpine fir
BMP = Best Management Practices
DBH = Diameter at Breast Height
DF = Douglas-fir
ERZ = Equipment Restriction Zone
ES = Englemann spruce
GF = Grand fir
LPP=Lodgepole pine
RMZ = Riparian Management Zone
SMZ = Streamside Management Zone
WL=Western Larch
WRC=Western Red Cedar
WUI= Wildland Urban Interface
WWP=Western White Pine