Sula State Forest Project
Environmental Assessment

Hamilton Unit
Southwest Land Office
Montana Department of Natural Resources and Conservation
December 2023

Sula State Forest Project

Environmental Assessment

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Environmental Assessment

Project Name: Sula State Forest Project
Proposed Implementation Date: 2024 - 2034
Proponent: Hamilton Unit, Southwest Land Office, Montana DNRC
County: Ravalli County

Type and Purpose of Action

Description of Proposed Action:

The Hamilton Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing the Sula State Forest Project. The project is located approximately 3 miles northeast of Sula, MT (refer to Attachments vicinity map A-**1** and project map A-**2**) and includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	**2N 19W Sec. 2, 3, 8, 11, 13, 14, 17, 24, 25, 26, 27, 28, 32, 36 1N 19W Sec. 5 3N 19W Sec. 25, 36**	**6,590**	**3,546**
Public Buildings	**2N 19W Sec. 8, 9, 10, 14, 15, 17, 20, 21, 22, 23, 28, 29, 32, 33**	**5,258**	**3,690**
MSU 2nd Grant			
MSU Morrill			
Eastern College-MSU/Western College-U of M			
Montana Tech	**2N 19W Sec. 14, 20**	**238**	**116**
University of Montana			
School for the Deaf and Blind			
Pine Hills School			
Veterans Home			
Public Land Trust			
Acquired Land			

Objectives of the project include:

- Improve timber stand growth and productivity by increasing tree spacing and removing trees with poor form and/or vigor.
- Salvage Douglas-fir, Engelmann spruce, and alpine-fir impacted Douglas-fir dwarf mistletoe, Douglas-fir bark beetle, and western spruce budworm.

- Maximize revenue over the long-term for the School Trust accounts from the timber resources and provide a sufficient amount of sawlog volume to contribute to the DNRC's sustained yield as mandated by State Statute 77-5-222, MCA.
- Move stands toward and desired future condition of ponderosa pine.
- Reduce ladder fuels

Proposed activities include:

Action	Quantity
Proposed Harvest Activities	# Acres
Clearcut	
Seed Tree	1,654
Shelterwood	
Selection	1,642
Commercial Thinning	56
Salvage	
Total Treatment Acres	**3,352**
Proposed Forest Improvement Treatment	# Acres
Pre-commercial Thinning	**4,000**
Planting	
Proposed Road Activities	# Miles
New permanent road construction	0
New temporary road construction	2.0
Road maintenance	29.5
Road reconstruction	
Road abandoned	
Road reclaimed	
Other Activities	
Prescribed burning	2500

Duration of Activities:	2024-2034
Implementation Period:	2024-2034

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:
  - June 28, 2023
- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: https://dnrc.mt.gov/News/scoping-notices
  - The proposal was posted in the local newspaper (Bitterroot Star)
  - Adjacent landowners were scoped. The mailing list of parties receiving initial scoping notices for this project is located in the project file at the Hamilton Unit Office. Letters were sent to all parties on the DNRC statewide scoping list.
- AGENCIES SCOPED:
  - Tribal Nations, FWP, USFS
- COMMENTS RECEIVED:
  - How many: 0
  - Concerns: N/A
  - Results: N/A

Internal and external issues and concerns were incorporated into project planning and design and will be implemented in associated contracts.

INTERDISCIPLINARY TEAM (ID):

- Project Leader: Thayer Jacques
- Archeologist: Patrick Rennie
- Wildlife Biologist: Garrett Schairer
- Hydrologist: Andrea Stanley
- Soil Scientist: Andrea Stanley
- Silviculturist: Tim Spoelma

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

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

- **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.

ALTERNATIVES CONSIDERED:

No-Action Alternative: No commercial harvest, precommercial thinning, prescribed burning, road maintenance, temp road construction would occur.

Action Alternative :

- DNRC would harvest approximately 6 - 7 MMBF from approximately 3296 acres using individual tree selection and seed tree prescriptions. These prescriptions would harvest infested and dying timber. Timber exhibiting poor form and limited growth would also be harvested. Douglas-fir, Engelmann spruce, and alpine-fir would primarily be targeted for removal to meet the desired future condition of ponderosa pine. Large ponderosa pine trees over 21" DBH would be favored for retention. A ground-based harvest system and excaline harvest system would be utilized. Approximately 4,000 acres of pre-commercial thinning would be performed to an average spacing of 16 feet leaving the best available tree. Prescribed burning and pile burning would be utilized to treat slash (approximately 2500 acres).

- Approximately 29.5 miles of road maintenance, 2.0 miles of temp road construction would take place to improve logging access to DNRC parcels and to bring existing roads up to BMP standards for log hauling.

Impacts on the Physical Environment

VEGETATION:

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

- Timber harvesting, temp road construction, and road maintenance may introduce or spread noxious weeds in the project area.
- Insects and disease may continue to reduce tree growth and cause mortality in the overstory.
- Overstocked stand conditions lead to reduced growth and vigor as well as the probability of increased fire behavior.

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

- Favor the largest ponderosa pine trees with good vigor for retention to improve overall stand growth and vigor.
- Wash equipment prior to entering the harvest area to limit weed seed dispersal.
- Spray and implement bio-control for weeds pre and post-harvest, as needed. Proposed treatment units with identified infestations of African wiregrass (Ventenata dubia) would be treated with chemical spraying before any proposed activities begin.
- Grass seed newly disturbed road surfaces, landings, and burn pile areas to limit the area available for weeds to become established.
- In stands identified as old growth, retain sufficient large live trees and basal area to meet the old growth definition.
- Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*. All existing snags would be maintained. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.

FOR COMPLETE VEGETATION ANALYSIS SEE ATTACHMENT B.

SOILS:

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

- Proposed activities could physically impact soils through physical disturbance (compaction and/or displacement), increase soil loss by erosion or slope failure, alter the local nutrient cycle, and reduce soil productivity.

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

- The Contractor and Sale Administrator should agree to a general skidding plan prior to equipment operations. Disturbance from ground-based harvest and yarding would also be avoided by limiting turning on slopes, optimizing favorable skidding, and limiting new disturbances by optimizing use of historic skid trail disturbances.

- Ground-based harvest and/or yarding would be excluded from slopes >45%. On slopes >45% options for harvest and or yarding would be limited to skyline yarding or tethered harvest with limited turning.

- Skid trails would be mitigated concurrent with yarding operations with slash and grass-seed only. Mitigation with slash can include use of limbed logs partially embedded across a trail or area at risk of erosion from concentrated runoff. The logs can be partially embedded by tracking equipment over the placed material. Water bars would be discouraged along skid trails due the higher erosion risk associated with the local soil types.

- To prevent soil compaction ground-based mechanical felling and yarding would be restricted to one or more of the following conditions:
  Soil moisture content at 4-inch depth less than 20% oven-dry weight.
  Minimum frost depth of 4 inches.
  Minimum snow depth of 18 inches of loose snow or 12 inches packed snow.

- Equipment scarification would be excluded from potential site preparation activities. Scarification related to control lines for prescribed burning would be allowed. Control lines would be grass seeded after burning is complete.

FOR COMPLETE SOILS ANALYSIS SEE ATTACHMENT C.

WATER RESOURCES:

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

- Proposed activities could impact water quality through increased erosion and sediment delivery to streams. Proposed activities and associated road activities could impact the timing, distribution, and amount of water yield in affected watersheds.

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

- The action alternative does not involve work within any streams. Harvest equipment would be excluded from areas within 50 feet of any Class 1 stream, unless on an existing road.

- Dust abatement would be used if project-related traffic is producing excessive airborne dust (see DNRC standard contract for more info). In particular, the one-mile section of Gold Creek Road near the unnamed tributary to East Twin Creek. Dust abatement options include limiting the speed of all project vehicles (including log trucks) to 10 mph, road watering, or application of chemical dust abatement.

- During road maintenance activities such as grading or snowplowing, side-casting of road material into a stream or to an area where runoff would cause sedimentation, would be prohibited.

- Slash and debris would not be left in drainages, roadside ditches, wetlands, or streams. Slash can be used as sediment and erosion control at drainage feature outlets (i.e., at the outlets of ditch relief culverts and rolling dip outlets).

- Cut slopes, fill slopes, ditches, and road shoulders would be seeded following construction or reshaping.

- Exposed soils at landings would be grass seeded following operations and/or following burning of slash piles.

- Equipment operators would locate skid trails according to DNRC Forester direction/approval. Skid trails would be located in areas of existing disturbance as much as possible.

- Skid trails would be mitigated concurrent with yarding operations with slash and grass-seed only. Mitigation with slash can include use of limbed logs partially embedded across a trail or area at risk of erosion from concentrated runoff. The logs can be partially embedded by tracking equipment over the placed material. Water bars would be discouraged along skid trails due the higher erosion risk associated with the local soil types.

- Equipment operators would maintain erosion control structures in active sale areas throughout the contract period and especially before operations cease for inactive periods, including during periods of heavy winter snowfall and spring breakup.

- Hauling would be restricted or suspended during periods when roads could be damaged by rutting into the subgrade, reducing effectiveness of drainage structures, or displacing surface materials.

FOR COMPLETE WATER RESOURCES ANALYSIS SEE ATTACHMENT D.

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

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

- Proposed activities could impact water quality and fisheries habitat.

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

- The action alternative does not involve work within any streams. Harvest equipment would be excluded from areas within 50 feet of any Class 1 stream, unless on an existing road.

- Dust abatement would be used if project-related traffic is producing excessive airborne dust (see DNRC standard contract for more info). In particular, the one-mile section of Gold Creek Road near the unnamed tributary to East Twin Creek. Dust abatement options include limiting the speed of all project vehicles (including log trucks) to 10 mph, road watering, or application of chemical dust abatement.

- During road maintenance activities such as grading or snowplowing, side-casting of road material into a stream or to an area where runoff would cause sedimentation, would be prohibited.

- Slash and debris would not be left in drainages, roadside ditches, wetlands, or streams. Slash can be used as sediment and erosion control at drainage feature outlets (i.e., at the outlets of ditch relief culverts and rolling dip outlets).

- Cut slopes, fill slopes, ditches, and road shoulders would be seeded following construction or reshaping.

- Exposed soils at landings would be grass seeded following operations and/or following burning of slash piles.

- Equipment operators would locate skid trails according to DNRC Forester direction/approval. Skid trails would be located in areas of existing disturbance as much as possible.

- Skid trails would be mitigated concurrent with yarding operations with slash and grass-seed only. Mitigation with slash can include use of limbed logs partially embedded across a trail or area at risk of erosion from concentrated runoff. The logs can be

partially embedded by tracking equipment over the placed material. Water bars would be discouraged along skid trails due the higher erosion risk associated with the local soil types.

- Equipment operators would maintain erosion control structures in active sale areas throughout the contract period and especially before operations cease for inactive periods, including during periods of heavy winter snowfall and spring breakup.

- Hauling would be restricted or suspended during periods when roads could be damaged by rutting into the subgrade, reducing effectiveness of drainage structures, or displacing surface materials.

FOR COMPLETE FISHERIES RESOURCE ANALYSIS SEE ATTACHMENT D.

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

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

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

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

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

- Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing while potentially removing snags needed by flammulated owls for nesting.

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

- Proposed activities could disturb nesting red-tailed hawks and/or modify nesting habitats for red-tailed hawks.

- Proposed activities could disturb golden eagles and/or modify nesting habitats for golden eagles.

- Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range.
- Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

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

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Should a raptor nest be identified in or near project activities, activities will cease and a DNRC biologist will be contacted. Site-specific measures will be developed and implemented to protect the nest and birds prior to re-starting activities.
- Motorized public access will be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. In instances where snags are small or deficient, retention of additional recruit trees would be required. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger with a total CWD goal of 15-25 tons per acre.
- Contractors and purchasers conducting contract operations will be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants will be stored in a bear-resistant manner.
- Limit potential stress and disturbance to big game species by restricting operations during the big game hunting seasons.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units in lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fire and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.

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

FOR COMPLETE WILDLIFE ANALYSIS SEE ATTACHMENT E.

AESTHETICS:

Any change to the scenery in the area from these alternatives would be in addition to past activity within the project area. This analysis includes all past and present effects.

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

- Harvest activities could affect the viewshed of neighboring landowners.
- Harvest activities would include road reconstruction and new temp road construction.
- Harvest activities would produce ground disturbance such as skid trails and landing areas.

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

- A 50 foot (SMZ) no cut buffer would be placed along class one streams.
- All roads and disturbed areas would be grass seeded. Landing piles would be burned and landing areas would be grass seeded.
- Hauling would utilize existing roads.
- No new permanent road would be constructed.
- Temp roads would be recontoured, and grass seeded after harvest operations.
- Skid trails would be located on existing areas of disturbance (remanent skid trails/roads) as much as possible.
- Herbicide and bio-control would be used for noxious weed treatment.

Existing Conditions

The project area is located behind locked gates. Approximately 2/3 of the area experienced a stand replacing fire in 2000. The rest of the project area experienced mixed fire regimes. Most of Sula State Forest is surrounded by the Bitterroot National Forest which experienced mixed

fire regimes during the fires. The rest of the area is surrounded by scattered parcels of private ground.

Environmental Effects
Treatment prescriptions would be designed to emulate historic disturbance regimes, and leave the largest trees on site resulting in an open park-like stand. Seedlings and saplings would be retained with a prescribed thinning to approximately 16 feet. The mitigations listed above would help to limit negative impacts to aesthetics.

-VISUAL QUALITY

No-Action Alternative:
No commercial harvest, precommercial thinning, prescribed burning, road maintenance, temp road construction would occur. No change to visual quality.

Action Alternative:

Direct, Secondary, and Cumulative Effects
The proposed activities would reduce stocking in the overstory and understory. Road reconstruction, new temp road construction, skid trails, and landings would be utilized for harvest operations.

Through the proposed sale area, slash from the harvest would be noticeable yet temporary. Generally, slash disappears from the site within five years, and is often covered by other vegetation within three years. Again, sites would be generally lighter in color than can be seen currently. Some areas, where appropriate, would treat in-unit slash with prescribed burning.

The proposed Action Alternative would be expected to have low direct, indirect, or cumulative effects based on the following:

- A 50 foot (SMZ) no cut buffer would be placed along class one streams.
- All roads and disturbed areas would be grass seeded. Landing piles would be burned and landing areas would be grass seeded.
- Hauling would utilize existing roads.
- No new permanent road would be constructed.
- Temp roads would be recontoured, and grass seeded after harvest operations.
- Skid trails would be located on existing areas of disturbance (remanent skid trails/roads) as much as possible.
- Herbicide and bio-control would be used for noxious weed treatment.
- No harvest areas and no harvest buffers would be utilized to mitigate visual effects to neighboring landowners.

- The treatment prescription would leave the largest trees on site resulting in an open park-like stand.

- Seedlings and saplings along with pockets of pulp-size material would remain.

-NOISE

No-Action Alternative:
No commercial harvest, precommercial thinning, prescribed burning, road maintenance, temp road construction would occur. No change to noise quality.

Action Alternative:

Direct, Secondary, and Cumulative Effects
Harvest activities would be quite audible, and, depending upon air conditions, equipment could be heard many miles from their location. Noise would be generated by harvest operations, harvest related traffic, road construction, and administrative oversight. This could be expected to be present for the entire season of harvest, typically from mid-June through mid-March of the following year, for the duration of the harvest of two to three years during the general "work week".

Based on the anticipated operating periods and the short duration of the timber sale direct, secondary, and cumulative effects of noise will be low.

HISTORICAL AND ARCHEOLOGICAL SITES:
The tribes were scoped but none identified a specific cultural resource concern. 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 revealed Archeological site (24RA667) located near School Marm Lake in T2N R19W Section 22 S1/2NWNENE1/4. All ground disturbances (harvesting, thinning, decking, slash piling, vehicle parking, and equipment storage) would be excluded from this site. 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.

DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, AND ENERGY:
Direct, secondary, and cumulative impacts related to environmental resources of land, water, air, and energy would be expected to be low due to mitigations listed in this document.

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:
- State Forest Land Management Plan EIS, DNRC 1996, sets the strategy that guides DNRC forest management decisions statewide.

Impacts on the Human Population

HUMAN HEALTH AND SAFETY:

Air Quality

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

The project area is located within Montana Airshed 4, which encompasses Ravalli County. Currently, this Airshed does not contain any impact zones.

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

- Smoke will be produced during pile burning and prescribed burning.
- Dust will be produced during harvesting and hauling activities.

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

- Only burn on days approved by the Montana/Idaho Airshed group and DEQ.
- Conduct test burn to verify good dispersal.
- Dust abatement may be used as necessary.
- Slower speed limits may be included in contracts as necessary to reduce dust.

-SLASH BURNING

No-Action Alternative:
No slash would be burned within the project areas. Thus, there would be no effects to air quality within the local vicinity and throughout Airshed 4.

Action Alternative:

Direct and Secondary Effects
Slash consisting of tree limbs and tops and other vegetative debris would be piled or scattered 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 Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.

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

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

-DUST

No-Action Alternative:
No increased dust would be produced as a result of harvesting activities within the proposed project area. Current levels of dust would be produced in the area.

Action Alternative:

Direct, Secondary, and Cumulative Effects
Harvesting operations would be short in duration. Dust may be created from log hauling on portions of native surface roads during summer and fall months. Contract clauses would provide for the use of dust abatement or require trucks to reduce speed if necessary to reduce dust near any affected residences.

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

Log Hauling Traffic
Log hauling traffic is common in the project area.

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

- There will be increased travel on weekends.
- Trucks will drive fast.

Recommended Mitigation Measures for Log Hauling Traffic- The analysis and levels of effects of log hauling traffic is based on implementation of the following mitigation measures:

- Log hauling will take place typically during the general “work week”.
- Signs will be posted making the public aware of log hauling traffic in the area.
- If necessary, a slower speed limit may be imposed in the timber harvest contract.

No-Action Alternative:
No increase in log truck traffic would occur.

Action Alternative:

Direct, Secondary, and Cumulative Effects
Log truck traffic in the area would increase for the duration of the timber sales. However signs will be posted indicating that log truck traffic is present in the area. If necessary, a slower speed limit may be imposed in the timber harvest contract.

Based on the mitigation measures direct, secondary, and cumulative effects of log hauling on human health and safety would be minimal.

RECREATION ***(including access to and quality of recreational and wilderness activities):***
The area is used for hiking, hunting, cross-country skiing, snowmobiling and general recreating. The area receives the most use during the big game hunting season from September 1 to November 28. Currently, roads through the area are closed to motorized use and used only for administrative purposes. There would be no change in road closure status.

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

- Logging activities could adversely affect recreation in the area.

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

- Signs would be posted indicating that log truck traffic and timber harvesting is present in the area.
- If necessary, a slower speed limit may also be imposed in the timber harvest contract.
- Log hauling and harvesting activities would take place during the general “work week”.
- No commercial harvesting/hauling activities would occur during the big game hunting season (bow and rifle) from September 1 to November 28

Existing Conditions
The area is used for hiking, hunting, cross-country skiing, snowmobiling and general recreating. The area receives the most use during the big game hunting season from September 1 to November 28. Currently, roads through the area are closed to motorized use and used only for administrative purposes. There would be no change in road closure status.

No-Action Alternative:
There would be no change from existing conditions. Therefore, there would be no measurable direct, secondary, or cumulative impacts on recreation from proposed actions.

Action Alternative:

Direct, Secondary, and Cumulative Effects

During harvesting/thinning operations, recreation may be adversely affected due to noise and equipment in the area. Direct, secondary, and cumulative effects would be temporary during harvesting.

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**				**N**					
Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**				**N**					
Quantity and Distribution of Employment	**X**				**X**				**N**					
Local Tax Base and Tax Revenues	**X**				**X**				**N**					
Demand for Government Services	**X**				**X**				**N**					
Density and Distribution of Population and Housing	**X**				**X**				**N**					
Social Structures and Mores	**X**				**X**				**N**					
Cultural Uniqueness and Diversity	**X**				**X**				**N**					
Action														
Health and Human Safety		**X**				**X**				**X**			**YES**	**1**
Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**				**X**					
Quantity and Distribution of Employment		**X**				**X**				**X**				**2**
Local Tax Base and Tax Revenues		**X**				**X**				**X**				**2**
Demand for Government Services	**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**					

Comment Number 1:

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

Mitigations:

- Signs would be posted indicating that log truck traffic and timber harvesting is present in the area.
- If necessary, a slower speed limit may also be imposed in the timber harvest contract.
- Log hauling would take place during the general "work week".
- No commercial harvesting/hauling activities would occur during the big game hunting season (bow and rifle) from September 1 to November 28

Comment Number 2:

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

This harvest is viewed as a continuation of a sustained yield and as such would not create any new jobs but rather sustain approximately 60 to 70 person years of employment in the forest products industry. Additionally, local businesses, such as hotels, grocery stores, and gas stations would likely receive additional revenues from personnel working on the proposed project. This would be a positive low impact to quantity and distribution in the area.

Mitigations:

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

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

None.

OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

The proposed action has a projected harvest volume between 5 and 6 MMBF. This volume is worth approximately $400/MBF delivered to a forest products manufacture site at current market prices. Delivered to market, the proposed action has a total revenue value of an estimated $2,200,000 (based on 5.5MMBF average). Removing the timber sale purchaser's contracted operations and DNRC's development, administration, and operation expenses, the trust beneficiaries net between an estimated 15 and 35 percent of total delivered sawlog market value. Therefore, the proposed action may generate net income for trust beneficiaries between $330,000 and $770,00.
Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not track project-level costs for individual timber sales.

An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. A recent revenue-to-cost ratio of the Southwest Land Office was 1:2.07. 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.

Currently the Sustained yield and target harvest from Trust Lands is 60.0 MMBF, which represents approximately 16.4% of timber harvested in the state of Montana. This project would provide approximately 5 - 6 MMBF of timber towards the annual sustained yield target thus helping sustain current mill capacity.

Environmental Assessment Checklist Prepared By:

Name: Thayer Jacques
Title: Hamilton Unit Manager
Date: December 20, 2023

Finding

Alternative Selected

Action alternative

I have decided to approve the Proposed Action with all mitigations and controls recommended in the EA Checklist and is hereby adopted. My decision is based on a thorough review of the environmental assessment and the following conclusions arrived at through that review:

1) I conclude that the proposed action will achieve the project objectives of a) Improve timber stand growth and productivity and b) improve resistance to future insect or disease attack and c) reduce fuel loading and ladder fuels and d) increase the growth and vigor of regeneration and finally e) maximize revenue over the long-term for the School Trust accounts from the timber resources and provide a sufficient amount of sawlog volume to contribute to the DNRC's sustained yield as mandated by State Statute 77-5-222, MCA.

2) I further conclude that, by virtue of design, mitigations and controls adopted and integrated into the proposed action, the project objectives will be achieved in a manner that avoids significant adverse impacts to the human and physical environment.

I am also satisfied that the proposed action has been developed through an appropriate process involving public participation, interdisciplinary methods and inter-entity consultations; that it

reflects understandings, conclusions and agreements arrived at through such collaborative work; and that it is true and faithful to the trust land mission provided by the Montana Constitution and forestry laws of the State of Montana, as well as principles laid out in the State Forest Land Management Plan and Rule under which policy the trust land forestry mission is pursued.

Significance of Potential Impacts

I am satisfied that all pertinent resources and environmental values have been properly identified and studied through the project development process. Based on my review of the environmental analysis, I have concluded that the proposed action will not cause any significant adverse impacts - direct, secondary or cumulative - on the human and physical environment.

With respect to the significance of potential impacts, I find there are none that should be regarded as severe, enduring, geographically widespread or frequent.

Further, I find that the quantity and quality of the various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree and that the seven criteria for determining significance of impacts contained in ARM 26.2.644 have been addressed completely. I find in the proposed action no precedent for future actions that would cause significant impacts and I find no conflict with local, state or federal laws, requirements or formal plans. Proposed timber harvest and precommercial thinning activities are common practices and none of the project activities are being conducted on important fragile or unique sites. In summary, I find that some adverse impacts are avoided altogether by means of project design and that others are controlled and mitigated to the extent that they do not become significant.

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

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

Need for Further Environmental Analysis

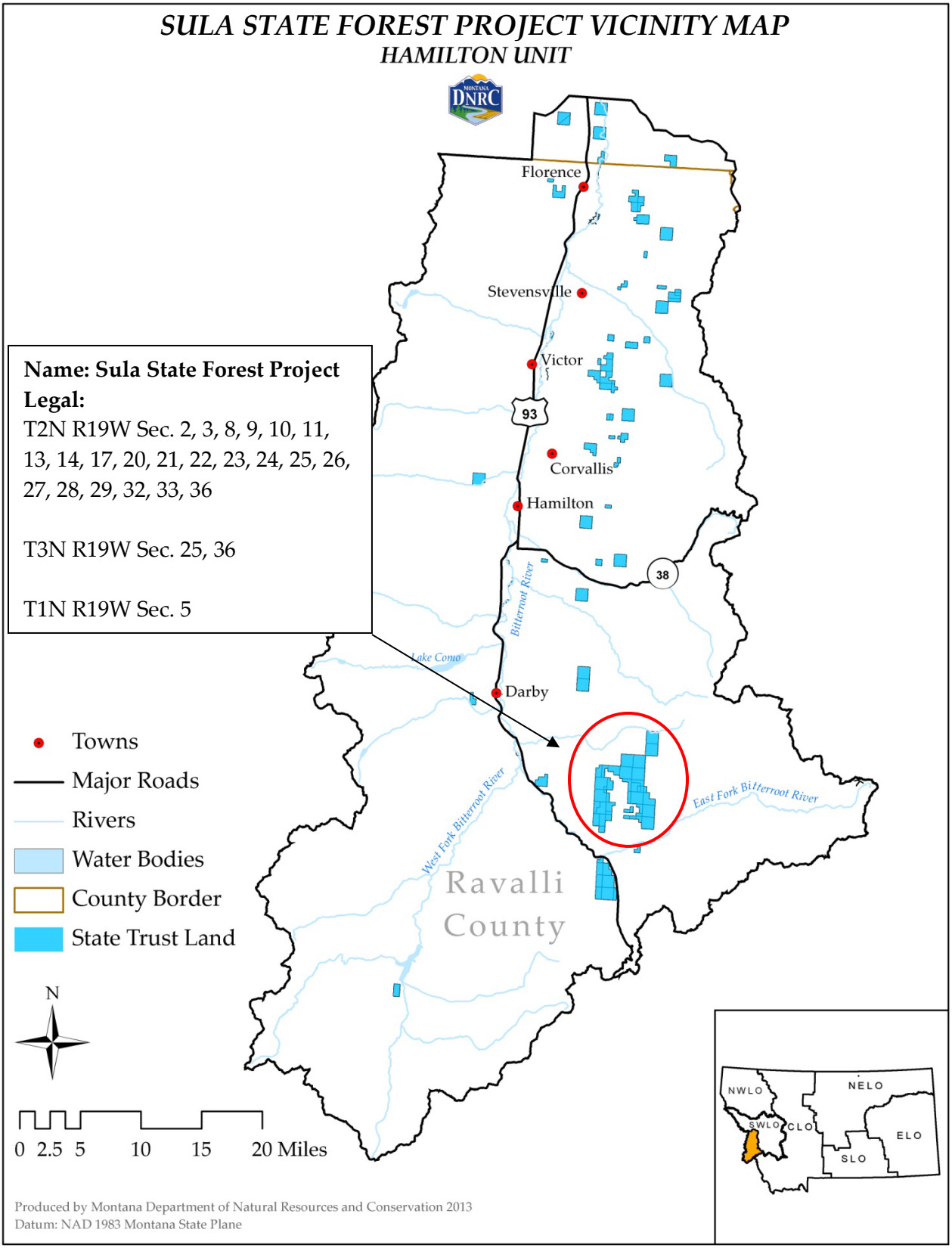
☐	EIS	☐	More Detailed EA	☒	No Further Analysis

Environmental Assessment Checklist Approved By:

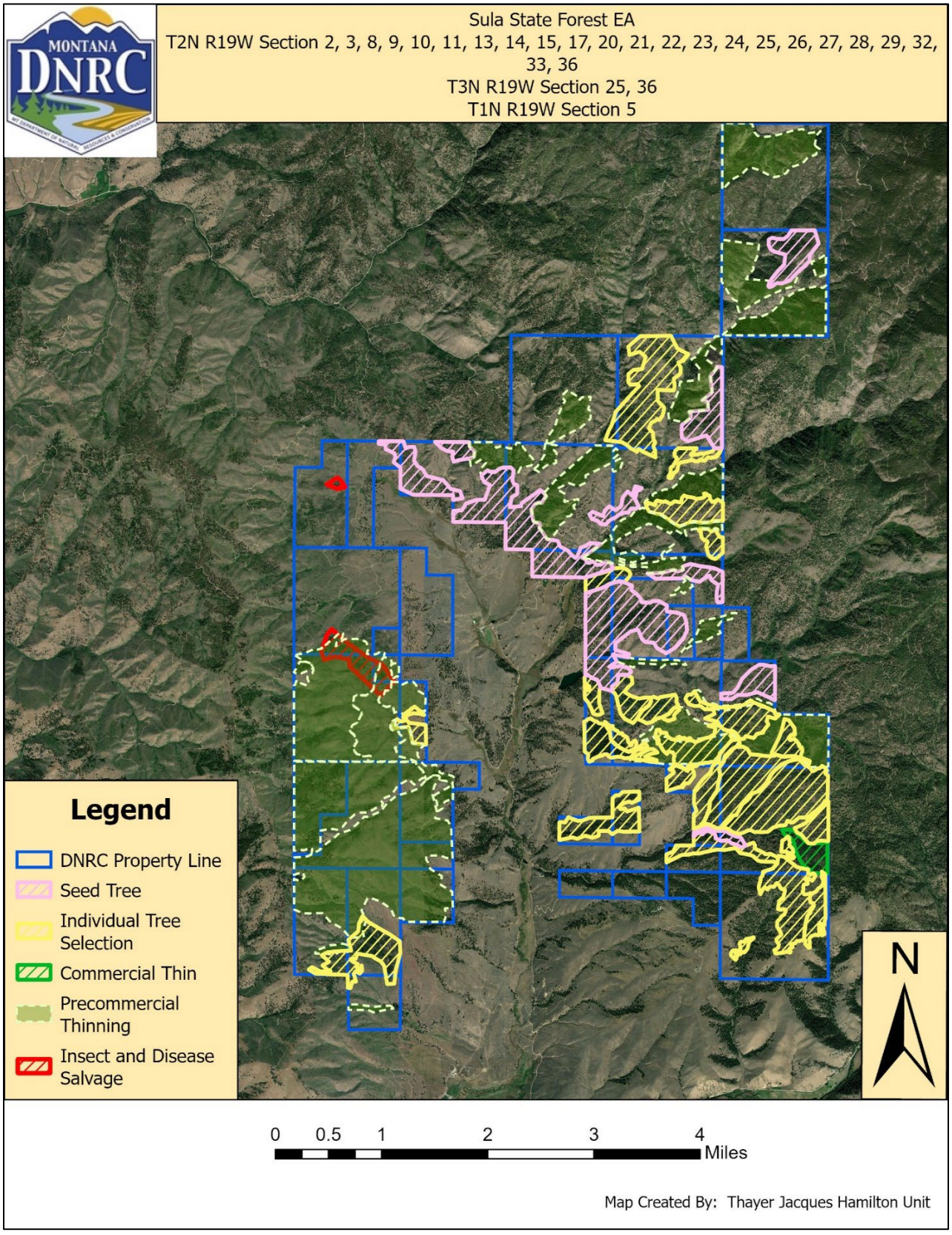
Name: Jon M. Hayes
Title: SWLO Forest Management Program Manager
Date: December 22, 2023
Signature: /Jon M. Hayes/

Attachment A - Maps

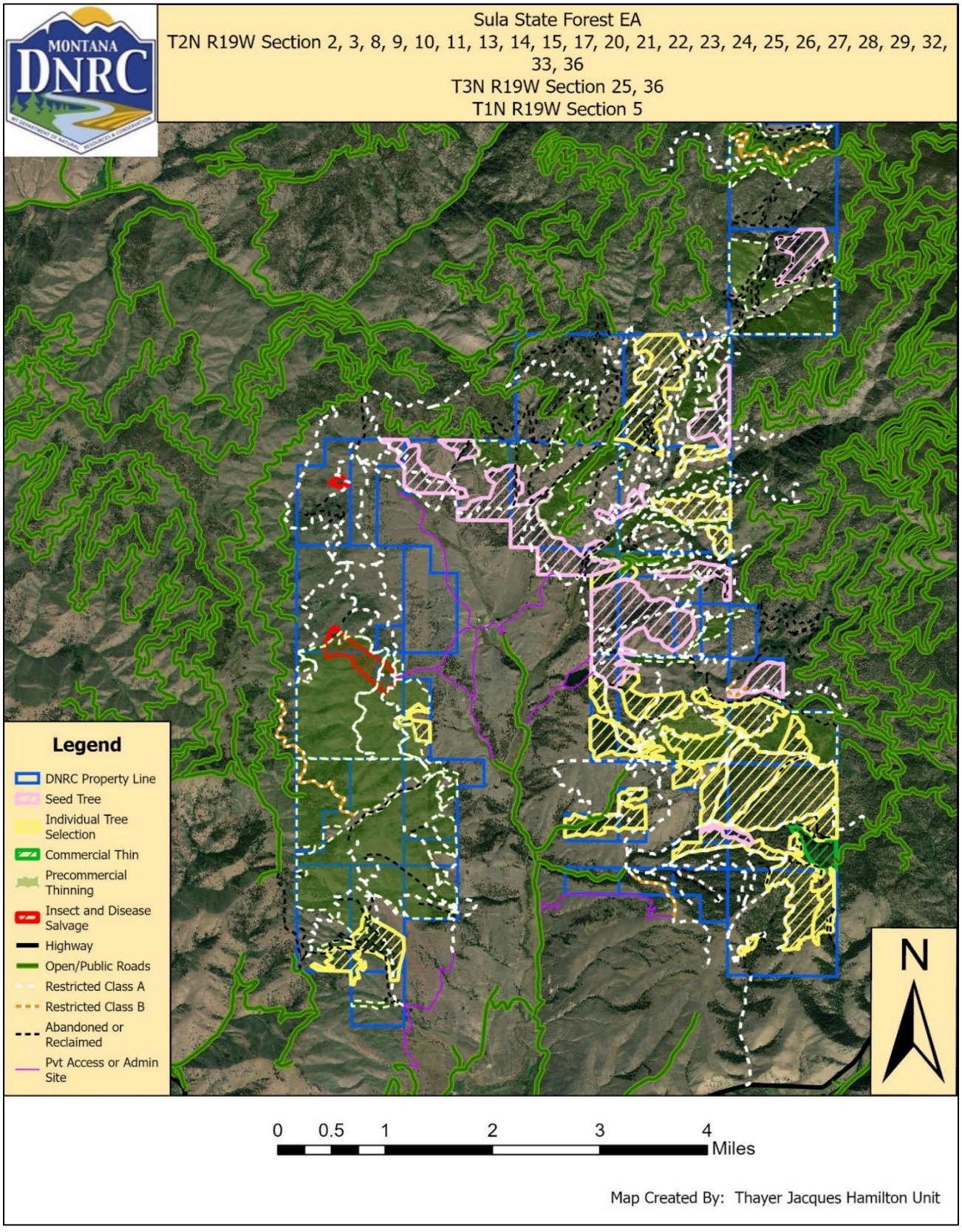
A-1: Sula State Forest Project Vicinity Map



A-2: Project Map Treatment Areas



A-3: Project Map Roads



Attachment B – Vegetation Analysis

Sula State Forest Project – Vegetation Analysis

Analysis Prepared By:
Name: Thayer Jacques
Title: Hamilton Unit Forester, Montana DNRC

Introduction

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

Issues and Measurement Criteria

- Timber harvesting and road building/reconstruction may introduce or spread noxious weeds in the project area.
- Insects and disease may continue to cause reduced growth and mortality in the overstory.
- Several stands are currently overstocked. These conditions lead to reduced growth and vigor as well as the probability of increased fire behavior.
- There is concern the proposed project could negatively impact populations of threatened, endangered, or sensitive plant species.

Regulatory Framework

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

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

DNRC Forest Management Rules
DNRC Forest Management Rules (*ARM 36.11.401 through 450*) are the specific legal resource management standards and measures under which DNRC implements the SFLMP and subsequently its forest management program. The Forest Management Rules were adopted in March 2003 and provide the legal framework for DNRC project-level decisions and provide field

personnel with consistent policy and direction for managing forested state trust lands. Project design considerations and mitigations developed for this project must comply with applicable Forest Management Rules.

Montana Best Management Practices (BMPs) for Forestry
Montana BMPs consists of forest stewardship practices that reduce forest management impacts to water quality and forest soils. The implementation of BMPs by DNRC is required under *ARM 36.11.421*. Key forestry BMP elements include streamside management; road design and planning; timber harvesting and site preparation; stream crossing design and installation; winter logging; and hazardous substances storage, handling, and application.

Analysis Areas

Direct and Secondary Effects Analysis Area
The proposed treatment areas: Commercial = approximately 3,115 acres
Pre-commercial = approximately 4,000 acres

Cumulative Effects Analysis Area
The proposed project area: 12,086 acres

Existing Conditions

Noxious Weeds
Spotted knapweed (Centaurea maculosa) is the most prevalent noxious weed present. Infestations were mainly observed on open, dry, south and west-facing aspects and along established roads. Knapweed was more prevalent in areas that were burned during the fires of 2000. Overall infestation in open areas is moderate to high.

Houndstongue (Cynoglossum officinale L) was found in small, scattered patches throughout the project area. Overall infestation of Houndstongue is low.

African Wiregrass (Ventanata dubia) is found in small, isolated patches on the east side of the forest. Overall infestation is low.

Washing equipment, grass seeding of roads and burn piles, followed by roadside spot herbicide treatments, and release of bio-control insects can be most effective in reducing the spread of noxious weeds. Proposed treatment units with identified infestations of African wiregrass (Ventenata dubia) would be treated with chemical spraying before any proposed activities begin. The Sula State Forest is also currently included in a WHIP grant for arial spraying of noxious weeds in cooperation with the Forest Service and private landowners.

Rare Plants
A query of the Montana Natural Heritage Program did not list any plant species with special status as potentially existing within the project area. Special Status Species need to be recognized in environmental review, permitting, or planning processes because they either have global conservation status ranks that include G1 or G2 or have some legal protections in place.

The query listed Coville Indian Paintbrush (Castilleja covilleana) as a Species of Concern potentially existing in T2N R19W Section 36 of the project area. Species of Concern are native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. Designation as a Montana Species of Concern or Potential Species of Concern is based on the Montana Status Rank, and is not a statutory or regulatory classification. The State Threat Score for Coville Indian Paintbrush is currently low.

Standard Vegetative Community

- **Stand History/Past Management**
  Most of the analysis area was heavily affected by wildfires of 2000. The predominant fire intensity experienced on the west side of the forest was high severity stand replacing. The east side of the forest experienced more mixed severity burning with some areas of stand replacement mixed with other areas of low intensity understory burning. Commercial harvesting post fire (2000 – 2004) was concentrated on salvage logging of fire killed trees. Post fire, regeneration on the west side was a mix of planting and natural regeneration. Regeneration on the east side is predominately natural.

  The southeast portion of the forest was much less affected by the fire. Much of the area did not burn. A salvage harvest in 2005 treated 340 acres affected by insect and disease (primarily mistletoe).

  The habitat types identified within the project area place them within the Pseudotsuga menziessi series (moderately warm and dry). Historically, this type was subject to low intensity fires at a frequency of 10 to 30 years. The treatment prescriptions for proposed harvest units would be designed to mimic this low intensity frequent fire interval.

  The project area currently and historically has been grazed from June to September each year.

- **Current stand conditions (species composition, size, density, insects and disease, forest age class and distribution, etc.)**
  The current stand condition in the project area is a result of past timber management and wildfire activity and/or suppression. The west side of the forest contains primarily seedling/sapling structure (90%) with isolated pockets of overstory (10%) that survived the fires. The areas of seedlings/saplings contain a mix of ponderosa pine, Douglas-fir, and lodgepole pine. Diameters range from 0” to 7”. Overstory in these areas contains a mix of ponderosa pine and Douglas-fir. Ponderosa pine and Douglas-fir comprise the dominant, co-dominant, and intermediate layers. The dominant layer of the overstory contains ponderosa pine with diameters ranging from 25” to 30”+. The codominant layer contains a mix of ponderosa pine and Douglas-fir with diameters ranging from 17” to 20”. The intermediate layer contains ponderosa pine and Douglas-fir with diameters ranging from 8” to 15”.

  The east side of the forest contains both areas of seedlings/saplings along with areas of surviving overstory due to a mixed fire regime during the fires of 2000. Overstory in these areas contains primarily a mix of ponderosa pine and Douglas-fir. The dominant layer of the overstory contains ponderosa pine with diameters ranging from 25” to 30”+. The codominant layer contains a mix of ponderosa pine and Douglas-fir with diameters ranging from 17” to 20”. The intermediate layer contains ponderosa pine and

Douglas-fir with diameters ranging from 8" to 15". Lesser amounts of alpine-fir, Engelmann spruce, and lodgepole pine exist in the codominant, and intermediate layers on northern aspects.

The understory in unburned areas is comprised mainly of seedling/sapling Douglas-fir forming patches in the openings along with scattered ponderosa pine seedling/saplings in the larger canopy openings. Lesser amounts of alpine-fir, Engelmann spruce, and lodgepole pine exist on northern aspects in unburned areas. al The understory in burned areas contains a mix of ponderosa, Douglas-fir, and lodgepole pine. Northern aspects have a higher concentration of Douglas-fir and lodgepole pine, while all other aspects contain higher concentration of ponderosa pine. Tree density of the understory varies between 400 to 1200 trees per acre. Tree density is greatest on northern aspects.

Overall stand health varies by species. Douglas-fir in the project area (overstory and understory) has been moderately affected by dwarf mistletoe overall with some pockets of heavy infestation. Douglas-fir also shows minor effects due to spruce budworm and Douglas-fir bark beetle. Areas of alpine-fir and Engelmann spruce on northern aspects show moderate to heavy defoliation by spruce budworm. Overall health of ponderosa pine is good with just some small patches (less than .2 acre) of mortality due to bark beetle.

26. Table V-1 – Current and appropriate cover type for the Sula State Forest Project Area.

Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Subalpine fir				
Douglas-fir				
Lodgepole pine				
Mixed conifer	10,661	88	0	0
Ponderosa pine	225	2	10,886	90
Western larch/Douglas-fir				
Western white pine				
Non-stocked	1,200	10	1,200	10
Non-forest				
Other (specify)				
Total:	12,086	100	12,086	100

Old Growth

Old Growth is identified and analyzed using criteria outlined in Green et al. (ARM 36.11.403). Stand level inventories of the project area would be queried to identify potential old growth and old growth stands. This data would be field verified using cruising data from the inventory of the sale areas.

The proposed prescriptions would be designed to meet standards for old growth restoration and old growth maintenance treatments, according to ARM 36.11.418, using individual tree selection. The project would retain sufficient large live trees and basal area to meet the old growth definition in ARM 36.11.403.

Environmental Effects

No Action Alternative: Direct and Secondary Effects and Cumulative Effects
Under the No Action Alternative, natural processes would continue to have a direct influence on forest conditions. Trees infected with insect and/or disease would remain on site. Areas of overstocking would continue to have negative effects on tree health and vigor. In addition, overstocking would continue to increase the risk of crown fires.

With no action, noxious weeds may continue to spread. Grazing licensees would be required to continue weed control efforts consistent with their use.

Action Alternative: Direct, Secondary, and Cumulative Effects

Noxious Weeds
Direct, Secondary, and Cumulative Effects
Implementation of the action alternative would involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. For the action alternative, an Integrated Weed Management (IWM) approach was considered for treatment of existing and prevention of potential noxious weeds. For this project: prevention, revegetation of roads/disturbed areas, and weed control measures (herbicide treatments and biocontrol) are considered the most effective weed management treatments.

Herbicide application would be completed, as needed, in disturbed areas to reduce weed spread and promote desired vegetation for weed competition. Herbicide would be applied according to labeled directions, laws, and rules, and would be applied with adequate buffers to prevent herbicide runoff to surface water resources. Implementation of IWM measures listed in the mitigations are expected to reduce existing weeds, limit the possible spread of weeds, and improve current conditions to promote existing native vegetation. More weed control would occur compared to the no-action alternative and grass and competitive vegetation would increase along roads.

Overall cumulative effects of increased noxious weeds within the project area are expected to be low, based on implementing prevention measures to reduce new weeds (herbicide application and biocontrol), by cleaning equipment, and grass seeding on roads and in disturbed areas (burn piles, landings, temp trails, temp roads) to compete against weeds.

Rare Plants

Direct, Secondary, and Cumulative

Any rare plants identified within treatment units would be protected from machinery (tracks and tires).

The proposed action would be expected to have low direct, indirect, and cumulative impacts on rare plants.

Standard Vegetative Community

The proposed action alternative would commercially treat approximately 3,348 acres out of the 12,086 acre project area The proposed timber harvest would promote healthy stand conditions and emulate natural disturbances based on fire regimes historically present in the project area. Large trees over 21" DBH would be favored for retention. Ponderosa pine would be favored over Douglas-fir. The harvest would remove dead and dying trees impacted by insects and disease. Trees with poor form and growth (forked tops, crook, sweep, flat tops and showing signs of little to no growth) would also be removed. Advanced regeneration would be protected during operations. Post-harvest stands would appear more open and park like. Ponderosa pine along with lesser amounts of healthy Douglas-fir would be present across the landscape in the overstory. Young, vigorous ponderosa pine, Douglas-fir and lodgepole pine would remain present in the understory to eventually replace the trees removed from the overstory. In accordance with ARM 36.11.411, all current snags and at least 2 snag recruits per acre would be retained. In accordance with ARM 36.11.410 and ARM 36.11.414 fine slash foliage and coarse woody debris would be left scattered on the forest floor in all harvest units.

The proposed action would non-commercially treat approximately 4,000 acres. Trees would be cut to an average of 16 foot spacing. The healthiest, most vigorous trees would be targeted to remain. Treatments would maintain a species composition of ponderosa pine, Douglas-fir, and lodgepole pine on site. Thinning would employ any combination of lop and scatter, mastication, and hand piling.

Old Growth

Direct, Secondary, and Cumulative

Stands within proposed treatment areas would be identified as old growth using stand level inventory and confirmed with data acquired during cruising.

The proposed prescriptions would be designed to meet standards for old growth restoration or old growth maintenance treatments, according to ARM 36.11.418, using individual tree selection. The project would retain sufficient large live trees and basal area to meet the old growth definition in ARM 36.11.403.

The proposed action would be expected to have no direct, indirect, or cumulative impacts on old growth.

Vegetation Mitigations

- Favor the largest ponderosa pine trees with good vigor for retention to improve overall stand growth and vigor.
- Wash equipment prior to entering the harvest area to limit weed seed dispersal.
- Spray and implement bio-control for weeds pre and post-harvest, as needed. Proposed treatment units with identified infestations of African wiregrass (Ventenata dubia) would be treated with chemical spraying before any proposed activities begin.
- Grass seed newly disturbed road surfaces, landings, and burn pile areas to limit the area available for weeds to become established.
- In stands identified as old growth, retain sufficient large live trees and basal area to meet the old growth definition.
- Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*. All existing snags would be maintained. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.

VEGETATION REFERENCES

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.

Montana Natural Heritage Program (MTNHP). 2013. Plant Species of Concern and Special Status Species map. Available online at: https://mtnhp.org/mapviewer/

Montana Administrative Rules for Forest Management. 36.11.401 (50)

Pfister, R., B. Kovalchik, S. Arno, R. Presby. 1977. Forest Habitat Types of Montana. USDA Forest Service. General Technical Report INT

Attachment C – Soils Analysis

Sula State Forest Project – Soils Analysis

Analysis Prepared By:

Name: Andrea Stanley

Title: Hydrologist/Soil Scientist, Montana DNRC

Introduction

The following analysis will disclose anticipated effects to soil resources within the Sula State Forest project area. Direct, secondary, and cumulative effects to soil resources of both the No-Action and Action alternatives will be analyzed.

Issues and Measurement Criteria

Proposed activities could physically impact soils through physical disturbance (compaction and/or displacement), increase soil loss by erosion or slope failure, alter the local nutrient cycle, and reduce soil productivity.

Regulatory Framework

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

Montana Best Management Practices (BMPs) for Forestry

Voluntary guidelines for forest management developed by the State to protect soil and water resources. These BMPs are considered required for forestry projects on State Trust lands and become enforceable as contract requirements on timber sales. Note that many of these requirements are also specified in the Administrative Rules of Montana for Forest Management (discussed in the following paragraph).

DNRC Forest Management Rules

The Administrative Rules of Montana (ARMs) for Forest Management (Subchapter 4) apply to forest management activities on all state trust lands administered by the department. Rules that apply to soil protection include the following:

- ARM 36.11.410 For nutrient retention purposes, treatments shall minimize the amount of fine branches and leavy material removed from the site.
- ARM 36.11.414 requires adequate coarse woody debris (CWD) be left on site to facilitate nutrient conservation and cycling. CWD retention amounts have been determined by the state in the SFLMP using concentrations recommended by Graham et

al. (1994). ARM 36.11.422 (2) (2) (a) requires BMPs appropriate to the project be determined during project development and environmental analysis.

- ARM 36.11.424 requires monitoring of soil disturbance at selected sites – this is discussed further in the following State Forest Land Management Plan section.
- ARM 36.11.425 requires establishment of equipment restriction zones (ERZs) when forest management activities are proposed on sites with high erosion risk.

State Forest Land Management Plan (SFLMP)

The programmatic plan and Environmental Impact Statement guiding forested Trust Land management. Detrimental soil disturbance is defined when compaction and displacement exceed 20 percent of an area. The SFLMP sets the threshold for significant impact to soil productivity at 15 percent of the native soil condition within a timber harvest area. The plan reports an expected environmental consequence of less than 15 percent soil area impact from compaction and displacement, a slight increase in erosion, and a slight increase in loss of slope stability. The plan reports an expected maintenance of available of soil nutrients by retaining adequate levels of coarse and fine woody debris to facilitate nutrient retention and cycling. The plan also directs all prescribed silvicultural treatments maintain the long-term productivity of the soil and site to ensure the long-term capacity to produce trust revenue and maintain soil hydrologic function. The plan also requires the DNRC to monitor soil effects on selected sites for implementation of mitigation measures and effectiveness to guide future harvest practices. This monitoring is reported by the DNRC in reports completed in 2009 and 2011 (see Soil References at end of this attachment).

Montana Forested State Trust Lands Habitat Conservation Plan (HCP)

This plan directs forest management activities to implement specific mitigation for managing wildlife and fish habitat. Mitigations include equipment restriction zones (ERZs) at sites with high erosion risks near streams, and a Riparian Management Zone (RMZ) conservation strategy. The plan also requires minimization of roads and implementation of Montana Best Management Practices (BMPs) to reduce increases in erosion and potential sedimentation of surface waters.

Existing Conditions

The project area is located in the southern section of Rye Creek in the Sapphire Mountains and north of the East Fork Bitterroot River. The project area includes moderate to steep slopes with soils weathering from mainly granitic rock (intrusive Late Cretaceous) and nonconsolidated gravels of Tertiary and Quarternary age (valley fill deposits). The granitic rock weathers to coarse sand with weak cohesion and easily erodes. Within the project area, some existing road fills and shaped cutslopes constructed from the decomposed granite have failed or are vulnerable to failure due to the weak cohesion of this material. This has generally occurred where slope angles are not shallow enough, vegetation has not established after construction, and/or the area received heavy use from cattle and/or wildlife.

Unique or unusual geologic features have not been observed at the project area. Areas of slope instability and recent failure have been observed along road fills in the western and northern portions of the project area. Failures or scarps outside of road fills have not been observed in the field or in review of recent Lidar imagery of the project area.

Site History

- Most of the area was designated as the Sula State Forest in 1925 by the Montana Legislature and are owned by the state and reserved for forest production and watershed protection (MCA 77-5-101 and 102). Since that time the area has been managed by Trust Lands with mainly forestry and grazing operations.
- The Sleeping Child Wildfire in 1961 burned approximately 20% of the Cameron Creek watershed.
- In August 2000, wildfires burned most of the project area, except for some areas located in the southeastern portion of the project area. Much of the timber killed by the wildfires and subsequent insect attack was salvaged in the following years. Post-fire rehab also included suppression rehab (repair of areas disturbed by suppression equipment), fire rehabilitation (including measures to protect erodible areas such as aerial and broadcast seeding, improved and replaced road drainage, mulching and other ground cover, and tree planting).

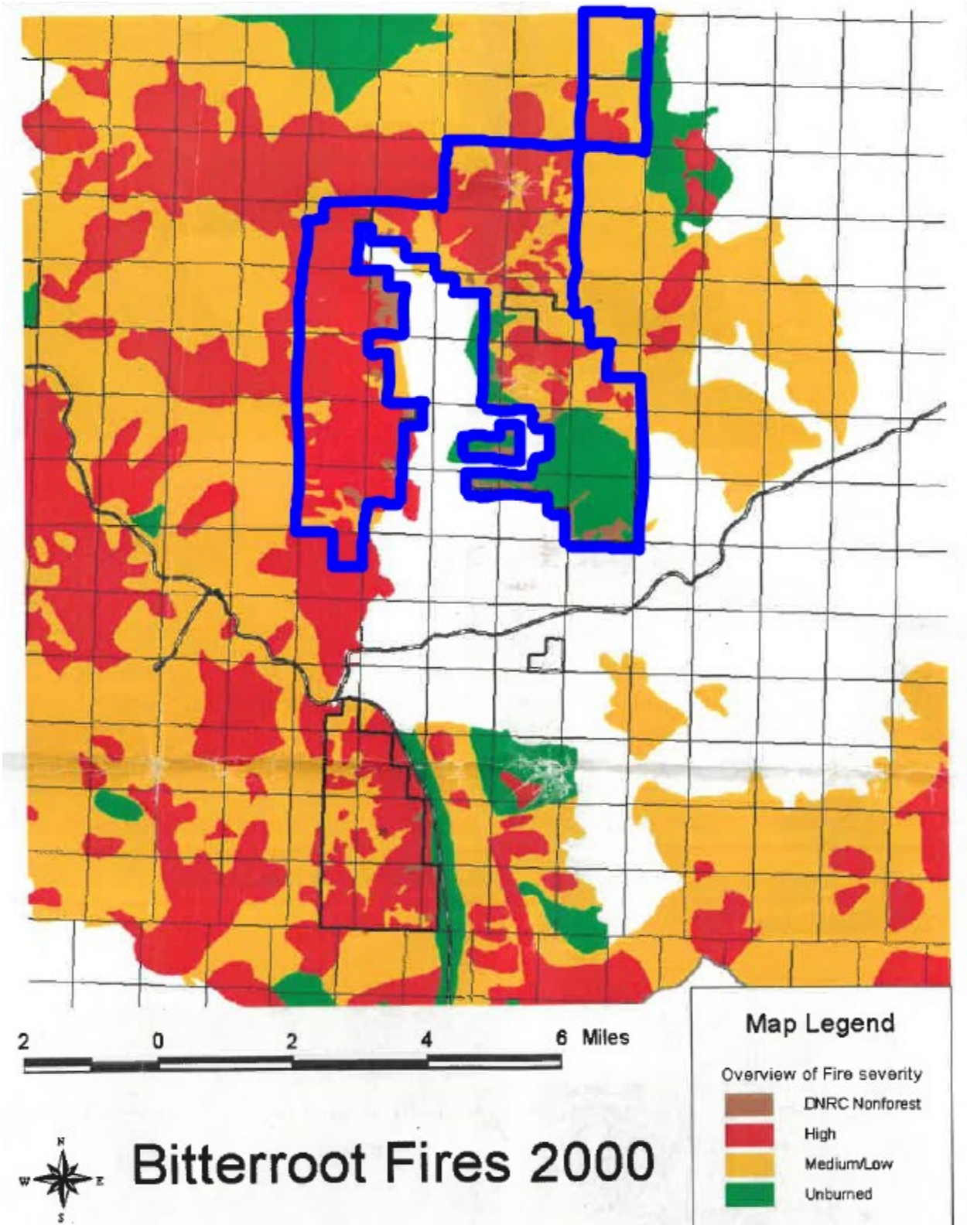


Figure S1: Map of fire burn severity following the regional fires in 2000. The area outlined in **dark blue** is the proposed project area.

The wildfires of 2000 resulted in significant damage to soil resources in the project area due to soil heating and loss of ground cover including the duff layer, woody material, and vegetative cover (Brown et al., 2003; Rymniak, 2021). Soil heating under severe burning conditions removes or severely alters soil organic matter, volatizes nutrients, decreases water infiltration, and kills microorganisms (Brown et al., 2003). Much of the project area burned under high-severity conditions (Figure S1). Since the fire, fire severity (along with aspect, and post-fire management) has been influential on vegetation regeneration, distribution and cover within the project area (Rymniak, 2021).

Post-fire erosion loss included sheet erosion less than 1 inch throughout the Sula area as a result of the fire and subsequent intense summer rainstorms (DNRC, 2002). Little coarse woody debris remained on the forest floor following the fire, measurements averaged 1.8 tons/acre (DNRC, 2002). Post-salvage, these numbers increased due to mitigation and the average measured range increased to an average of 9.6 tons/acre (DNRC, 2002).

Figure S2 presents visual estimates of existing coarse woody debris (CWD) concentrations within the project area observed in 2023. CWD concentrations appear to have increased from the 9.6 tons/acre average observed in 2003, to an approximate average of 20 tons/acre. This could be explained by recruitment of fallen snags over the 20-year period following the fire.

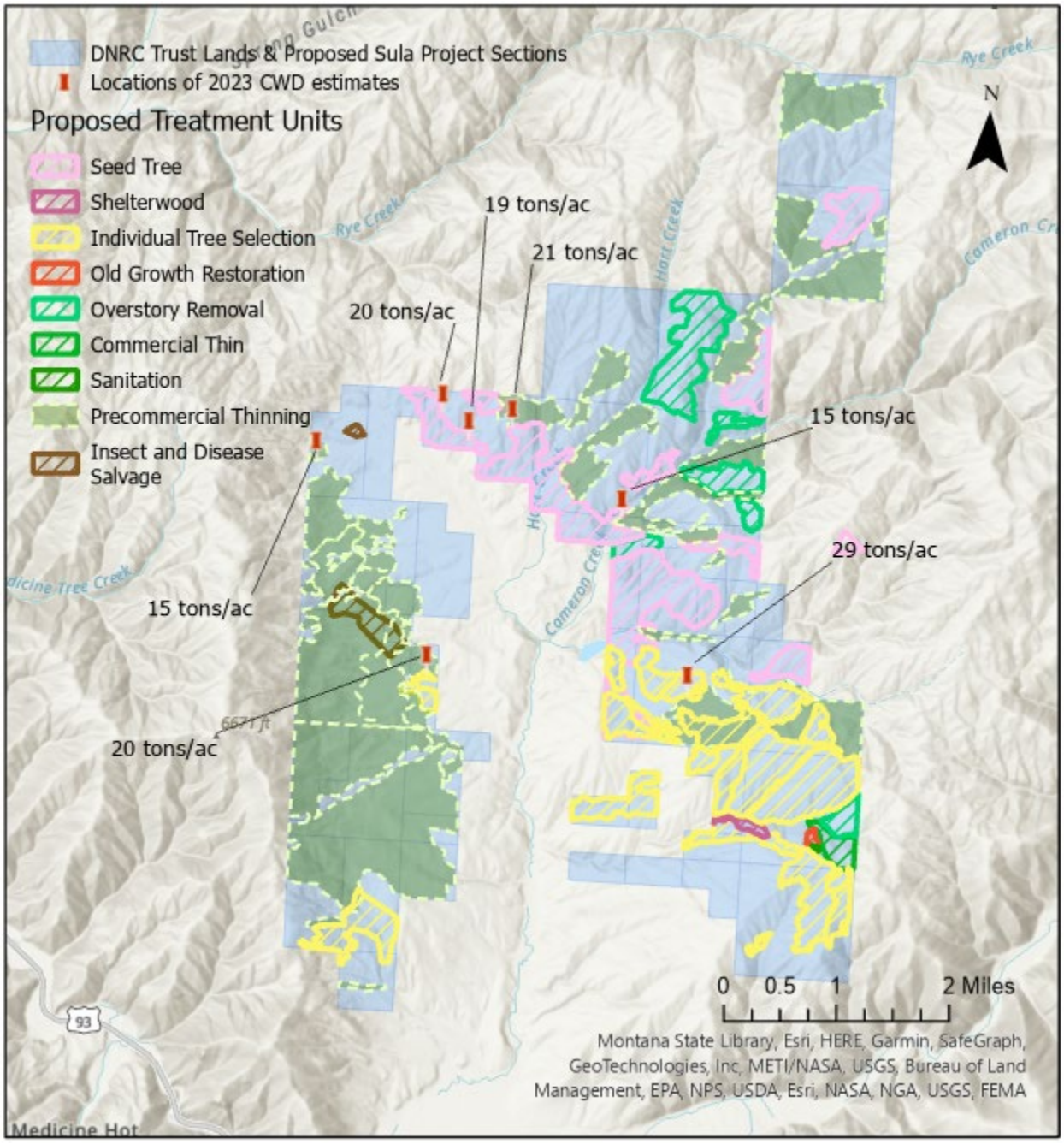


Figure S2: Map of the proposed project area, areas proposed for harvest and/or thinning, and distribution of estimated CWD concentrations.

Environmental Effects

No Action Alternative: Direct, Secondary, and Cumulative Effects

Implementation of the no-action alternative would result in no soil resource impacts in the project area. Soil resource condition would remain similar to those described in the existing conditions sections of this environmental assessment.

Action Alternative: Direct, Secondary, and Cumulative Effects

Physical Disturbance

Physical disturbances to soils including displacement and compaction are expected with the proposed action alternative. The majority of these disturbances would be visibly detectible during and in the seasons following project completion, but not detrimental in the long term as they would likely mostly be ameliorated within one to two years by natural processes including revegetation, freeze/thaw, and recruitment of coarse and fine organic material. Other disturbances in areas of more frequent equipment use including main skid trails, landings, and where slash is burned would have a longer detrimental residual effect on the physical properties of the soil and the soil's productivity. The distribution of the detrimental and non-detrimental effects within the project area are expected to be similar to the observable residual impacts observed at the project area from past harvest entries. The area-averaged residual impact from the last entry in the project area was 7%.

The DNRC conducted quantitative soil monitoring studies on select timber harvest projects for 22 years, beginning in 1988 (MT DNRC 2006, 2011). This data provides additional information for estimating risk of impacts to project area soils with the proposed action.

The proposed harvest includes ground-based equipment yarding where harvest is planned and non-commercial thinning (by hand or equipment). Using the measured detrimental disturbance of DNRC monitoring the detrimental effects forecasted within the proposed project area would be approximately 12.1% where equipment would be used for harvest. Note that much of the areas that would be impacted are areas of existing residual effects from past harvest entries such as existing skid trails, landings, and roads described in the Existing Conditions portion of this assessment.

Detrimental soil impacts of compaction and displacement are considered significant when they exceed 20 percent of an area (SFLMP, IV-9). Using the upper end of observed detrimental disturbance completed by the DNRC and others, the total detrimental disturbance would remain below what is considered significant.

Erosion

Increased erosion is expected with the proposed action alternative. The risk of erosion associated with timber harvest activities include the following:

- erosion can be accelerated by an increase in precipitation reaching the ground due to reduced interception from the modified forest canopy

- erosion can be exacerbated by displacement of soils in skid trails and equipment traffic (Crawford et al., 2021)
- erosion can occur where runoff from road and landing surfaces is concentrated and discharged

Reducing the risk of erosion and sedimentation has been the impetus for the development of Montana Forestry BMPs and many of the BMPs are designed and monitored for their effectiveness in avoiding and mitigating the risk or increased erosion associated with timber harvesting activities. Project design elements and mitigation measures listed earlier in this analysis are expected to reduce the risk of increased erosion to levels that may be detectible but are not highly detrimental. Detrimental erosion would include direct delivery to streams and loss of soils and soil productivity. Erosion is expected in some areas where physical disturbances have occurred but are not expected to be prolonged or result in delivery from hillslopes to surface waters.

Nutrient Cycling

Effects to nutrient cycling and long-term productivity is expected with the proposed action alternative. These effects would be detrimental in areas where equipment would be operated. Some of the affected areas already have residual effects from past timber harvest activities, and the addition of new areas with detrimental effects are expected to not be significant.

Timber harvest and vegetation removal does result in nutrients leaving the local system. These effects are mitigated by the retention of coarse (CWD) and fine (FWD) woody debris and by implementing a harvest prescription that is designed to sustain yield and long-term productivity of the ground.

Cumulative Effects

Cumulative effects are the collective impacts on the soil environment when considered in conjunction with other past, present, and future actions related to the proposed action alternative. This ground has been used for timber production by the State for nearly 100 years. The proposed project is associated with the DNRC Trust Lands planned continued use of the ground to continue to sustainably yield timber. The word sustainability includes maintaining the long-term productivity of the soils.

The proposed action would result in the continued detrimental effect on existing impacted soils and would likely cause some detrimental effects on currently non-impacted soils. However, these effects when considered in conjunction with the existing condition are not considered significant. Non-significance is determined based on the proportion of the project area that would have lasting detrimental effects, which is estimated to be 12.1 percent, and includes existing disturbed areas such as roads and landings. This area is inside the agency’s tolerance for impacts which is specified in the SFLMP. Temporary impacts would occur over a greater area, but BMPs and natural soil recovery result in these impacts being low and non-lasting.

The detrimental impacts to the physical properties, productivity, and nutrient cycling of soils would be generally limited to areas where equipment operation would be concentrated (i.e., main skid trails, landings, slash piles, and roads). These effects are mitigated by monitoring for factors that could exacerbate these effects such as monitoring for appropriate soil moisture conditions during operations. And reducing the existing area of impacted soils by using existing roads and skid trails as much as possible. Other measures that lower the risk of cumulative effects to soils with the proposed project include implementation of forestry BMPs, including erosion control and grass seeding newly disturbed roads and landings to promote prompt revegetation.

Soils Mitigations

- The Contractor and Sale Administrator should agree to a general skidding plan prior to equipment operations. Disturbance from ground-based harvest and yarding would also be avoided by limiting turning on slopes, optimizing favorable skidding, and limiting new disturbances by optimizing use of historic skid trail disturbances.
- Ground-based harvest and/or yarding would be excluded from slopes >45%. On slopes >45% options for harvest and or yarding would be limited to skyline yarding or tethered harvest with limited turning.
- Skid trails would be mitigated concurrent with yarding operations with slash and grass-seed only. Mitigation with slash can include use of limbed logs partially embedded across a trail or area at risk of erosion from concentrated runoff. The logs can be partially embedded by tracking equipment over the placed material. Water bars would be discouraged along skid trails due the higher erosion risk associated with the local soil types.
- Newly disturbed roads and landings would be grass seeded following harvest activities.
- To prevent soil compaction ground-based mechanical felling and yarding would be restricted to one or more of the following conditions:
- Soil moisture content at 4-inch depth less than 20% oven-dry weight.
- Minimum frost depth of 4 inches.
- Minimum snow depth of 18 inches of loose snow or 12 inches packed snow.
- Equipment scarification would be excluded from potential site preparation activities. Scarification related to control lines for prescribed burning would be allowed. Control lines would be grass seeded after burning is complete.

Soils References

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Attachment D – Water and Fisheries Analysis

Sula State Forest Project – Water and Fisheries Resources Analysis

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Introduction

The following analysis will disclose anticipated effects to water and fisheries resources within the Sula State Forest project area. Direct, secondary, and cumulative effects of both the No-Action and Action alternatives will be analyzed.

Issues and Measurement Criteria

Proposed activities could impact water quality through increased erosion and sediment delivery to streams. Proposed activities and associated road activities could impact the timing, distribution, and amount of water yield in affected watersheds. Along with effects to water quality and yield, is a potential risk to fisheries by changes in water quality and/or habitat.

Regulatory Framework

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

Montana Best Management Practices (BMPs) for Forestry

Voluntary guidelines for forest management developed by the State to protect soil and water resources. These BMPs are considered required for forestry projects on State Trust lands and become enforceable as contract requirements on timber sales such as the proposed project. Example BMPs that protect water quality that are contract requirements:

- VI.F. – “The Purchaser shall not transport, handle, store, load, apply, or dispose of any hazardous substance in such a manner as to pollute water supplies or waterways…”
- VII.M.4.d. – “Erosion Control work shall commence as soon as skidding is completed on each skid trail or landing and must be kept current with unit operations.”

Note that many of the requirements of Montana BMPs for Forestry are also specified in the Administrative Rules of Montana for Forest Management (discussed in the following paragraph).

DNRC Forest Management Rules

The Administrative Rules of Montana (ARMs) for Forest Management (Subchapter 4) apply to forest management activities on all state trust lands administered by the department, including this proposed project. Rules that apply to water resources protection include the following. Note these rules are summarized and paraphrased below.

- 36.11.421 Requires transportation planning that minimizes roads when considering existing and future management needs. This rule also requires maintaining roads commensurate with use and appropriate resource protection including adequate drainage and distancing from streams.
- 36.11.422 Requires DNRC Trust Lands to incorporate BMPs into project design and implementation for all forest management activities.
- 36.11.423 Requires DNRC Trust Lands to consider cumulative effects with each project to ensure the project would not increase impacts beyond the physical limits for supporting the most sensitive beneficial uses.
- 36.11.425 Requires implementation of Streamside Management Zones (SMZs), Riparian Management Zones (RMZs), and Equipment Restriction Zones (ERZs) to protect riparian areas and sites with high erosion risk.
- 36.11.426 Requires implementation of Wetland Management Zones (WMZs) to protect wetland soils, habitat, and hydrologic function.
- And note ARM 36.11.301-313 Forest Management (Subchapter 3) is described below:

Montana Streamside Management Law and Rules (SMZ law)

The Montana Code Annotated (MCA) 77-5-301 and the Administrative Rules of Montana (ARM) 36.11.301-313 (Subchapter 3) apply to forest management activities near streams on all state trust lands administered by the department.

Pre-commercial thinning (PCT) is included in the proposed project. PCT activities are not regulated by SMZ law, unless harvested material is sold for commercial purposes.

Montana Forested State Trust Lands Habitat Conservation Plan (HCP)

This plan directs forest management activities to implement specific mitigation for managing wildlife and fish habitat. Mitigations include equipment restriction zones (ERZs) at sites with high erosion risks near streams. The plan also requires minimization of roads and implementation of Montana Best Management Practices (BMPs) to reduce increases in erosion and potential sedimentation of surface waters. Some of the commitments in the HCP go beyond the minimum requirements for Class 1 streams specified in the DNRC Forest Management Rules and SMZ Law and Rules, by adding a riparian management zone (RMZ) and sometimes channel

migration zones both of which impose restrictions on harvest that covers a greater area around Class 1 streams than the SMZ law.

PCT is included in the proposed project. In the HCP retention requirements are limited State-owned parcels in lynx management areas (LMAs) or grizzly bear recover zones. The Sula project area contains neither. Therefore, for the proposed Sula Project, HCP commitments do not affect PCT activities.

Existing Conditions & Proposed Activities

The project area occurs in an area commonly referred to as French Basin and/or the Sula State Forest. The French Basin and the majority of the Sula State Forest drains to Cameron Creek which connects with the East Fork of the Bitterroot River. Cameron Creek and its tributaries are not listed as impaired by the Montana Department of Environmental Quality (DEQ) 303d Reports, meaning that the DEQ has not listed the creek as not meeting water quality standards for assigned beneficial uses.

The Bitterroot Water Forum (BRWF) completed a Watershed Restoration Plan (WRP) for the Bitterroot watershed in 2000, and indicates poor fish habitat (for WCT in particular) in the lower half of Cameron Creek due to high sediment loads and elevated water temperatures (BRWF, 2000). Sources of concern include shade loss, channelization, and grazing or riparian or shoreline zones. The lower half of Cameron Creek is outside the proposed project area.

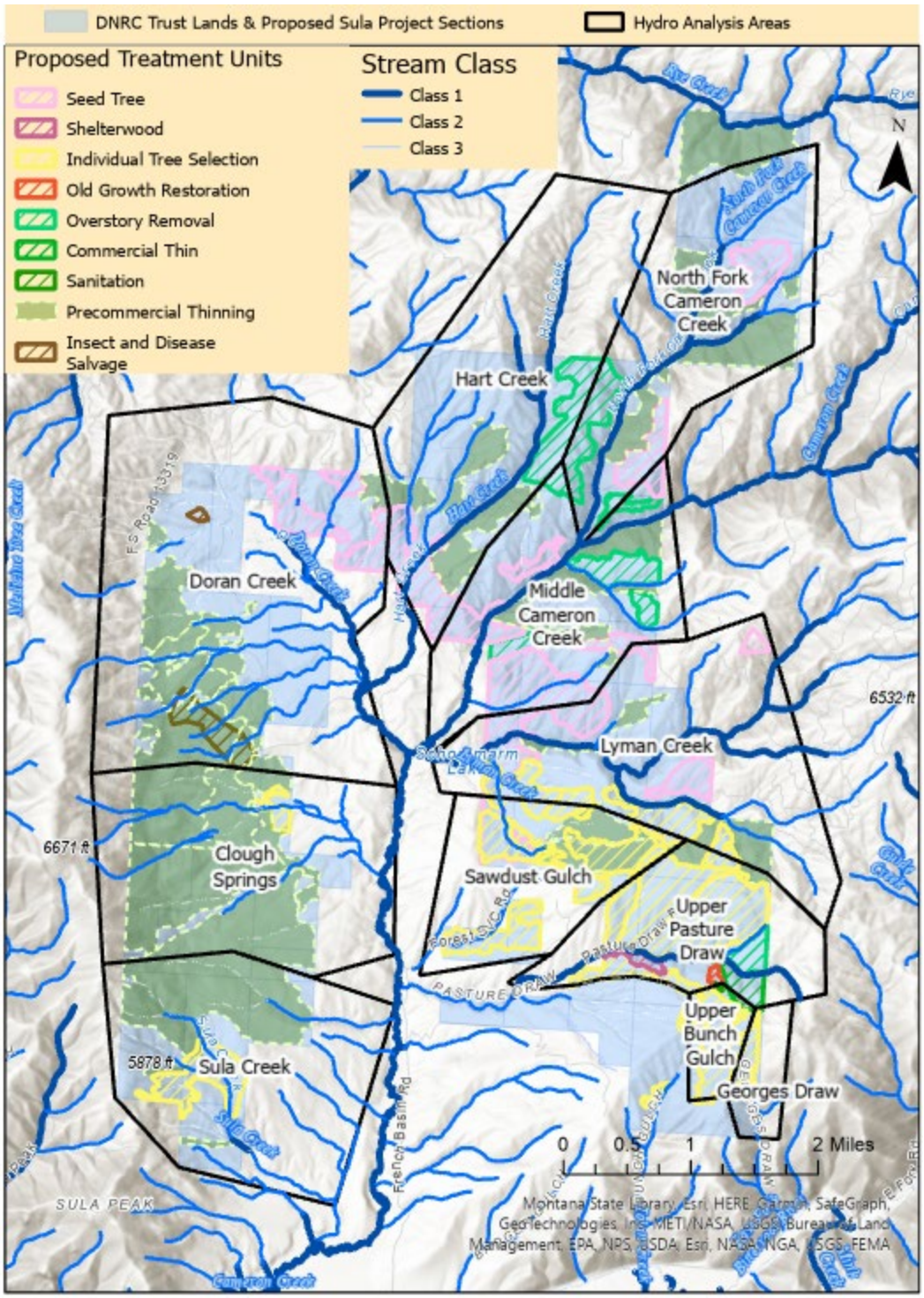
A small (northern) portion of the project area and one of the proposed haul routes is in the Rye Creek watershed. Rye Creek is listed as impaired for multiple parameters including nutrients, sedimentation, and alteration of streamside vegetation. Similar to Cameron Creek the watershed is naturally sensitive due to the easily erosible decomposing granite (DG).

Fire History

Nearly all the proposed project area burned during the Bitterroot Fires in 2000, much with high severity. Wildfire is known to have adverse effects on water quality and fish habitat by increasing runoff, erosion, and sedimentation rates (Smith et al., 2011; and Moody et al., 2013) due to the loss of vegetation and litter exposing soil to erosion and a water-repellant surface that develops in the soil during the fire (Debano, 2000). The duration of these effects have been documented to last between one to six years depending on the severity of the burn (Debano, 2000). The hydrologic effect of the 2000 fires is assumed to have ameliorated because the fire occurred >20 years ago and vegetation has reestablished in the burn areas.

Project area sub-watersheds and streams

The geography and existing condition of analysis watersheds are described in the following paragraphs.


DNRC Trust Lands & Proposed Sula Project Sections
Hydro Analysis Areas
Proposed Treatment Units
Seed Tree
Shelterwood
Individual Tree Selection
Old Growth Restoration
Overstory Removal
Commercial Thin
Sanitation
Precommercial Thinning
Insect and Disease Salvage
Stream Class
Class 1
Class 2
Class 3
N
North Fork Cameron Creek
Hart Creek
Doran Creek
Middle Cameron Creek
Lyman Creek
Sawdust Gulch
Upper Pasture Draw
Upper Bunch Gulch
Georges Draw
Clough Springs
Sula Creek
6532 ft
6671 ft
5878 ft
SULA PEAK
0
0.5
1
2 Miles
Montana State Library, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, Esri, NASA, NGA, USGS, FEMA

Georges Draw

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Discontinuous Class 3 stream alternating with adjacent wetlands at bottom of draw occur near proposed harvest areas. • Class 2 stream initiates ~300 feet downhill of proposed harvest units. • No Fish	• Watershed area: 517 acres • State owned: 120 acres • Acres harvest: 46 individual tree selection (ITS)

Georges Draw drains to the south towards the East Fork Bitterroot River. Proposed harvest occurs at the upper elevations of the mostly south-facing watershed. The channel grade near the project area is steep (>3%) with no potential for fish habitat due to discontinuous surface water and grade. Riparian shrubs and sedges occur at the draw bottom. A poorly located former logging road occurs near the bottom of the draw and has been recruited into regular use by vehicle (ATV) trespass. Due to poor drainage, this “trail” is likely a source of sedimentation to the stream and wetland.

Upper Bunch Gulch

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 2 stream located near proposed harvest area. Stream has no downstream connection. • No Fish	• Watershed area: 723 acres • State owned: 425 acres • Proposed acres harvest: 160 acres ITS • Recent harvest: 133 ITS

Bunch Gulch flows south towards the East Fork Bitterroot River, however there is no channel observable at the MT Route 472 culvert crossing immediately south of the mouth of Bunch Gulch and 100 feet north of the East Fork Bitterroot River. No flows were present in Bunch Gulch during field observations in October 2022. Above channel initiation the draw bottom has discontinuous wetlands. The channel appears to have some impacts from cattle including hoof shear and punging. Riparian shrubs and sedges occur at the stream channel that has an average bank full width of 1 foot.

Field observations, and Lidar data collected in 2020 and processed to show bare-earth conditions, indicate roads have been constructed along the draw bottom adjacent to the channel in Bunch Gulch. Within the proposed harvest areas, abandoned roads occur east of the channel. Above the channel, abandoned roads occur both east and west of the draw bottom.

This proposed harvest adds approximately 160 acres of ITS harvest to the watershed. This proposed harvest would likely occur simultaneously or within 3-5 years previously analyzed and sold timber sale (Pasture Draw, 2023) which includes approximately 133 of ITS.

Pasture Draw

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 1 and Class 2 stream, depending on location, Pasture Draw, is located near proposed harvest areas. • No Fish	• Watershed area: 1,820 acres • State owned: 1,214 acres • Proposed acres harvest: • 617 acres ITS • 55 acres commercial thin • Recent harvest: 334 ITS

The lower reach of Pasture Draw is a Class 2 stream that is intercepted by the Daniels (Vought) Ditch after it crosses French Basin Road approximately 0.4 miles downstream of Trust Lands ownership. The Daniels (Vought) Ditches returns flow to Cameron Creek approximately 1.5 miles south of the confluence with Pasture Draw. Upper Pasture Draw (in Sections 26 and 25) is a Class 1 stream. Proposed harvest activities for this project are adjacent to this class 1 portion of Pasture Draw. The Class 1 classification is due to flows estimated to occur >6 months in the average year.

The existing Pasture Draw Road is poorly located near the stream and in some areas the buffer between the edge or the road and road fill is immediately adjacent to the creek. The road material is loose and is composed mostly of sand-sized grains with low binders. The existing road drainage is mainly rolling dips that are appropriately spaced but require maintenance and/or reconstruction to sustain or restore effectiveness.

Sawdust Gulch

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• No Fish • Class 2 streams	• Watershed area: 551 acres • State owned: 196 acres • Acres harvest: 220 acres seed tree

Although stream features occur within the project area, the channel does not have connection downstream of the project area. Below the project area Sawdust Gulch terminates in a wetland before reaching Cameron Creek. The channel within state ownership appears to have some impacts from cattle including hoof shear and punging. Riparian shrubs and sedges occur at the stream channel that has an average bank full width of 1 to feet.

Lyman Creek

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 1 stream (potential Type 1 CMZ) • Westslope Cutthroat Trout and Brook Trout (MFISH).	• Watershed area: 3,580 acres • State owned: 1,140 acres • Acres harvest: 230 acres ITS • Acres PCT: 210 acres

Lyman Creek and its northern tributary carry Westslope Cutthroat Trout and Brook Trout (MFISH). Lyman Creek is the primary source of surface water for Schoolmarm Lake, a reservoir constructed by earthen dam on private land.

The channel above the lake was dry during field observations in mid-August 2023.

Trust Lands expanded its ownership within this watershed in 2009 Some of the existing roads within the acquired parcels have poor drainage. However, sediment risk is low due to distance from streams.

The watershed included restoration following the 2000 fire; work included at least one pipe replacement. No fish barriers associated with road crossings remain within state ownership in this watershed.

North Fork Cameron Creek

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Westslope Cutthroat Trout and Brook Trout (MFISH). • Class 1, 2, and 3 streams	• Watershed area: 2,426 acres • State owned: 1,495 acres • Acres harvest: • 166 acres Seed Tree • 124 acres ITS • Acres PCT: 447 acres

The watershed included multiple restoration projects following the 2000 fire; work included pipe replacements. No fish barriers associated with road crossings remain within state ownership in this watershed.

Middle Cameron Creek (including North Fork)

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 1 and 2 streams (potential Type 1 CMZ) • Westslope Cutthroat Trout, Brook Trout, Mountain Whitefish, and Longnose Sucker (MFISH).	• Watershed area: 9,280 acres • State owned: 2,881 acres • Acres harvest: • 524 acres Seed Tree • 327 acres ITS • PCT: 660 acres • Approximately 20% of the Cameron Creek watershed burned during the Sleeping Child Wildfire in 1961.

The watershed included multiple restoration projects following the 2000 fire; work included pipe replacements. No fish barriers associated with road crossings remain within state ownership in this watershed. Lower reaches of Cameron Creek within State ownership have several irrigation diversions including headgates and ditches. Some appear to be not used or unmaintained.

Hart Creek

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 1 and 2 streams (potential Type 1 CMZ) • Westslope Cutthroat Trout (MFISH).	• Watershed area: 2,334 acres • State owned: 1,370 acres. • Acres harvest: • 177 acres Seed Tree • 135 acres ITS • PCT: 286 acres

The lower portion of Hart Creek that is still within State ownership is entrenched (i.e., hydrologically isolated from the floodplain) potentially due to vertical adjustment due to loss of vegetation and or gullying post-fire. Cattle use appears to be somewhat heavy with hoof punging of banks and hedging of adjacent shrubs. The channel

The lower reach of the Hart Creek channel (still within State ownership) was dry during field observations in mid-August 2023 (see photo).

The lower reaches of Hart Creek (on private) are heavily diverted into a system of irrigation ditches, hay meadows, and pastures.

Doran Creek

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• No fish (within state ownership) • Class 2 and 3 features near harvest and PCT areas.	• Watershed area: 4,310 acres • State owned: 1,960 acres. • Acres harvest: • 180 acres Seed Tree • 100 acres Salvage • PCT: 740 acres

The stream channel and perennial flow with fish occupancy (including WCT) initiates below state ownership (in the SE corner of Section 9). Numerous unnamed ephemeral draws, springs, wetlands, and swale features occur within state ownership above channel initiation. The proposed forest management activities (harvest and PCT) are located in areas drained by numerous unnamed ephemeral and intermittent draw and swale features that drain towards Doran Creek, but do not necessarily have a surface connection. Many of these drainage features contain isolated and limited reaches of discernable stream channel. Some of these defined channel reaches are spring-fed and are perennial. However, all of these stream channels flow subsurface as the flow downhill towards the valley bottom.

Clough Springs

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 2 within state ownership and proposed PCT. • No Fish	• Watershed area: 1,890 acres • State owned: 1,220 acres. • Acres harvest: 30 ITS • PCT: 1,040 acres

The lower extent of the Clough Springs watershed contains a small short reach of perennial stream with direct delivery to Cameron Creek. This lower reach includes occurrences of Brook Trout (below state ownership in the E half of Section 21). The stream is fed by a series of

springs and wet meadows located in the pasture and grassland valley bottom on private land in Section 21. The watershed within state ownership is drained by several unnamed discontinuous draw features with no direct surface delivery to the Clough Springs stream channel. Most of these drainage features consist of ephemeral draws and swale bottoms. Several of these drainage features contain springs, wetlands and isolated reaches of discernable stream channel. However, all discernable stream channels and concentrated surface flow go subsurface before reaching the Clough Springs channel.

Sula Creek

Summary of surface water features:	Summary of watershed, state ownership, and proposed project activities:
• Class 1 near proposed PCT • Class 2 near proposed harvest • No Fish	• Watershed area: 1,000 acres • State owned: 630 acres. • Acres harvest: 140 acres ITS • Acres PCT: 195 acres

The upstream portions of Sula Creek within state ownership meets the criteria for a Class 2 stream due to the seasonality of flow and downstream connection. The lower reach of the stream within state ownership has more perennial flow and is therefore a Class 1 stream. Immediately below state ownership there is a small impoundment (earthen dam) on private land.

Proposed Activities Near Streams and at Wetlands

Proposed activities with action alternative near streams and at wetlands. No lakes (as defined in SMZ law) occur within the project area. The mitigations listed in table cells highlighted **orange** are protections specific to this project for mitigating erosion risk, and to limit risk to water resources, fish habitat, and wildlife.

Type of water feature zone	Potential harvest activities	Equipment limitations	Potential non-commercial thinning activities[1]	Potential slash and prescribed burn[2] activities
Within 50 feet of Class 1 stream	No harvest. The only merchantable trees that could be harvested in these areas are for cable corridors and hazard trees. These exceptions are not expected with this project.	No ground-based equipment except on established roads. No exception for areas above established roads.	Thinning of conifer species to max spacing of 14'x 14'. Protect all deciduous tree and shrub species.	Slash scatter, hand piles and burn, chip and mastication are all ok. Must prevent delivery to stream.
In Class 1 SMZ > 50 feet from OHWM because slope [3] 35% or adjacent wetland	Must comply with SMZ law retention requirement because same requirement is specified in HCP. Currently no HCP allowances are permitted in Bitterroot Aquatic Analysis Unit (BAAU) for disease, insect, blowdown, fire salvage, or desired future condition. (i.e., no AP for reduced retention). • *Retain at least 50% of the trees ≥ 8 inches DBH on each side of a stream* • *Retain shrubs and sub-merchantable trees*	Due to high erosion risk within the project area, and ERZ must be established in accordance with ARM 36.11.425.	Thinning of conifer species to max spacing of 14'x 14'. Protect all deciduous tree and shrub species.	Slash scatter, hand piles and burn, chip and mastication are all ok. Must prevent delivery to stream.
Class 1 stream in RMZ outside of SMZ and adjacent wetlands.	Must retain 50% of trees ≥ 8 inches DBH. Currently no HCP allowances are permitted for less than 50% retention in BAAU for disease, insect, blowdown, fire salvage, or desired future condition.	Due to high erosion risk within the project area, and ERZ must be established in accordance with ARM 36.11.425.	Thinning of conifer species to max spacing of 14' x 14'. Protect all deciduous tree and shrub species.	• Slash scatter • Slash piles • Hand piles • Chip or mastication • Broadcast burn
Class 2 stream SMZ (including adjacent wetlands)	Must comply with SMZ law retention requirement unless A.P. issued for reduced retention. Below is summary of requirement: • *Retain at least 50% of the trees ≥ f8 inches DBH on each side of a stream or 5 trees per 100-foot segment, whichever is greater.* • *Protect and retain submerchantable trees and shrubs (unless deliberate for non-harvest thinning).* • *Retention trees must be representative of species and sizes in pre-harvest stand.* • *If SMZ is extended to 100 feet, most retention should be within 50 feet of stream.*	Due to high erosion risk within the project area, and ERZ must be established in accordance with ARM 36.11.425.	Thinning of conifer species to be max spacing of 14' x 14'. Protect all deciduous tree and shrub species.	• Slash scatter • Hand piles • Chip or mastication (Maintain distance to prevent delivery to stream.) Equipment operation OK for mastication with A.P.

Class 3 stream SMZ (including adjacent wetlands)	No retention requirement. *Protect and retain submerchantable trees and shrubs (unless deliberate for non-harvest thinning).*	Due to high erosion risk within the project area, and ERZ must be established in accordance with ARM 36.11.425.	Thinning of conifer species can be same as adjacent non-riparian areas. Protect all deciduous tree and shrub species.	• Slash scatter • Hand piles • Chip or mastication (Maintain distance to prevent delivery to stream.) Equipment operation OK for mastication with A.P.
Isolated wetlands	No retention requirement. *Protect and retain submerchantable trees and shrubs (unless deliberate for non-harvest thinning).*	Limit ground-based operations to periods of low soil moisture, frozen soil, or snow-covered conditions.	Thinning of conifer species can be same as adjacent non-riparian areas. Protect all deciduous tree and shrub species.	• Slash scatter • Hand piles • Chip or mastication (Avoid equipment operation in zone.)

Environmental Effects

No Action Alternative: Direct, Secondary, and Cumulative Effects

Water Quality

Direct and Secondary

Under this alternative, no timber harvesting or related activities would occur. Water Quality would continue as described in the existing conditions.

Cumulative

No additional cumulative impacts to water quality would be expected. Sediment delivery sites from roads on the proposed haul routes would remain unchanged, as would the sediment sources described in Existing Conditions.

Water Quantity

Direct and Secondary

No increased risk of increases or reductions in annual water yield would result from this alternative.

Cumulative

No increase in water yield would be associated with this alternative. As vegetation continues toward a fully forested condition, annual water yields would also be expected to gradually decline.

Fisheries
No direct or indirect impacts would occur to fish species or habitat beyond existing conditions (e.g., some riparian grazing and hoof shear impact to streams, sediment delivery from existing roads).

Action Alternative: Direct, Secondary, and Cumulative Effects

Water Quality
Risks of direct impacts to water quality are low because the proposed project would not involve work directly in streams beyond potential equipment crossings of Class 3 streams and wetlands per ARM 36.11.304.

The risks to water quality from the proposed action are sediment delivery from roads and increased erosion from disturbed soils. A small increased risk of secondary effects to water quality would occur with the project associated with the use of existing roads that are poorly located near streams. However, these risks would be minimized with the use of Forestry BMPs and site-specific actions such as dust abatement (e.g., speed control and/or chemical treatment) and sediment control (e.g., slash filter windrows, maintenance, and improvement of road drainage).

Other recommended site-specific mitigations that lower water quality risk and/or address existing water quality issues are listed in the table below. Beyond reducing water quality risk, meeting these improvements would aid the State in meeting commitments contained in the SFLMP and the HCP.

Recommended specific mitigations to improve water quality risk by analysis area:

Analysis Area	Percent Proposed Harvest within Analysis Area
Georges Draw	 Close ATV access point and add drainage to ATV trespass trail near bottom of draw. Photo is of trail near southern boundary of proposed harvest in Georges Draw (summer, 2023).
Pasture Draw	Continue maintenance and/or reconstruction of rolling dips where roads are located near streams. Add slash filter windrows at outlets of rolling dips and/or ditch relief culverts.
Sawdust Gulch	Improve road surface drainage and runoff treatment. I.e., maintained and/or reconstruct rolling dips and add slash filter windrows at outlets.
Cameron Creek	 Review existing irrigation infrastructure including ditches and headgates with users. Some of the existing ditch infrastructure is unmaintained or has blown out. Potential need for additional hydrologic relief so that additional failures are not a risk. Photo is of location where ditch berm failed with debris and sediment fan on floodplain and within 100 feet of Cameron Creek.
Sula Creek	Add water bars and/or Kelley hump to close access and to ensure road runoff does not drain to Sula Creek where road has been abandoned in the SE corner of Section 12.

General:

 Treat existing cutslopes with limited or no vegetated cover by either reshaping, grass-seeding, and/or with slash or coir logs. Existing roads with cutslope angles in the area that are 1:1 or steeper do not stabilize or vegetate. Suggest all road maintenance or construction require shallower cutslopes.

Montana's Forestry BMPs are Montana's answer to addressing water quality impacts from forestry activities. The federal Clean Water Act requires states to implement control strategies for addressing nonpoint sources causing water quality impacts. Ongoing monitoring of implementation and effectiveness of Montana Forestry BMPs on State Trust lands have indicated that this strategy has been effective in avoiding water quality impacts from activities such as those proposed with this action alternative (Sugden et al., 2012; Sugden, 2018).

Considering the existing condition, the project design (including limits on activities near streams and wetlands listed earlier in this analysis), the above-listed mitigations, the application of Forestry BMPs, Administrative Rules including SMZ law, and HCP protections – the proposed action would have low risk of causing detrimental effects to water quality.

Water Quantity
Direct and Secondary

Water Yield

The mechanism for effects to stream flow would be change in how water is moving through the watershed (timing and volume). Changes to the forest canopy would change canopy hydrologic fluxes (precipitation interception and transpiration). Studies correlating vegetation harvest and treatment with streamflow yield have suggested at least 20% of the watershed vegetation must be harvested to have a measurable increase in water yield in similar mountain environments (Stednick, 1996; Brown et al., 2005; Adams et al, 2012). However, the effects of the change in canopy fluxes can be dampened or potentially reversed by change in understory transpiration from understory shrubs, retained trees, rapid postdisturbance growth, and increased sublimation on south-facing slopes (Goeking and Tarboton, 2020).

The table below summarizes the proportion of vegetation that would be removed from each sub-watershed analysis area. The only sub-watershed analysis area that exceeds the 20% threshold for detectible change in water yield is the Clough Springs. Changes to steam flow hydrology resulting from the action alternative would likely not be detectible in the other streams in the project area.

Enough vegetation is proposed for removal from Clough Springs to result in a risk of a measurable effect on streamflow hydrology according to the commonly cited rule-of-thumb of 20% tree cover removal (Goeking and Tarboton, 2020; Stednick, 1996; Brown et al., 2005; Adams et al, 2012). However, because most precipitation is mainly received as snow, and half of the watershed is south-facing there is a reasonable assumption that increased sublimation would dampen or reverse the hydrologic effect of the canopy removal (Biederman et al., 2015; Slinski et al., 2016). The conclusion for this assessment is there is a moderate risk of low effects to streamflow for a short duration (1-5 years) within Clough Springs.

Percent vegetation removal anticipated with proposed action.

Analysis Area	Percent Proposed Harvest within Analysis Area	Percent Proposed PCT within Analysis Area	Estimated Total % vegetation proposed for removal considering prescriptions within analysis area
Georges Draw	9%	None	2%
Upper Bunch Gulch	40%	None	10%
Pasture Draw	55%	None	14%
Sawdust Gulch	39%	None	10%
Lyman Creek	6%	6%	5%
North Fork Cameron Creek	12%	18%	9%
Middle Cameron Creek (including North Fork)	9%	7%	6%
Hart Creek	13%	12%	9%
Doran Creek	6%	17%	10%
Clough Springs	2%	55%	28%
Sula Creek	14%	20%	14%

The risk of a cumulative effect on water yield in all analysis watersheds is low. Field observations of the forest floor and adjacent streams indicate that there are no observable lasting detrimental hydrologic impacts from the past harvest entry.

Fisheries

Direct and Secondary

Streams containing fish within or near the project area include Hart, Cameron, and Lyman Creeks. No activities are proposed in streams containing fish (i.e., no new crossings and no replacement of existing crossings are proposed). Harvest of trees would not occur within 50 feet of fish-bearing streams. Beyond 50 feet, a minimum of at least 50% of trees ≥ 8 inches DBH would be retained along with all deciduous trees and shrubs. Some non-commercial thinning activities may occur within 50 feet of streams with fish, but this activity would occur only where densities of conifer species is greater than 14' spacing. These activities are expected to have a low risk of change in recruitment of woody debris, change in stream shading, change in stream temperature.

Changes in low regime, stream connectivity, and fish populations for fish-bearing streams within or near the project area are not expected to be measurable or significant. See water yield analysis above.

The project has a moderate risk of increased sediment delivery to streams within the project area due to increased truck traffic. Proposed haul routes include roads in the Cameron and Rye Creek watersheds. Several miles of road in the Rye Creek watershed are poorly located adjacent to the stream.

Water and Fisheries Resources Mitigations

The proposed project includes the following project-wide strategies and mitigations to comply with the laws and plans and to minimize potential risk to water and fisheries resources. Most of these mitigations are paraphrased from standard DNRC timber contract that would be used in administering the proposed project.

- The action alternative does not involve work within any streams. Harvest equipment would be excluded from areas within 50 feet of any Class 1 stream, unless on an existing road.
- Dust abatement would be used if project-related traffic is producing excessive airborne dust (see DNRC standard contract for more info). In particular, the one-mile section of Gold Creek Road near the unnamed tributary to East Twin Creek. Dust abatement options include limiting the speed of all project vehicles (including log trucks) to 10 mph, road watering, or application of chemical dust abatement.

- During road maintenance activities such as grading or snowplowing, side-casting of road material into a stream or to an area where runoff would cause sedimentation, would be prohibited.
- Slash and debris would not be left in drainages, roadside ditches, wetlands, or streams. Slash can be used as sediment and erosion control at drainage feature outlets (i.e., at the outlets of ditch relief culverts and rolling dip outlets).
- Cut slopes, fill slopes, ditches, and road shoulders would be seeded following construction or reshaping.
- Exposed soils at landings would be grass seeded following operations and/or following burning of slash piles.
- Equipment operators would locate skid trails according to DNRC Forester direction/approval. Skid trails would be located in areas of existing disturbance as much as possible.
- Skid trails would be mitigated concurrent with yarding operations with slash and grass-seed only. Mitigation with slash can include use of limbed logs partially embedded across a trail or area at risk of erosion from concentrated runoff. The logs can be partially embedded by tracking equipment over the placed material. Water bars would be discouraged along skid trails due the higher erosion risk associated with the local soil types.
- Equipment operators would maintain erosion control structures in active sale areas throughout the contract period and especially before operations cease for inactive periods, including during periods of heavy winter snowfall and spring breakup.
- Hauling would be restricted or suspended during periods when roads could be damaged by rutting into the subgrade, reducing effectiveness of drainage structures, or displacing surface materials.

Water and Fisheries Resources References

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Attachment D – Wildlife Analysis

Sula State Forest Project – Wildlife Analysis

Analysis Prepared By:

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Title: Wildlife Biologist, Montana DNRC

Introduction

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

Issues

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

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

Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles.
Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing while potentially removing snags needed by flammulated owls for nesting.

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

Proposed activities could disturb nesting red-tailed hawks and/or modify nesting habitats for red-tailed hawks.

Proposed activities could disturb golden eagles and/or modify nesting habitats for golden eagles.

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

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

Regulatory Framework

Various legal documents dictate or recommend management direction for terrestrial wildlife species and their habitats on state trust lands. The documents most pertinent to this project include DNRC Forest Management Rules, DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan (USFWS and DNRC 2010), the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Analysis Areas

The discussions of existing conditions and environmental effects within each subsection pertain to land areas of 2 different scales. The first scale of analysis is the Project Area (12,086 acres), which includes the DNRC-managed lands in sections 2, 3, 8, 9, 10, 11, 13, 14, 15, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, and 36 in T2N, R19W, sections 25 and 36 in in T3N, R19W, and section 5 in T1N, R19W. where activities are being proposed. The second scale is the cumulative-effects analysis area, which refers to a broader surrounding landscape useful for assessing cumulative effects to wildlife and habitat. The cumulative effects analysis area is approximately 53,437 acres and includes the area bounded by East Fork Bitterroot River, Jennings Camp Creek, the series of peaks leading to Blue Mountain, Crystal Peak, Rye Creek, Bear Gulch, the headwaters of Medicine Tree Creek, and Whiskey Creek back to the East Fork Bitterroot River. The cumulative effects analysis area is largely managed by USDA Forest Service (31,546 acres, 59%) with lesser amounts of DNRC-managed lands (12,685 acres, 24%) and private ownership (9,206, 17%).

Analysis Methods

Analysis methods are based on the DNRC State Forest Land Management Plan, which is designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries (MNHP data accessed 8/21/23), DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, USFS VMAP (v16), and consultation with professionals. Past and ongoing activities on all ownerships, as well as planned future agency actions, have been considered in each cumulative-effects analysis for each resource topic.

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

Coarse Filter Wildlife Analysis

DNRC's principal means of managing for biodiversity is by taking a ‘coarse-filter approach’, which favors an appropriate mix of stand structures and compositions on state lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., land

type, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained like those endemic species evolved with, the full complement of species will persist, and biodiversity will be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a 'fine-filter' approach for threatened, endangered, and sensitive species (ARM 36.11.406). The fine-filter approach focuses on a single species' habitat requirements and helps ensure that special habitat needs of these rare or sensitive species are not overlooked.

MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY

Issue

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

Introduction

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

Connectivity of forest cover between adjacent patches is important for promoting movements of species that are hesitant to cross non-forested expanses (Hilty et al. 2006). Effective corridors tend to be relatively wide, unfragmented, diverse, and associated with riparian areas or ridges (Fischer and Fischenich 2000). In general, wider corridors are more effective and provide connectivity for more wildlife species than narrower corridors. Narrow corridors can provide some connectivity, particularly for small mammals and amphibians; however, they can also act as funnels that increase predator efficiency (Groom et al. 1999). Wildlife movement may be adversely affected when habitat fragmentation, a landscape-level process in which a specific habitat is progressively subdivided into smaller and more isolated patches occurs (McGarigal and Cushman 2002). Historically, wildfires were the primary disturbance factor that shaped the forests of western Montana (Fischer and Bradley 1987, Arno et al. 1995, Losensky 1997). Thus, substantial portions of forested landscapes were fragmented naturally by young forests or non-forested habitat (Gruell 1983, Hart 1994), and many species native to Montana evolved under conditions where habitat occurred in relatively small, isolated patches. Timber management can also fragment dense forested habitat and decrease patch size and shape. Patch size, age, shape, abundance, and connectivity of similar patches can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the species and its habitat requirements. Temporary non-forested openings,

patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 12,086-acre project area. Cumulative effects were analyzed on a 53,437-acre area described above in the Analysis Areas portion of this analysis. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Analysis Methods

Direct and indirect effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, aerial photograph interpretation, USDA remotely sensed data, and a GIS analysis of available habitats. Factors considered within the cumulative effects analysis area included the amounts of mature forest cover with >40% canopy closure, amount of riparian habitats, levels of human developments, motorized access, and visual screening, and levels of potential human disturbance.

Affected Environment

The project area is situated in the East Fork of the Bitterroot drainage and is dominated by moderately warm and dry forest types. Elevations in the project area range from roughly 4,620 to 6,480 feet. The project area currently contains approximately 3,262 acres (27% of project area) of mature stands (100-plus years in age) of ponderosa pine and Douglas-fir that have a reasonably closed canopy. There are some stands in the project area that potentially could meet the definition of Old Growth (Green et al. 1992; see Vegetation section for additional details).

Generally, fire has historically played an important role in shaping vegetation community types in the Bitterroot area (Losensky 1997 -- Climatic Section M332B). Fire played a variable role in these communities, with frequent, non-lethal fires in the lower elevations (average fire frequencies between 5-20 years) to mixed severity in the mid-slopes dominated by Douglas-fir and western larch/Douglas-fir (average fire frequencies between 30-85 years on Douglas-fir and 70-200 years on western larch/Douglas-fir stands) to stand replacement fires in areas dominated by lodgepole pine, Engelmann spruce, and subalpine fir (average fire frequencies between 120-350 years). Historically, the project area likely saw a combination of low intensity, frequent fires that reduced understory vegetation but were not lethal; mixed severity fires that removed certain components of existing stands, but largely didn’t replace whole stands; and small areas of stand replacement burns that removed whole stands of lodgepole pine.

The existing conditions in the project area were heavily influenced by the wildfires of 2000, during which roughly 12,021 acres (87%) of Sula State Forest (including the portion of Sula South that is west of Highway 93 in the vicinity of Andrews and Praine Creeks) burned, with over half experiencing stand replacement burns (DNRC 2000). During those fires, the western

side of the project area generally experienced high severity wildfires that resulted in high mortality and subsequent salvage harvesting. Following the fires and salvage activities these stands regenerated via natural regeneration and planting that have led to the existing dense seedling/sapling stands of young ponderosa pine, lodgepole pine, and Douglas-fir trees. Additionally, there are isolated pockets of mature stands that survived the fires scattered across the western portion. Generally, the eastern side of the project area experienced less intense fire, resulting in a combination of high severity and mixed severity burns. This side contains both seedling/sapling stands as well as mature sawtimber stands of ponderosa pine and Douglas-fir. Similar to the western portions of the project area, those areas in high severity, stand replacement burns experienced high mortality and underwent considerable salvage harvesting following the fires and are largely in the seedling/sapling stages of development; while the areas of mixed severity burns generally burned through the understory and numerous fire-killed trees were subsequently salvaged resulting in stands with mature trees and considerable regeneration in the understory. Regeneration in the eastern portion of the project area was largely via natural regeneration and is a mix of ponderosa pine, Douglas-fir, and lodgepole pine. Currently, forest habitats cover much of the project area, but only 4,985 acres (4,276 sawtimber and 709 pole timber; 41% of the project area), are moderately or well stocked in pole timber or saw timber stands, with the remaining 59% being in poorly stocked stands or young stands resulting from the recent wildfires, any salvage harvesting, and subsequent regeneration. The forested areas (41%) could facilitate some use by those species requiring connected-forested conditions and/or forested-interior habitats. Generally, these habitats exist where stand replacement burns did not occur and are generally concentrated in the southeastern portion of the project area, but there are also stringers of mature stands that connect lower elevation grasslands on private ownerships to upper elevation areas on USFS ownership across other portions of the project area. Thus, connectivity within the project area through mature forested patches is only partially intact due to recent wildfire activity; those resultant young stands, likely provide some connectivity for certain wildlife species and will continue to mature and could start to provide some more mature forested attributes in the next 20-50 years.

Within the project area there are numerous open roads (~14 miles) resulting in an open road density of 0.76 mi./sq. mi. (simple linear calculation). Considerable non-motorized access to the project area exists given the open roads and the 105 miles of low standard, restricted roads used for administrative uses (total road density of 5.6 mi/sq. mi.). Collectively, the project area has moderate potential for human disturbance due to the amount and location of open roads, moderate to high amounts of access for the general public via non-motorized access routes, and only portions of the project area with considerable visual screening.

A portion of the 4,960 acres (12% of cumulative effects analysis area) of forested habitats currently possessing greater than 40% overstory canopy cover on other ownerships in the cumulative effects analysis area are likely providing habitat for those species requiring mature, forested habitats and/or forested connectivity. A portion of the 3,089 acres (7%) of well-stocked pole timber stands on other ownerships likely facilitates some use by a portion of these same species requiring forested habitats and could contribute to overall landscape connectivity. Conversely, much of the 33,434 acres (81% of cumulative effects analysis area) of shrubs, herbaceous areas, poorly stocked forested stands, open water, agricultural fields,

seedling/sapling stands, and recently burned or harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful for these species requiring forested habitats. Past timber management, recent wildfires, human developments, roads, and the natural openness of certain habitats in the cumulative effects analysis area has influenced landscape-level connectivity in the cumulative effects analysis area. Collectively, connectivity across the cumulative effects analysis area is partially intact and likely provides a suitable network of cover capable of facilitating movements of many terrestrial species across the local landscape; however the central part of the cumulative effects analysis area includes a non-forested bowl that many of the drainages in the project area flow down through, so the overall ability of riparian areas in this portion of the cumulative effects analysis area to function as viable corridors is somewhat limited. Open road densities in the cumulative effects analysis area are rather high (121 miles, 1.4 miles/sq. mi., simple linear calculation). Numerous restricted roads (at least 322 miles; 3.9 miles/sq. mi.) exist that likely facilitate non-motorized access. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could continue disturbing wildlife in the vicinity and continue altering stand densities and connectivity of forested stands on DNRC-managed lands in the project area and cumulative effects analysis area.

Environmental Effects- Mature Forested Habitats and Landscape Connectivity

No Action Alternative: Direct and Indirect Effects

No forest management activities would occur. Stands providing forested cover that may be functioning as corridors, including along riparian areas, would not be altered. No changes to the amount of the project area meeting the old stand definition would occur. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Over time and in the absence of further natural disturbance events, the abundance of dense mature forest would increase. No adverse direct or indirect effects to wildlife requiring mature forests or landscape connectivity would be anticipated under this alternative. Thus, no direct or indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) no changes to existing forested stands with >40% canopy closure would occur; 2) no changes to riparian habitats would occur, 3) no changes to human developments, motorized access, or visual screening would occur, and 4) no changes in potential for human disturbance would be anticipated.

No Action Alternative: Cumulative Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including along riparian areas, would not be altered. Past harvesting, recent wildfires, and ongoing harvesting have reduced the amount of mature, forested habitats in a portion of the cumulative effects analysis area. Across the cumulative effects analysis area, continued successional advances would move existing stands toward mature forests. Stands in the project area would continue to contribute to the amount of mature forested stands in the cumulative-effects analysis area. No appreciable changes in the existing open habitat types would be anticipated. No further changes in human developments, motorized access, or visual screening would occur. No further changes in wildlife use would be expected.

Thus, no further cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) no changes to existing forested stands with >40% canopy closure would occur; 2) no changes to riparian habitats would occur, 3) no changes to human developments, motorized access, or visual screening would occur, and 4) no changes in potential for human disturbance would be anticipated.

Action Alternative: Direct and Indirect Effects

Proposed timber management would reduce stand densities on roughly 1,907 acres (58%) of existing mature ponderosa pine and Douglas-fir stands with a closed canopy. Another 551 acres of mature stands with a reasonably closed canopy would be pre-commercially thinned, which would alter overall stand density but would not be expected to appreciably alter use by those species requiring mature, forested habitat conditions. The reductions in forested habitats associated with commercial management would be expected to reduce connective forested patches in the project area including habitats for those species that rely on dense patches of mature timber. Habitat connectivity associated with riparian areas would not be appreciably altered as limited riparian timber management would occur in the project area; slight reductions in habitat quality along riparian areas could occur with limited proposed activities that may occur in SMZ and RMZ areas, but sufficient cover would be retrained as required under DNRC's Habitat Conservation Management Plan that would facilitate use by many of the species in the area requiring corridors. Within stands proposed to be treated, individual trees and patchy tree retention would remain, but these would provide limited escape cover and visual screening compared to the existing condition. Overall habitat quality for those species relying on mature, closed-canopied forested habitats would be reduced, but potential continued use would be possible. In general, habitats for those species adapted to more-open forest conditions similar to historic conditions would increase in parts of the project area, meanwhile habitats for wildlife species that prefer dense, mature forest conditions would be reduced in those same parts of the project area. Although proposed commercial and pre-commercial treatments on 6,861 acres (57% of the project area) would create more open stands, corridors would be retained, particularly along riparian areas and draws. Generally, some reductions in canopy cover would be possible in riparian areas, but mitigations would retain many of the habitat characteristics presently found in those areas. Generally, negligible effects to mature forested habitats and landscape connectivity would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning. No changes to the amount of the project area meeting the old stand definition would occur; proposed prescriptions would retain sufficient large live trees to meet the old growth definition in ARM 36.11.403 (see Vegetation section for more details). No changes in legal motorized public access would occur in the project area and no changes in permanent human developments in the project area would occur. Contract stipulations would minimize the presence of human-related attractants for the duration of the proposed activities. Some changes in visual screening would occur within individual units, but the combination of irregular-shaped units, riparian areas, un-harvested patches throughout the project area, and distance from open roads would minimize the effects of the reductions in visual screening. Short-term increases in disturbance potential associated with proposed timber management, road construction, and use would occur with proposed activities in the project area, but overall, a negligible increase in potential human disturbance would be anticipated following proposed

treatments. Thus, a moderate risk of adverse direct and indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) roughly 58% of the forested stands with >40% canopy cover would be altered in the project area, but some corridors would be retained; 2) a moderately high percentage of riparian habitats would remain unaltered; 3) no changes in human developments or human-related attractants would occur; 4) no changes to legal motorized public access would occur; 5) visual screening in portions of the project area could be reduced, but some visual screening would be retained across the project area; and 6) a short-duration increase in disturbance potential would occur, but overall a negligible long-term increase in overall potential for human disturbance would be anticipated.

Action Alternative: Cumulative Effects

Modifications to mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities, ongoing harvesting, and recent wildfires in the cumulative effects analysis area. There would still be roughly 6,315 acres (12%) of moderately or highly stocked forested habitats in the cumulative effects analysis area that may be providing habitats for species requiring mature forested habitats and/or connected forests for movements through the landscape. Connectivity of forested habitats in the cumulative effects analysis area would be further reduced, but some would persist, and generally the ability for species requiring forested corridors along riparian areas would not be removed. No increases in human developments or human-related attractants would occur. No changes in open road density or total road density would be anticipated. Minor reductions in visual screening in a portion of the cumulative effects analysis area would be anticipated, but no appreciable change in wildlife use would result. Short-term increases in disturbance potential would occur with proposed activities in a small portion of the cumulative effects analysis area, but overall, a negligible increase in potential human disturbance would be anticipated following proposed activities. Thus, a minor risk of adverse cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce stand density in a portion of the cumulative effects analysis area and corridors would be retained; 2) minor changes in riparian habitats would be anticipated, 3) no appreciable changes in human developments or human-related attractants would occur; 4) no further changes to motorized public access would occur; 5) visual screening in a portion of the cumulative effects analysis area would be reduced, but considerable visual screening would persist across the cumulative effects analysis area; and 6) a short-duration increase in disturbance levels would be anticipated, but negligible long-term increase in overall potential for human disturbance would be anticipated.

Fine Filter Wildlife Analysis

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, species of concern identified through public scoping, and species managed as big game by DFWP. In western Montana, 3 terrestrial species that could be affected by forest management activities are federally classified as threatened: Canada lynx, grizzly bear, and yellow-billed cuckoo. Additionally, DNRC considers numerous sensitive species that may have

specific habitat requirements and/or could potentially be affected by timber management activities (see Table below).

The potential for direct, indirect, and cumulative effects was considered for the endangered, threatened, and sensitive species included in the table below. The assessment rationale for each species is presented in each corresponding rationale cell in the table. For Canada lynx, bald eagles, fisher, flammulated owls, pileated woodpeckers, red-tailed hawk, golden eagle, big game security, and big game thermal cover, potential for adverse effects was present, therefore, more detailed analyses for each of these species are included below.

Table WI-1 –Anticipated Effects of the Sula State Forest Project on wildlife species

Species/Habitat	27. **Potential for Impacts and Rationale** 28. [Y/N] Potential Impacts and Mitigation Measures 29. N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Threatened and Endangered Species	
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	30. [N] The project area is 68 miles south of the Northern Continental Divide Ecosystem grizzly bear recovery area and is 64 miles southwest of `occupied' grizzly bear habitat as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger et al. 2002). The project area is also 12 miles east of the unoccupied Bitterroot Ecosystem grizzly bear recovery area. Grizzly bears are infrequent visitors to the Bitterroot drainage but have been documented in the vicinity in the past including a recent visitor to the Sula area. Individual animals could occasionally use the project area while dispersing or possibly foraging. Extensive use of the project area and vicinity would not be anticipated. Grizzly bears could be displaced by project-related disturbance if they are in the area during proposed activities. However, given their large home range sizes, and manner in which they use a broad range of forested and non-forested habitats, the proposed activities and alterations of forest vegetation on the project area would have negligible influence on grizzly bears.
Canada lynx (*Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	[Y] Detailed analysis provided below.
Yellow-Billed Cuckoo (*Coccyzus americanus)* Habitat: Deciduous forest stands of 25 acres or more with dense	**31.** [N] Western Montana is on the northern edge of the yellow-billed cuckoo range and no direct records of breeding exist in Montana. Yellow-billed cuckoos have only been detected in western Montana twice in the last 20 years (all in June) and appear transitory in nature. No suitable deciduous riparian habitats exist in the project area. No disturbance to cuckoos

understories and in Montana these areas are generally found in large river bottoms	would occur. Thus, no direct, indirect, or cumulative effects to yellow-billed cuckoos would be expected to occur as a result of either alternative.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest less than 1 mile from open water	[Y] Detailed analysis provided below.
Black-backed woodpecker *(Picoides arcticus)* Habitat: Mature to old burned or beetle-infested forest	[N] No preferred, recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Fisher *(Pekania pennanti)* Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[Y] Detailed analysis provided below.
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest	[Y] Detailed analysis provided below.
Fringed myotis (*Myotis thysanodes*) Habitat: low elevation ponderosa pine, Douglas-fir and riparian forest with diverse roost sites including outcrops, caves, mines.	[N] Fringed Myotis are year-round residents of Montana that use a variety of habitats, including deserts, shrublands, sagebrush-grasslands, and forested habitats. They overwinter in caves, mines, crevices, or human structures. Fringed myotis forage near the ground or near vegetation. No known caves, mines, crevices, or other structures used for roosting occur in the project area or immediate vicinity, but a variety of rock outcrops exist in the project area and cumulative effects analysis area that may be suitable for roosting. Fringed myotis have been documented in the vicinity of the project area. Proposed activities could disturb fringed myotis should they be in the area. Changes in vegetation structural attributes could change overall prey availability, but considerable foraging habitats would persist in the project and cumulative effects analysis areas. Overall, no appreciable changes to fringed myotis use of the project area or cumulative effects analysis areas would be anticipated.

Hoary bat *(Lasiurus cinereus)* Habitat: low elevation ponderosa pine, Douglas-fir and riparian forest with diverse roost sites including outcrops, caves, mines	[N] Hoary bats are summer residents (June-September) across a variety of forested habitats in Montana. Hoary bats frequently forage over water sources near forested habitats. Hoary bats are generally thought to roost alone in, primarily in trees, but will use also use caves, other nests, and human structures. Hoary bats have been documented in the vicinity of the project area. Some use by Hoary bats use could be possible given the varied habitats in the project area and the proximity to Schoolmarm Lake and numerous other smaller wetlands. Individual trees and snags in the existing forested habitats could be used for roosting. No known caves or other structures used for roosting occur in the project area or immediate vicinity. Any proposed activities during the summer associated with the action alternative could disturb hoary bats should they be in the area. Some loss of potential roosting habitats could occur with the proposed harvesting under the action alternative, but considerable numbers of ponderosa pine and Douglas-fir as well as most of the existing snags would persist in the project following proposed activities. Generally, habitats for Hoary bats in the project area would persist as they likely experienced under natural fire regimes historically. Within the cumulative effects analysis area, considerable potential roost habitats would persist under both alternatives. No changes in foraging habitats would be anticipated under either alternative. Overall, negligible changes to Hoary bat use of the project area or cumulative effects analysis areas would be anticipated.
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	[N] No preferred cliffs or suitable rock outcrops suitable for use by peregrine falcons occur on, or within 1 mile of the proposed project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	32. [Y] Detailed analysis provided below.
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the project area or vicinity. Townsend's big-eared bats have not been documented in the vicinity of the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Wolverine *(Gulo gulo)* Habitat: Alpine tundra and high-elevation boreal and coniferous forests that maintain deep persistent snow into late spring	[N] Generally wolverines are found in sparsely inhabited remote areas near treeline characterized by cool to cold temperatures year-round and rather deep and persistent snow well into the spring (Copeland et al. 2010). The availability and distribution of food is likely the primary factor in the large home range sizes of wolverines (Banci 1994). The project area is generally below the elevations where wolverines tend to be located. No areas of deep persistent spring snow occur in the project area. Individual animals could occasionally use lands in the project area while

	dispersing or possibly foraging, and they could be displaced by project-related disturbance if they are in the area during proposed activities. However, given their large home range sizes (~150 sq. mi. -- Hornocker and Hash 1981), and manner in which they use a broad range of forested and non-forested habitats, the proposed activities and alterations of forest vegetation on the project area would have negligible influence on wolverines. Thus, minimal direct, indirect or cumulative effects to wolverines would be anticipated.
Other Species Considered	
Red-tailed hawk **(***Buteo jamaicensis***)** Habitat: Open habitats, including agricultural, grasslands, woodlands, and meadows	33. [Y] Detailed analysis provided below.
Golden eagle **(***Aquila chrysaetos***)** Habitat: Nest on cliffs or large trees, hunt over prairies, sagebrush, grasslands, and open woodlands.	34. [Y] Detailed analysis provided below.
Big Game Species	
Elk	35. [Y] Big game winter range exists in the project area. Potential big game security habitat exists in the project area - Detailed analyses provided below.
Moose	
Mule Deer	
White-tailed Deer	

Threatened and Endangered Species

CANADA LYNX

Issue

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

Introduction

Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). Lynx in western Montana prefer mature, multi-storied stands with dense horizontal cover year-round; during the summer lynx also select earlier successional stands with a high horizontal cover (Squires et al. 2010). For denning sites,

the primary component appears to be abundant large woody debris, particularly in the form of downed logs, root wads, slash piles, and live trees (Squires et al. 2008). These conditions are found in a variety of climax vegetation habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) occurred in continuous dense forests of lodgepole pine, subalpine fir, and Engelmann spruce. These fires created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 12,086-acre project area. Cumulative effects were analyzed on a 53,437-acre area described above in the Analysis Areas portion of this analysis. The scale of this analysis area approximates the home range size of an individual lynx (Ruediger et al. 2000).

Existing Environment

The proposed project area ranges from approximately 4,620 to 6,480 feet in elevation and is dominated by ponderosa pine, Douglas-fir, Douglas-fir/ponderosa pine, and mixed conifers. Approximately 731 acres of potential lynx habitats exist in the northeastern portion of the project area in the upper reaches of the North Fork of Cameron Creek and near the divide to Rye Creek (Table WI-2 –Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Sula State Forest Project); considerable non-suitable lynx habitats exist in the project area (11,355 acres, 94%). The potential habitats in the project area are dominated by summer foraging (62% of potential lynx habitats) habitats and temporary non-suitable habitats (25% of potential lynx habitats) resulted from the wildfires of 2000 and subsequent salvage activities. Smaller amounts of other suitable habitats (largely forested lands that provide cover to facilitate movement, 82 acres, 11% of potential lynx habitats) and winter foraging habitats (13 acres, 2% of potential lynx habitats) are present in the project area. Connectivity of forested habitats in the project area is relatively poor and has been altered by recent wildfires and past timber management; Canada lynx habitats in the project area are generally disconnected and exist in a matrix of unsuitable habitats and temporary non-suitable types. Extensive use of the project area by lynx is unlikely given the limited habitats present and the extent of unsuitable habitats in the project area.

The cumulative effects analysis area varies in elevation and stand types with lower elevations dominated by ponderosa pine and Douglas-fir to higher elevations dominated by lodgepole pine, subalpine fir, and mixed conifers. Similarly, potential Canada lynx habitats range from generally unsuitable in the drier and warmer areas to potentially suitable in the higher, cooler, and moister areas in the cumulative effects analysis area. Generally, the project area is at the lower end of this spectrum, and as such provides minimal amounts of suitable Canada lynx habitats. On other ownerships in the cumulative effects analysis area, there are roughly 4,960 acres (12% of non-DNRC lands) of forested stands with a reasonably closed canopy; a portion of those stands that include lodgepole pine, subalpine fir, and mixed conifer stands would likely be suitable lynx habitats and probably include some winter foraging habitats and other suitable habitats. Additionally, summer foraging habitats likely exists on a portion of the 17,022 acres (41% of non-DNRC lands) of sparsely stocked and young forest on other ownerships, however portions

are in drier types that are dominated by ponderosa pine and/or Douglas-fir that may not be suitable for lynx; no lynx habitats likely exist on the 19,501 acres (47% of non-DNRC lands) of shrubs, herbaceous, and non-forested types on other ownerships in the cumulative effects analysis area. The natural interspersion of suitable and unsuitable types in the vicinity likely affects Canada lynx use of the cumulative effects analysis area; connectivity of lynx habitats within the cumulative effects analysis area has been altered by past timber management and recent wildfires. Roughly 85.0% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas, which includes the project area, are in suitable lynx habitat categories. No effects to Canada lynx or their habitats are anticipated from the ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) on DNRC-managed lands in the project area and cumulative effects analysis area.

Environmental Effects- Canada Lynx

No Action Alternative: Direct and Indirect Effects

None of the proposed forest management activities would occur and no alterations of forest vegetation or lynx habitats would occur. Continued maturation in areas identified as other suitable and temporary non suitable habitats could improve overall habitat quality in the small portion of the project area that may be suitable for lynx; continued maturation in summer foraging habitats could reduce the overall availability of younger aged stands used as foraging habitats by lynx. The sizable portion of the project area in non-lynx types would persist and no changes to overall levels of suitable habitats would occur. Landscape connectivity would not be altered. Thus, a negligible risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) habitats found in the project area are marginally suitable for lynx and exist in a matrix of unsuitable habitats; 2) limited winter foraging habitats would persist; 3) summer foraging habitats would continue to be present in the project area in the short term, but would decline in the longer term; 4) the amount of temporary non-suitable habitats in the project area would not change, but could decrease through time; 5) no further risk of displacement due to motorized activities would be anticipated; and 6) no further to alterations in landscape connectivity would occur.

No Action Alternative: Cumulative Effects

No appreciable change in lynx habitats in the cumulative effects analysis area would occur. No appreciable changes to landscape connectivity would be anticipated. Roughly 85.0% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories with this alternative. Thus, a negligible risk of adverse cumulative effects to lynx would be expected since: 1) habitats found in the project area and portions of the cumulative effects analysis area are marginally suitable for lynx use and exist in a matrix of unsuitable habitats; 2) winter foraging habitats would persist in the cumulative effects analysis area; 3) summer foraging habitats would persist in the near-term across the cumulative-effects analysis area, but longer-term availability of summer foraging habitats would likely decline without further disturbance; 4) no further changes in the amount of the cumulative-effects analysis area that is in the temporary

non-suitable habitat class would occur; 5) no further risk of displacement due to motorized activities would be anticipated; and 6) no further alterations in landscape connectivity would occur.

Action Alternative: Direct and Indirect Effects

Most of the proposed commercial activities (3,120 acres; 93%) and proposed pre-commercial activities (3,359 acres; 93%) would not occur in mapped lynx habitats and would not be expected to appreciably affect lynx. Approximately 344 acres of lynx habitats (47% of lynx habitats in the project area) would be altered with this alternative (Table WI-2 –Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Sula State Forest Project). Proposed activities in lynx habitats (265 acres, 77%) would largely be pre-commercial type treatments, which would alter tree densities on 63 acres (18% of lynx habitats) of other suitable habitats and 135 acres (39% of lynx habitats) of temporary non lynx habitats where proposed activities would not change the habitat class on those acres. Meanwhile, proposed pre-commercial thinning on 67 acres (19% of lynx habitats) of summer foraging would reduce tree densities and likely convert these habitats into the other suitable habitats. Proposed commercial activities in temporary non-suitable lynx habitats would further delay the development of those acres into suitable habitats, but would not appreciably alter the usefulness of the overall area for Canada lynx; proposed commercial activities in summer foraging (53 acres; 15% of lynx habitats) and winter foraging (13 acres; 4% of lynx habitats) would be expected to reduce stand densities to the point of rendering those areas temporarily unsuitable for Canada lynx. Following proposed treatments, roughly 34% of the lynx habitats in the project area would be temporarily unsuitable for lynx. Overall, the reductions in summer foraging (119 acres) and winter foraging (13 acres) coupled with the increase in temporary non-suitable habitats (65 acres) and other suitable habitats (67 acres) and the modifications to existing habitats on some temporary non suitable habitats (149 acres) and other suitable habitats (63 acres) would render the landscape slightly less suitable for Canada lynx, however limited to no use of the project area would be expected currently, and proposed changes would not appreciably alter the expected levels of use by Canada lynx. These treated acres would contain fewer trees and less horizontal cover following proposed activities and would likely take 15 to 30 years to regenerate into a suitable habitat condition comprised of Douglas-fir and lodgepole pine stands. Generally, given lynx have relatively low use of silvicultural-treated areas for 10-40 years depending on the intensity of the treatments (Holbrook et al 2018), potential use of the project area could be slightly reduced. The retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine fir and Engelmann spruce in foraging habitats, would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx. Similarly, in pre-commercial thinning units, mitigations to retain small shade tolerant trees would provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands. Generally, minor effects to horizontal cover and coarse woody debris would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that could occur. Coarse woody debris would be retained (emphasizing retention of some logs 15 inches dbh and larger) to provide some horizontal cover and security structure for lynx. No appreciable changes in lynx use of the project area would be anticipated given the limited

habitats present and the mosaic of unsuitable habitats intermixed with those habitats. Proposed activities would reduce forested connectivity in the project area; some connectivity would be retained along riparian areas and through unharvested patches between harvested units. Should individual lynx be present in the project area at the time of proposed management, there would be increased risk of their displacement due to the increased level of noise and disturbance for the duration of the project (potentially up to 10 years). Risk of any displacement attributable to motorized project activities beyond 10 years would not be expected. Thus, a minor risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) habitats found in the project area are marginally suitable for lynx use and exist in a matrix of unsuitable habitats and appreciable use by lynx is unlikely; 2) all the winter foraging habitats would be removed and largely transitioned into temporary non-lynx habitats; 3) summer foraging habitats would be removed, but future summer foraging habitats would be expected to develop over time in the project area; 4) a moderate amount of the project area would be in temporary non-suitable habitats that would be temporary and may take 15 to 30 years for conifer stands to regenerate; 5) risk of displacement due to motorized activities would be temporary and short-term up to 10 years; and 6) minor alterations in landscape connectivity would reduce connectivity of lynx habitats that may alter lynx movements in the project area, but would not prevent lynx movements.

Table WI-2 –Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Sula State Forest Project.

Lynx Habitat Element	Existing Condition	No-Action Alternative	Action Alternative
Winter Foraging	13 (2%)	13 (2%)	0 (0%)
Summer Foraging	451 (62%)	451 (62%)	332 (45%)
Other Suitable	82 (11%)	82 (11%)	149 (20%)
Temporary Non-Suitable	185 (25%)	185 (25%)	250 (34%)
Total Lynx Habitats	731 (6% of project area)	731	731
Non-Lynx Habitats	11,355 (94% of project area)	11,355	11,355

Action Alternative: Cumulative Effects

Should any individual lynx be present in the cumulative effects analysis area at the time of proposed activities, there would be increased risk of their displacement due to the increased level of noise and disturbance for the duration of the project (periodically for up to 10 years). Such disturbance could render some habitats temporarily unavailable for denning or foraging in the local areas where project activities would take place. Risk of any displacement attributable to motorized project activities beyond 10 years would not be expected. Disturbance associated with motorized and non-motorized human activities conducted would be additive to existing levels of human disturbance.

Overall, the reductions in summer foraging (119 acres) and winter foraging (13 acres) coupled with the increase in temporary non-suitable habitats (65 acres) and other suitable habitats (67

acres) and the modifications to existing habitats on some temporary non suitable habitats (149 acres) and other suitable habitats (63 acres) would render a small portion of the cumulative effects analysis area less suitable for Canada lynx, however limited use of the cumulative effects analysis area would be expected currently, and proposed changes would not appreciably alter the expected levels of use by Canada lynx. Anticipated reductions in lynx habitats would be additive to past losses from timber harvesting, recent wildfires, and any ongoing modifications in the cumulative-effects analysis area; likewise, increases in temporary non-suitable lynx habitats would be additive to habitats that have been recently converted due to timber harvesting and recent wildfires. No appreciable changes to the suitable lynx habitats on other ownerships would be anticipated. The existing mixture of suitable and unsuitable habitats in the vicinity of the project area caused by varying ownerships, past timber management, and wildfires has altered connectivity of upland forested habitats in the vicinity; proposed harvesting activities would further affect connectivity, but would occur in areas likely receiving less use by lynx due to the mixture of suitable and unsuitable habitats present in the project area and cumulative effects analysis area, but overall negligible changes to connectivity across the cumulative effects analysis area would be anticipated. Roughly 84.8% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories following proposed treatments. Thus, a minor risk of adverse cumulative effects to Canada lynx would be expected since: 1) habitats found in the project area and portions of the cumulative effects analysis area are marginally suitable for lynx and exist in a matrix of unsuitable habitats; 2) winter foraging habitats would be reduced, but some winter foraging habitats for lynx appear to exist in the cumulative effects analysis area; 3) summer foraging habitats would continue developing for the next 10 to 30 years across the cumulative effects analysis area; 4) the amount of temporary non-suitable habitats would increase in a small portion of the cumulative effects analysis area that would be temporary and may take 15 to 30 years for conifer stands to regenerate; 5) risk of displacement would be temporary and short-term for up to 10 years; and 6) minor alterations in landscape connectivity would not prevent lynx movements.

Sensitive Species

BALD EAGLES

Issue

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

Introduction

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

include large emergent trees that are within sight distances of lakes and rivers and typically screened from human disturbance by vegetation.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area within 2.5 miles of the nest associated with the Sula bald eagle territory. Cumulative effects were analyzed on the home range of this bald eagle territory. This cumulative effects analysis area includes the likely nesting home range area used by the pairs of eagles, considering the size of such areas typically used by eagles breeding in western Montana.

Analysis Methods

Direct and indirect effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, aerial photograph interpretation, USDA remotely sensed data, and a GIS analysis of available habitats. Factors considered in this analysis include human disturbance levels, levels of human access, and availability of snags and large, emergent trees with stout horizontal limbs for nests and perches.

Existing Environment

Roughly 232 acres in the southwestern portion of the project area are within the home range associated with the Sula bald eagle territory. This territory has been in the vicinity for numerous years. The aquatic habitats associated with the territory include the East Fork Bitterroot River, Cameron Creek, Camp Creek, Reimel Creek, and numerous smaller streams, ponds, and wetlands. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitats incorporated by this territory is a coniferous/deciduous mixture as well as shrub/grass habitats along the riparian areas, with coniferous forests, rangelands/shrublands, and grasslands in the upland areas. Within the home range, black cottonwood is the deciduous tree of primary importance to bald eagles, while large emergent conifers also provide important nesting, roosting, and perching habitats. Human disturbance, including timber harvesting, agricultural activities, Highway 93, numerous residential homes and other developments, and recreational activities along the river are potential sources of disturbance to the nesting territory. Numerous large emergent trees are available across portions of the home range, but logging and other human developments in the last 100 years has likely reduced some of these attributes while others have experienced mortality and are declining in quality. No effects to bald eagles or their habitats are anticipated from the ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) on DNRC-managed lands in the project area and cumulative effects analysis area.

Environmental Effects-Bald Eagles

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; 2) no changes in human access would occur; and 3) no changes in the availability of large, emergent trees suitable for perching or nesting would be expected.

No Action Alternative: Cumulative Effects

No cumulative effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; 2) no changes in human access would occur; and 3) no changes in the availability of large, emergent trees would be expected.

Action Alternative: Direct and Indirect Effects

No timber management activities would occur in the nest area or primary use area associated with the bald eagle territory. Proposed activities on 58 acres (47 acres commercial activities, and 11 acres pre-commercial thinning; <1% of proposed units) would occur in the home range area associated with the bald eagle territory; thus the majority (>99%) of proposed activities would occur outside of the home range. Proposed activities could occur when soils are dry, frozen, or snow covered. Thus, the proposed activities could occur during the bald eagle nesting season (February 1- August 15), or the non-nesting (August 16-February 1) season. Given the proximity to Highway 93, numerous residences, recreational use of the river, and topography between the nest site and project area, any potential disturbance from proposed activities would be expected to have negligible effects to the nesting pair should they occur during the nesting season. Conversely, no disturbance to bald eagles would be anticipated should those activities be conducted during the non-nesting period. Minor reductions in the availability of large snags or emergent trees that could be used as nest or perch trees could occur in the home range within the commercial timber management (47 acres), and no further changes in the availability of these resources would be anticipated with the proposed pre-commercial thinning in the home range. No changes in human access to the home range would occur, thereby limiting potential for introducing additional human disturbance to the territory. Generally, negligible effects to bald eagles or their habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. Thus, a minor risk of direct and indirect effects to bald eagles would be anticipated since: 1) disturbance could be slightly elevated within the home range during operations, should they occur during the nesting period; 2) no appreciable change in human access within the project area would occur; and 3) minor reductions in the availability of large, emergent trees could occur in the home range.

Action Alternative: Cumulative Effects

Nesting bald eagles in this territory would continue to experience varying levels of disturbance. Any potential disturbance and/or noise from the proposed activities would be negligible, and no changes in bald eagle behavior would be anticipated. Negligible reductions in emergent trees or snags could occur on a small portion of the home range, which would be additive to past and ongoing activities within the home range. Thus, a minor risk of cumulative effects to bald eagles would be anticipated since: 1) disturbance could be slightly elevated within the territory during proposed activities; 2) no changes in human access within the territory would occur; and 3) negligible changes in the availability of large, emergent trees would be expected.

FISHER

Issue

There is concern that timber management and associated activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

Introduction

Fishers are a mid-sized forest carnivore whose prey includes small mammals such as voles, squirrels, snowshoe hares, and porcupines, as well as birds (Powell and Zielinski 1994). They also take advantage of carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of successional stages but are disproportionately found in stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994) and avoid openings or young forested stands (Buskirk and Powell 1994, Weir and Corbould 2010). However, some use of openings may occur for short hunting forays or if sufficient overhead cover (shrubs or saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Area

Direct and Indirect were analyzed for activities conducted in the 12,086-acre project area. Cumulative effects were analyzed on the 53,437-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to approximate overlapping home ranges of male and female fishers (Heinemeyer and Jones 1994).

Analysis Methods

To assess potential fisher habitat on DNRC-managed lands in the cumulative effects analysis area, sawtimber stands in preferred fisher covertypes (ARM 36.11.403[66]) below 6,000 feet in elevation with 40-percent or greater canopy closure were considered potential fisher habitat. Fisher habitat was further divided into upland and riparian-associated areas, depending on the proximity to streams and stream classification. Direct and indirect effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, aerial photograph interpretation, USDA remotely sensed data, and a GIS analysis of available habitats. Factors considered include the amount of suitable fisher habitats, landscape connectivity, and human access.

Existing Environment

There are approximately 429 acres (3%) of potential upland fisher habitats in the project area and 44 acres (<1%) of riparian habitats associated with the class 1 and class 2 streams in the project area. Additionally, there are 478 acres of upland preferred habitats and another 27 acres of preferred habitats in riparian areas that presently lack structural attributes that would facilitate use by fisher. Generally, habitats in the project area are somewhat disconnected and interspersed with some drier and/or more open habitats than generally used by fisher, thus

extensive use by fisher would not be anticipated, however some occasional use is possible. Moderate motorized human access exists to the project area (~1 miles; 0.76 mi./sq. mi. simple linear calculation) that could expose fisher to potential trapping pressure; nonmotorized access exists on the network of restricted roads (105 miles; total road density of 5.6 mi/sq. mi.).

Within the cumulative effects analysis area, there are roughly 38,392 acres that would be classified as upland (more than 100 ft from Class 1 and more than 50 feet from Class 2 streams) and 2,565 acres that would be classified as riparian that are associated with the 196 miles of Class 1 and 2 streams in the cumulative effects analysis area. On DNRC-managed lands, 62% of the potential riparian fisher habitats in the cumulative effects analysis area are providing structural habitat attributes that could facilitate use by fisher, but overall there are limited amounts of continuous habitats and the effects from past wildfires have influenced potential habitats in the project area.

Potential future fisher habitat could develop on roughly 13 acres of preferred covertypes that exist on DNRC-managed lands in the cumulative effects analysis area, but like many of the potential habitats in the project area, these areas are disconnected and exist in a matrix of unsuitable types. Potential fisher habitats may exist on roughly 144 acres (<1%) of reasonably closed canopied stands of Douglas-fir and mixed conifers in the cumulative effects analysis area. Another 99 acres (<1%) within the cumulative effects analysis area are in preferred covertypes (mixed conifers, Douglas-fir), but lack sufficient structure and cover to be used by fishers. Fisher habitats are largely absent from the 29,484 acres (99%) of shrubs, herbaceous, recently burned, non-forested habitats, and non-suitable forested types dominated by ponderosa pine or lodgepole pine stands in the cumulative effects analysis area. Overall, potential fisher habitats appear fairly limited and exist in a landscape dominated by drier and/or more open habitats than generally used by fisher; overall limited to no use of the cumulative effects analysis area by fisher would be anticipated. Observations of fishers in or near the cumulative effects analysis area within the last 30 years are lacking and recent research suggests that fishers are largely absent east of the wet forests along the Montana-Idaho border (Montana Natural Heritage Program 202, Krohner et al. 2022). No effects to fisher or their habitats are anticipated from the ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) on DNRC-managed lands in the project area.

Environmental Effects-Fisher

No Action Alternative: Direct and Indirect Effects

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

No Action Alternative: Cumulative Effects

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

Action Alternative: Direct and Indirect Effects

Roughly 3 acres (7%) of low-quality riparian habitats and 2 acres (5%) of preferred covertypes that are currently lacking structural attributes preferred by fisher would be treated with the proposed treatments. This would reduce the overall stand density and canopy closure, but given the prescriptions and the requirements of DNRC's HCP, these habitats would continue to be suitable for fisher in the near term. Approximately 8 of the 429 acres (2%) of upland fisher habitats and 50 acres (10%) of preferred covertypes the in the project area would receive treatments that would reduce canopy closure and would likely be too open to be used by fisher following proposed activities. Roughly 12 acres (27%) of riparian fisher habitats would be pre-commercially thinned and another 9 acres (33%) of preferred covertypes that are currently lacking structural attributes preferred by fisher would also be pre-commercially thinned. Similarly, roughly 254 acres of upland fisher habitats and 214 acres of preferred covertypes in the uplands would be pre-commercially thinned. Proposed pre-commercial thinning would reduce sapling and pole stand density, but negligible effects to fisher habitats would be anticipated. Generally, negligible effects to fisher or their habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. No changes in open roads would be anticipated. Trapping pressure and the potential for fisher mortality could remain similar to present levels. Minor reductions in landscape connectivity could occur with the proposed activities, but activities would largely avoid riparian areas commonly used by fisher and existing habitats are somewhat disconnected and interspersed with some drier and/or more open habitats than generally used by fisher. Thus, a minor risk of adverse direct and indirect effects to fisher would be anticipated since: 1) proposed timber management would mostly avoid riparian areas, but would alter stand density on a small amount of riparian habitats and would modify a relatively small percentage of existing upland fisher habitats; 2) reductions in connectivity would occur, but those areas associated with riparian areas would largely remain unaffected; 3) proposed activities would reduce snags and snag-recruitment trees while increasing coarse woody debris levels; however, some of these resources would be retained; and 5) no changes in legal motorized human-access levels would be anticipated.

Action Alternative: Cumulative Effects

Minor amounts of riparian habitats would be modified and the quality of those areas treated would be reduced, but no changes in the amount of the preferred riparian fisher cover types meeting structural requirements for fishers on DNRC-managed lands in the cumulative-effects analysis area would occur. Minor reductions in upland habitats on DNRC-managed lands (8 acres) would further reduce the amount of suitable upland fisher habitats in the cumulative effects analysis area, but would not be expected to alter fisher use of the cumulative effects analysis area. These reductions would be additive to the losses associated with past timber

management and wildfires in the cumulative-effects analysis area as well as any ongoing harvesting. Activities would largely avoid riparian areas commonly used by fisher and minor changes to landscape connectivity would be anticipated. No changes in legal, motorized public access would occur. Overall, no appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, a minor risk of adverse cumulative effects to fisher would be anticipated since: 1) proposed timber management would modify a minor amount of upland fisher habitats, and some upland habitats would persist in the cumulative effects analysis area; 2) minor changes in landscape connectivity would be anticipated and connectivity in riparian areas would not be appreciably altered; 3) proposed timber management in a relatively small portion of the cumulative-effects analysis area would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces; and 4) no changes to legal, motorized public access would occur.

FLAMMULATED OWLS

Issue

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing while potentially removing snags needed by flammulated owls for nesting.

Introduction

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 12,086-acre project area. Cumulative effects were analyzed on the 53,437-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support several pairs of flammulated owls (McCallum 1994).

Analysis Methods

To assess potential flammulated owl habitat on the project area, SLI data were used to identify stands in preferred habitat types (ARM 36.11.403(31)). Direct and indirect effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations,

aerial photograph interpretation, USDA remotely sensed data, and a GIS analysis of available habitats. Factors considered within the cumulative effects analysis area included the degree of harvesting and the amount of continuous forest within the cumulative effects analysis area.

Existing Environment

Flammulated owls have been documented in the vicinity. There are approximately 10,493 acres (87% of the project area) of potential flammulated owl habitats in ponderosa pine, Douglas-fir, and mixed conifer stands across the project area. Portions of these habitats underwent stand replacement fires in 2000 and are now largely suitable as foraging habitats while other stands experienced lower severity fires that resulted in the removal of Douglas-fir ingrowth and left suitable flammulated owl nesting habitats. Potential flammulated owl habitats likely exists on roughly 321 acres of DNRC-managed lands in the cumulative effects analysis area. Portions of the cumulative effects analysis area likely are suitable nesting and/or foraging habitats, including most of the 12,463 acres (30% of non-DNRC-managed lands) of open and closed forested habitats on other ownerships in the cumulative effects analysis area; however, there are likely relatively small amounts of these forested areas are not likely preferred flammulated owl habitat types. The portion of the cumulative effects analysis area (19,501 acres, 47%) is in open habitats including rangeland/shrubland, agricultural fields, water, developed areas, and other non-forested habitat types that are not suitable nesting or high-quality foraging habitats. A portion of the forested habitats in the cumulative effects analysis area (9,518 acres, 23% of non-DNRC-managed lands) has been harvested in the relatively recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a portion of the Douglas-fir encroachment and opening up stands of ponderosa pine; however, retention of large ponderosa pine was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Generally, modern fire suppression has allowed Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls through time. Timber management and human developments that have occurred in the cumulative effects analysis area likely altered flammulated owl habitats and/or human disturbance levels. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could be disturbing flammulated owls and are likely altering flammulated owl habitats on DNRC managed lands in the project area and cumulative effects analysis area.

<u>Environmental Effects-Flammulated Owl</u>

No Action Alternative: Direct and Indirect Effects

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

No Action Alternative: Cumulative Effects

Existing flammulated owl habitats would persist. Any ongoing and/or proposed harvesting in the cumulative effects analysis area could continue altering flammulated owl habitats and/or introducing potential disturbance to flammulated owls. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be anticipated since: 1) no further disturbance to flammulated owls would be anticipated; and 2) no further changes to potential nesting habitats would be anticipated.

Action Alternative: Direct and Indirect Effects

Flammulated owls can be tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur when flammulated owls are present. Proposed activities could overlap the nesting and fledging periods. Proposed commercial timber management activities on 3,084 acres of potential flammulated owl habitats (29% of the habitats in the project area) would open the canopy while favoring ponderosa pine. This would reduce the number of large trees and occasional snags in the project area that may be suitable for nesting, but numerous snags would be retained, thus a minor reduction in potential nesting substrates could occur. Elements of the forest structure important for nesting flammulated owls, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed units. The proposed pre-commercial thinning on 3,624 acres (34% of the habitats in the project area) could improve flammulated owl foraging habitats, while contributing to an increased representation of ponderosa pine in the future in those stands, which would improve potential flammulated owl habitat quality. Generally, negligible effects to flammulated owls or their habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. Generally, the more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the project area toward historical conditions over the long-term, which is preferred flammulated owl habitat. Thus, a minor risk of adverse direct and indirect effects would be expected to flammulated owls since: 1) the potential exists to disturb flammulated owls; 2) harvesting would open denser stands up while retaining elements of forest structure used for foraging and nesting by flammulated owl, improving overall flammulated owl habitat conditions in the project area.

Action Alternative: Cumulative Effects

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

and sustainability of flammulated owl habitat on a portion of the cumulative effects analysis area by making this area more representative of historic conditions.

PILEATED WOODPECKERS

Issue

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

Introduction

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (12,086 acres). Cumulative effects were analyzed on the 53,437-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support several pairs of pileated woodpeckers (Bull and Jackson 1995).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the cumulative effects analysis area, SLI data were used to identify sawtimber stands with more than 100 square feet of basal area per acre, were older than 100 years old, had greater than 40-percent canopy closure, and were occurring below 5,000 feet in elevation. Foraging habitats were defined as areas that did not meet the definition above but included the remaining sawtimber stands below 5,000 feet in elevation with greater than 40-percent canopy cover. To assess habitat on other ownerships in the cumulative effects analysis area, aerial photographs and USDA remotely sensed data were interpreted to assess forest stands. Where stands appeared to meet the minimum potential foraging habitat parameters, pileated woodpecker habitat was considered present. Potential foraging and nesting habitat were not differentiated on other ownerships for this analysis due to data limitations. Direct and indirect effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, aerial photograph interpretation, USDA remotely sensed data, and these mapped potential

habitats. Factors considered included the amount of potential habitat, degree of harvesting, and the amount of continuous forested habitat.

Existing Environment

In the project area, potential pileated woodpecker nesting habitat exists on approximately 303 acres (3% of the project area). These habitats are dominated by ponderosa pine and Douglas-fir. Additionally, 656 acres (5% of the project area) of sawtimber stands, dominated by ponderosa pine and Douglas-fir stands exist in the project area, which may be potential foraging habitats for pileated woodpeckers. The majority of the cumulative effects analysis area is above the elevations where pileated woodpeckers are typically found; some suitable habitats likely exist on a portion of the 488 acres of reasonably closed forested habitats on other ownerships in the cumulative effects analysis area (4% of non-DNRC lands) that is below 5,000 feet. Most of the cumulative effects analysis area below 5,000 feet (10,924 acres, 96%) is in open habitats including rangeland/shrubland, agricultural fields, poorly stocked forested stands, water, developed areas, and other non-forested habitat types that are not suitable pileated woodpecker habitats. Collectively, both the project area and cumulative effects analysis area are marginally suitable for pileated woodpeckers and extensive use is unlikely. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could be disturbing pileated woodpeckers and are likely altering pileated woodpecker habitats on DNRC managed lands in the project area and cumulative effects analysis area.

Environmental Effects-Pileated Woodpecker

No Action Alternative: Direct and Indirect Effects

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

No Action Alternative: Cumulative Effects

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

Action Alternative: Direct and Indirect Effects

Pileated woodpeckers can be tolerant of human activities (Bull and Jackson 1995) but might be temporarily displaced by any proposed activities that could occur during the nesting period.

Proposed activities would likely overlap the nesting and fledging periods. Proposed timber management would reduce forested habitats for pileated woodpeckers in the project area. Roughly 256 acres (85%) of the potential nesting habitats along with 419 acres (64%) of potential foraging habitats would be opened up with proposed treatments. Some of these acres could be dense enough to receive some use by foraging pileated woodpeckers following proposed treatments, but most of these stands would be temporarily unsuitable for pileated woodpeckers due to the openness of the stands following proposed treatments. Quality of these potential pileated woodpecker habitats would be reduced for 20-40 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers, including snags, coarse woody debris (15-25 tons per acre), numerous leave trees, and snag recruits would be retained in the proposed units. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), pileated woodpecker densities in the project area would be expected to be reduced on 911 acres (26%) where activities would occur below 5,000 feet. The proposed precommercial thinning on 916 acres of potential pileated woodpecker habitats and/or future habitats would not be expected to have a measurable effect on pileated woodpeckers, but may shorten the time before some of these stands may be again suitable for pileated woodpeckers. Similarly, negligible effects to pileated woodpeckers or their habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. The silvicultural prescriptions would retain healthy ponderosa pine and Douglas-fir while promoting the growth and/or regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, a minor risk of adverse direct and indirect effects to pileated woodpeckers would be anticipated since: 1) proposed activities would reduce the amount of continuous-forested habitats available; 2) potential nesting habitats and foraging habitats would be removed; 3) a few snags and some snag recruits would be removed; however, mitigation measures to retain snags and snag recruits would be included, and 4) proposed treatments would promote seral species in the project area.

Action Alternative: Cumulative Effects

Reductions in pileated woodpecker habitat quality and the amount of continuously forested habitats available for pileated woodpeckers would occur in the project area. Snags (a minimum of 2 snags greater than 21 inches dbh per acre), coarse woody debris (15-25 tons per acre), numerous leave trees, and snag recruits (a minimum of 2 trees per acre greater than 21 inches dbh) would be retained in the proposed areas to provide foraging and nesting structure when the canopy closure recovers to the point of encouraging pileated woodpecker use; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities. Modifications to pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting, recent wildfires and human development; continued use of the cumulative effects analysis area would be anticipated, but likely at a slightly reduced level. Continued maturation of stands across the cumulative-effects analysis area would provide future pileated woodpecker habitats. Proposed pre-commercial thinning in a portion of the cumulative effects analysis area could shorten the time before this portion of the cumulative effects analysis area could be again suitable for pileated woodpeckers. Overall,

limited use of the cumulative effects analysis area is likely given the limited habitats combined and anticipated changes. Thus, a minor risk of adverse cumulative effects to pileated woodpeckers would be anticipated since: 1) proposed activities would further alter the amount of continuously forested habitats available in the cumulative-effects analysis area; 2) potential nesting and foraging habitats would be modified, but some habitats would persist in the cumulative-effects analysis area; 3) snags and snag recruits in the cumulative effects analysis area could be reduced and coarse woody debris levels would increase, but much of this increase would be in the smaller size classes, which are of lower quality to pileated woodpeckers; however, mitigation measures to retain a snags and snag recruits would be included; and 4) proposed treatments would promote seral species in a portion of the cumulative effects analysis area.

Other Species

RED-TAILED HAWK

Issue

Proposed activities could disturb nesting red-tailed hawks and/or modify nesting habitats for red-tailed hawks.

Introduction

The red-tailed hawk is a fairly common bird of prey. Red-tailed hawks use a wide variety of open to semi-open habitats, including: grasslands, rangelands, deserts, forests, woodlands, agricultural fields, and urban areas. In general, red-tailed hawks prefer a mixture of forests and fields or other open habitats and generally avoid dense, unbroken forested habitats. Red-tailed hawks are opportunistic hunters with a diet consisting mainly of small mammals up to the size of a rabbit, but may also include birds and reptiles. Breeding begins in March and young fly in June or July. The nest is in a tall tree in or at the edge of woodlands near an open area. Nesting territories range from 0.5 to 3 square miles.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (12,086 acres). Cumulative effects were analyzed on the 53,437-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support several pairs of red-tailed hawks.

Existing Environment

During numerous field visits, numerous red-tailed hawks were observed, including several occurrences of groups of 2-3, were observed during the nesting season. Based on the presence of a red-tailed hawks during the nesting season that were fairly localized, it is probable that there are numerous nests in the project area or immediate vicinity. The stands in the project area likely provide suitable nesting structure and habitats for a suite of potential prey species using forested habitats, semi-forested habitats, and young forest habitats. A variety of potential habitats exist on DNRC-managed lands, including on approximately 8,579 acres (71%) of moderately to poorly stocked stands in a variety of age classes. In the cumulative effects

analysis area habitats for red-tailed hawks likely exists on most of the 115 acres of moderately or poorly stocked stands on DNRC-managed lands, some of the 7,504 acres of moderately stocked forested stands (18% of non-DNRC lands), and much of the 29,019 acres (70%) of shrubs, herbaceous areas, poorly stocked forested stands, burned areas, and recently harvested stands on other ownerships in the cumulative effects analysis area. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could be disturbing red-tailed hawks and are likely altering red-tailed hawk habitats on DNRC managed lands in the project area and cumulative effects analysis area.

Environmental Effects-Red-tailed Hawk

No Action Alternative: Direct and Indirect Effects

Existing red-tailed hawk habitats in the project area would persist. No disturbance to red-tailed hawks would occur. Thus, a negligible risk of adverse direct and indirect effects to red-tailed hawks would be anticipated since: 1) no harvesting would occur and 2) long-term, succession-related declines in foraging habitats would be anticipated.

No Action Alternative: Cumulative Effects

No further changes to existing red-tailed hawk habitats would occur. Recent timber management in the cumulative effects analysis area has potentially improved red-tailed hawk habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment. Areas exhibiting mature forested conditions would be expected to persist and would not be expected to provide high quality red-tailed hawk habitats into the future. Thus, a negligible risk of adverse cumulative effects to red-tailed hawks would be anticipated since: 1) no harvesting would occur and 2) long-term, succession-related declines in foraging habitats would be anticipated.

Action Alternative: Direct and Indirect Effects

Proposed activities could disturb red-tailed hawks should they occur during the nesting season; red-tailed hawks are sensitive to human disturbance during the breeding season and are known to change their home ranges to accommodate the disturbance (Andersen et al. 1990). Proposed timber harvest on 3,361 acres would open the canopy while favoring ponderosa pine, western larch, and Douglas-fir, which could improve red-tailed hawk foraging habitats in the project area. Similarly, proposed pre-commercial thinning would open up existing young stands on roughly 4,000 acres, which could improve potential foraging habitats in the project area. Generally, negligible effects to red-tailed hawks or their habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. Should a nest tree be identified in the vicinity, that tree and several perch trees within 100 yards of the nest tree would not be harvested and a seasonal restriction limiting activities during the nesting season (April 1 - August 1) would be implemented for areas within 0.25 miles of the nest during years when the nest is active. Thus, minor positive direct and indirect effects would be expected to red-tailed hawks since: 1) harvesting would open denser stands up, improving foraging habitats; 2)

proposed activities would revert succession-related declines in habitat quality; and 3) nest trees and several perch trees would be retained.

Action Alternative: Cumulative Effects

Proposed harvesting would increase the amount of the cumulative-effects analysis area that has been recently harvested or opened up by wildfire. Overall, a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative. Thus, negligible beneficial cumulative effects to red-tailed hawks would be expected since: 1) harvesting would improve the quality and sustainability of red-tailed hawk habitats on a portion of the cumulative effects analysis area; 2) a small increase in the amount of the cumulative-effects analysis area would be anticipated that would be more representative of historic conditions; and 3) nest trees and several perch trees would be retained.

Golden Eagle

Issue

Proposed activities could disturb golden eagles and/or modify nesting habitats for golden eagles.

Introduction

The golden eagle is a very large raptor that nests on cliffs or in the largest trees that often have unobstructed views of the surrounding area. Golden eagles use a wide variety of open to semi-open habitats, including: prairies, open woodlands, grasslands, rangelands, shrub-steppe, deserts, and forests. In general, golden eagles are typically found in open country in the vicinity of hills, bluffs, and cliffs. Golden eagles primarily consume jackrabbits, hares, ground squirrels, and carrion, but will occasionally prey on ungulates, waterfowl, grouse, weasels, rodents, and skunks (Montana Natural Heritage Program and Montana Fish, Wildlife and Parks, 2023). In Montana, breeding generally begins in February or March and young fly in June or July (Montana Natural Heritage Program and Montana Fish, Wildlife and Parks). Golden eagle nests are typically large stick-built structures that can be 5-8 feet across and 3-20 feet tall (USFWS 2023). Golden eagles tend to avoid nesting near urban habitats and generally do not nest in densely forested habitats (USFWS 2023). Nesting territories range from 16-97 square miles (Phillips et al 1984).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (12,086 acres). Cumulative effects were analyzed on the 53,437-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support several pairs of golden eagles.

Existing Environment

During field visits, a golden eagle was observed in the northern portion of the project area. Based on the presence of a golden eagle during the nesting season, it is possible that there is a nest in the project area or immediate vicinity. Large emergent trees that survived recent wildfires

in the project area could be suitable nesting structures for golden eagles. The habitats in the project area likely provide suitable habitats for a suite of potential prey species using forested habitats, semi-forested habitats, and young forest habitats. A variety of potential habitats exist on DNRC-managed lands, including on approximately 8,579 acres (71%) of moderately to poorly stocked stands in a variety of age classes. In the cumulative effects analysis area habitats for golden eagles likely exists on some of the 115 acres of moderately to poorly stocked stands on DNRC-managed lands, some of the 7,504 acres of moderately stocked forested stands (18% of non-DNRC lands), and much of the 29,019 acres (70%) of shrubs, herbaceous areas, poorly stocked forested stands, burned areas, and recently harvested stands on other ownerships. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could be disturbing golden eagles and are likely altering golden eagle habitats or habitats for their prey on DNRC managed lands in the project area and cumulative effects analysis area.

Environmental Effects-Golden Eagle

No Action Alternative: Direct and Indirect Effects

Existing golden eagle habitats in the project area would persist. No disturbance to golden eagles would occur. Thus, a negligible risk of adverse direct and indirect effects to golden eagles would be anticipated since: 1) no harvesting would occur and 2) long-term, succession-related declines in foraging habitats would be anticipated.

No Action Alternative: Cumulative Effects

No further changes to existing golden eagle habitats would occur. Recent timber management in the cumulative effects analysis area has potentially improved golden eagle habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment. Areas exhibiting mature forested conditions would be expected to persist and would not be expected to provide high quality golden eagle habitats into the future. Thus, a negligible risk of adverse cumulative effects to golden eagles would be anticipated since: 1) no harvesting would occur and 2) long-term, succession-related declines in foraging habitats would be anticipated.

Action Alternative: Direct and Indirect Effects

Proposed activities could disturb golden eagles should they occur during the nesting season; golden eagles are sensitive to human disturbance during the breeding season (USFWS 2023). Proposed timber harvest on 3,361 acres would open the canopy while favoring ponderosa pine and Douglas-fir, which could improve golden eagle foraging habitats in the project area. Similarly, proposed pre-commercial thinning on roughly 4,000 acres would open up existing young stands, which could improve potential foraging habitats in the project area. Generally, negligible effects to golden eagles or their habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. Should a golden eagle nest be identified in the vicinity, that tree and several perch trees within 100 yards of the nest tree would not be harvested and a seasonal restriction limiting activities during the nesting season (February 1 - August 1) would be implemented for areas within 0.25 miles of the nest during years when the nest is active. Thus, minor positive direct and indirect effects would be

expected to golden eagles since: 1) harvesting would open denser stands up, improving foraging habitats; 2) proposed activities would revert succession-related declines in habitat quality; and 3) nest trees and several perch trees would be retained.

Action Alternative: Cumulative Effects

Proposed harvesting would increase the amount of the cumulative-effects analysis area that has been recently harvested or opened up by wildfire. Overall, a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative. Thus, negligible beneficial cumulative effects to golden eagles would be expected since: 1) harvesting would improve the quality and sustainability of golden eagle habitats on a portion of the cumulative effects analysis area; 2) a small increase in the amount of the cumulative-effects analysis area would be anticipated that would be more representative of historic conditions; and 3) any nest trees and several perch trees would be retained.

BIG GAME

BIG GAME WINTER RANGE

Issue

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

Introduction

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Areas where these species winter are typically found at low to mid elevations (~3,000 to 6,500 ft.) and possess moderate to steep slopes – particularly associated with southerly or westerly exposures. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges are relatively disturbance-free and have adequate midstory and overstory to reduce wind velocity and intercept snow. Densely stocked thickets of conifer regeneration and densely forested mature stands provide thermal protection and hiding cover, which can reduce energy expenditures and stress associated with cold temperatures, wind, and human-caused disturbance. Areas with mature forest cover are also important for snow interception, which makes travel and foraging less stressful for big game during periods when snow is deep. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose. Thus, removing cover that is important for wintering big game through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local big game herds.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 12,086-acre project area. Cumulative effects were analyzed on the combined winter ranges in the 53,437-acre

cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support a couple of elk herds.

Analysis Methods

Direct and indirect, as well as cumulative effects, were analyzed using the DFWP winter range maps, field evaluations, aerial photograph interpretation, and a review of habitat components. Factors considered in the analysis include the amount of cover removal on the winter range, amount of mature forested habitat on the winter range, and levels of human disturbance.

Existing Environment

Montana Department of Fish, Wildlife, and Parks identified white-tailed deer (830 acres, 7%), mule deer (8,596 acres, 71%), elk (10,832 acres, 90%), and moose (3,740 acres, 31%) winter ranges in the project area; additionally, portions of the project area are in the vicinity of the winter range for the East Fork Bitterroot bighorn sheep herd (MFWP 2010). These winter ranges in the project area are part of larger winter ranges in the area. In the project area, mature ponderosa pine and Douglas-fir stands are providing attributes facilitating use by wintering big game. Approximately 4,125 acres of the project area (34%) appear to be providing snow intercept and thermal cover attributes for big game. Evidence of winter and non-winter use by deer and elk was noted during field visits.

Within the cumulative-effects analysis area, big game species are fairly common and winter range for deer, elk, and moose are fairly widespread. Roughly 13,519 acres (25%) of white-tailed deer winter range, 35,160 acres (66%) of mule deer winter range, 41,775 acres (78%) of elk winter range, and 7,928 acres (15%) of moose winter range exists in the cumulative effects analysis area. Within the cumulative effects analysis area, approximately 16,846 acres (32%) appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. In the recent past, timber harvesting and recent wildfires has reduced thermal cover and snow intercept in the area; ongoing timber management across the winter ranges could continue altering these attributes while potentially disturbing wintering big game. Sizable portions (34,888 acres, 65%) of the cumulative effects analysis area are in non-forested, herbaceous, recently burned, or shrublands/rangelands, which would not be expected to provide thermal cover or snow intercept in the near term. Human disturbance within the winter range is moderately high and is associated with residential development, recreational use, agricultural operations, and numerous roads, including Highway 93. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could be disturbing big game and are likely altering big game winter range habitats on DNRC managed lands in the project area and cumulative effects analysis area.

Environmental Effects-Big Game Winter Range

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to big game winter range and thermal cover would be anticipated since: 1) no further changes in the amount of mature-forested habitats in the winter range would

be anticipated; 2) no further changes in thermal cover and snow intercept would be anticipated; and 3) human disturbance levels would not change.

No Action Alternative: Cumulative Effects

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

Action Alternative: Direct and Indirect Effects

Proposed activities could occur in the winter or non-winter periods, but would avoid the fall hunting season. Proposed pre-commercial activities would not likely occur during the winter periods and would not be anticipated to affect wintering big game. Disturbance created by mechanized logging equipment and trucks associated with any commercial activities could temporarily displace big game animals during periods of operation for up to 10 years, but only when activities would be occurring; no disturbance or displacement of big game would be anticipated with activities conducted during the non-winter period, but those activities could temporarily displace big game animals during non-winter operations when considerable other suitable habitats exist in the vicinity, which would minimize the effects to big game species. Generally, proposed activities would avoid the sparsely forested, steep, south facing slopes in the area that bighorn sheep use in the winter, but activities could introduce noise and disturbance to some wintering bighorn sheep. No changes in public motorized access would occur, thus no added risk of displacement would be present. Minor positive, short-term benefits would be anticipated as big game may concentrate feeding activity on felled treetops, limbs, and slash piles during nighttime and quiet periods when logging operations would be shut down during the winter. Increasing short-term forage availability in this manner could partially offset some of the effects associated with temporary displacement caused by logging disturbance. There could be short-term added risk of disturbance and displacement of wintering animals that could result in moderate adverse effects associated with logging operations and road use in the project area. However, no long-term disturbance or displacement effects to winter range carrying capacity that would lead to reduced numbers of big game would be anticipated.

Proposed commercial activities would occur on roughly 230 acres (28%) of white-tailed deer winter range, 2,524 acres (29%) of mule deer winter range, 3,096 acres (29%) of elk winter range, and 1,503 acres (40%) of moose winter range. Similarly, proposed pre-commercial activities would occur on roughly 12 acres (1%) of white-tailed deer winter range, 2,678 acres (31%) of mule deer winter range, 3,193 acres (29%) of elk winter range, and 1,503 acres (40%) of moose winter range. Proposed commercial activities would reduce tree density and canopy closure, which would alter the ability of those stands to meet needs of wintering big game; proposed pre-commercial thinning would not be expected to appreciably alter the ability of those stands to meet needs of wintering big game since these stands are largely too young to provide snow intercept or thermal cover attributes. Proposed commercial activities would reduce canopy

closure and potential winter use by big game on roughly 2,338 acres (57%) that likely have attributes facilitating considerable winter use by big game. Following proposed activities, canopy densities in these stands providing snow intercept and thermal cover would be removed, reducing habitat quality for wintering big game. In general, it could take 30 to 50 years for these stands to regenerate and attain a size capable of providing thermal cover for big game. Proposed activities would not prevent big game movement through the project area appreciably in winter and could stimulate browse production in the units. No long-term effects to winter range carrying capacity or factors that would create long-term habitat reduction or reduced numbers of big game would be anticipated. Proposed activities would not have an appreciable effect on availability of forage or other habitat attributes for bighorn sheep in the project area. Generally, no effects to wintering big game and negligible increases in foraging habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. Thus, a moderate risk of adverse direct or indirect effects to big game winter range and thermal cover would be anticipated since: 1) the relatively short-term that proposed activities could create disturbance in this area and temporarily displace wintering big game; 2) proposed activities would remove 57% of the stands that are providing thermal cover and snow intercept habitats for big game species; and 3) moderate amounts of winter ranges for several species of big game would be altered.

Action Alternative: Cumulative Effects

Proposed activities could occur in the winter, and disturbance created by mechanized logging equipment and trucks in a small part of the cumulative effects analysis area could temporarily displace big game animals during periods of operation for up to 10 years; no disturbance or displacement of wintering big game would be anticipated with activities conducted during the non-winter period. Any potential disturbance and displacement could be additive to any displacement associated with ongoing activities in the cumulative effects analysis area and any other disturbances that may be affecting wintering big game. Similarly, any timber management activities that may be occurring in the cumulative effects analysis area could continue altering big game winter range and/or disturbing wintering big game. Proposed commercial activities would occur on roughly 230 acres (2%) of white-tailed deer winter range, 2,524 acres (7%) of mule deer winter range, 3,096 acres (7%) of elk winter range, and 3,193 acres (40%) of moose winter range, which would reduce canopy closure and potential winter use by big game. Proposed pre-commercial thinning activities would not be expected to appreciably alter the ability of those stands to facilitate use by big game in the winter periods. Modifications to thermal cover and snow intercept by proposed commercial activities in the project area would further reduce the amount of the larger winter range providing these attributes for big game. Continued use of the larger winter range would be expected and no appreciable long-term cumulative effects to winter range carrying capacity or factors that would create long-term displacement or reduced numbers of big game detectable at the scale of an elk herd unit would be anticipated. Thus, a minor risk of adverse cumulative effects to big game winter range or thermal cover would be anticipated since: 1) the relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area; 2) habitats providing big game snow intercept and thermal cover on a small percentage of the larger winter

range would be altered; 3) relatively small to moderate amounts of winter ranges for several species of big game would be altered.

BIG GAME SECURITY HABITAT

Issue

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

Introduction

Timber harvesting can increase vulnerability of big game animals by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, moose, elk, and deer have a greater probability of being observed and, subsequently, harvested by hunters, or they may become displaced or reduced in numbers due to lowered effective carrying capacity of the local habitat. Reduced cover attributable to logging and roads can also influence the effective use of habitat for big game species; particularly highly social species such as elk (Lyon et al. 1985). Big game security habitat are nonlinear blocks of hiding cover that are more than 0.5 mile from open roads and are a minimum of 250 acres in size. For this analysis, cover was considered generically as big game cover for deer, elk, and moose. Because elk are highly social, wide-ranging species, providing for their cover needs helps ensure that habitat needs for other ungulates, such as deer and moose are met as well. Because of their smaller size and behavioral differences, mule deer and white-tailed deer are able to use smaller cover patches more effectively for escape and security. Moose are a solitary, wide-ranging species capable of effectively using relatively small cover patches, and the hunting season for moose is heavily regulated, greatly reducing risk of overharvest by humans. Therefore, for this analysis it is assumed that if available security cover would provide for the needs of elk, it would also generally be adequate to meet the needs of moose, mule deer, and white-tailed deer.

Analysis Area

Direct and indirect effects were considered at the scale of the project area (12,086 acres). Cumulative effects were analyzed on the 53,437-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Analysis Methods

Direct and indirect effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, aerial photograph interpretation, USDA remotely sensed data, and a GIS analysis of available habitats. Big game security habitat was defined as forest habitat (≥40-percent canopy cover) that is ≥250 acres and located >0.5 miles from open roads (Hillis et al. 1991). Cumulative effects were evaluated against a threshold value of 30% security cover within an analysis area the size of an elk herd home range (Hillis et al. 1991). Factors considered in the analysis include the open road density, non-motorized access levels, amount of hiding cover and security habitats present, potential human disturbance levels, and alterations to big game survival.

Existing Environment

Hiding cover is rather abundant in the project area and deer and elk populations are present during the general hunting season. The project area is in deer and elk hunting district 270, which is a heavily regulated district with most hunting opportunities controlled by restricted permits and/or youth-hunter regulations (MFWP 2023). Roughly 4,248 acres (35%) in the project area appear to be providing hiding cover for big game. There are numerous open roads (~14 miles) in the project area resulting in an open road density of 0.76 mi./sq. mi. (simple linear calculation). Considerable non-motorized access to the project area exists given the open roads and the 105 miles of low standard, restricted roads used for administrative uses (total road density of 5.6 mi/sq. mi.). A portion of the project area does not contain big game security habitats due to the proximity to open roads and/or lack of sufficient hiding cover, however roughly 5,491 acres (45% of project area) are distant enough and contain sufficient cover to be able to contribute to larger blocks of potential security habitat that extend beyond the project area.

Hiding cover varies in the cumulative effects analysis area with the recent modifications from timber management, residential development, wildfires, and other human activities. At least 15,744 acres (29%) of moderate to dense mature forest stands or densely stocked sapling/pole stands appear to be providing big game hiding cover in the cumulative effects analysis area and approximately 20,769 acres (39%) of shrubs, herbaceous areas, poorly stocked forested stands, burned areas, and recently harvested stands do not meet cover requirements; much of the remaining portions of the cumulative effects analysis area (16,934 acres, 32%) of less dense stands are likely providing lower quality hiding cover. In the cumulative effects analysis area, access for recreational hunting is relatively high, with several open roads (at least 121 miles, 1.4 miles/sq. mile) that facilitate access and many restricted roads (at least 322 miles; 3.9 miles/sq. mile) that could be used for non-motorized access. In the cumulative effects analysis area, a total of 14,368 acres in 3 patches meet the distance, cover, and size requirements of elk security habitats (Hillis et al. 1991). This amount of security habitat (27% of the cumulative effects analysis area) does not meet the 30-percent minimum threshold established by Hillis et al. (1991). All the patches look to connect with potential security habitats that extent beyond the cumulative effects analysis area and contribute to larger blocks of potential security habitats in the Sapphire mountains on the Bitterroot National Forest. Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area likely altered big game security habitats and/or human disturbance levels. Ongoing activities (commercial timber management and pre-commercial thinning) associated with the Pasture Draw (431 acres) and Hart Creek (260 acres) Timber Projects as well as the Sula Section 17 Pre-Commercial Thinning Project (451 acres) could be disturbing big game, are modifying hiding cover, and in a portion of the Pasture Draw Project are altering big game security habitats on DNRC managed lands in the project area and the cumulative effects analysis area.

Environmental Effects-Big Game Security Habitat

No Action Alternative: Direct and Indirect Effects

No changes in big game security habitats would be expected. Existing hiding cover would continue to contribute to security habitats. No alterations in cover would occur that would

increase big game vulnerability during the hunting season. No changes would be anticipated in disturbance, potential mortality due to hunting, or human access. Thus, no direct or indirect effects related to big game vulnerability or big game security habitat in the project area would be anticipated since: 1) no changes in open roads or motorized access would occur; 2) no changes in non-motorized human access would be anticipated; 3) no further reductions in hiding cover or security habitats would occur, but hiding cover across the project area would continue to improve; 4) no further disturbance to big game would occur, and 5) no appreciable changes to big game survival in the project area would occur.

No Action Alternative: Cumulative Effects

Approximately 27% of the cumulative effects analysis area would continue providing big game security habitat, which would continue to be below the 30-percent minimum threshold recommended by Hillis et al. (1991). Continued maturation in previously burned and/or harvested stands on all ownerships in the cumulative effects analysis area would improve hiding cover in those areas. No further changes in big game hiding cover or security cover would be anticipated. No changes in open roads would occur, thus no changes in the amount of the cumulative effects analysis area near open roads would be anticipated; no other changes in disturbance and potential mortality due to recreational hunting would be anticipated. Thus, negligible positive cumulative effects to big game security habitats would be anticipated that would benefit big game since: 1) no changes in open roads or motorized access would occur; 2) no changes in non-motorized human access would be anticipated; 3) no further reductions in hiding cover or security habitats would occur, but hiding cover across the cumulative effects analysis area would continue to improve; 4) no further disturbance to big game would occur, and 5) no appreciable changes to big game survival in the cumulative effects analysis area would be anticipated.

Action Alternative: Direct and Indirect Effects

During proposed activities, disturbance from motorized equipment could disturb or displace big game animals in the area for up to 10 years, and habitats in the vicinity may temporarily be unusable due to the level of noise and human activity. Generally, activities would not occur during the big game hunting seasons, limiting potential disturbance during the time of the year when many of these species experience some of the higher levels of human disturbance, limiting the potential for additive effects associated with human disturbance. No changes in open roads or motorized access would occur. During all phases of the proposed project, any roads opened with project activities would be restricted to the public and would be closed after the completion of activities. While no new road construction is anticipated, improvements to permanent, restricted roads could facilitate slight increases in nonmotorized access using mountain bikes, horses, and/or foot travel. Additionally, contractors would be prohibited from carrying firearms while on duty, which would further reduce human access to some of these security habitats. No improvements or reductions in recreational hunter access would occur that would change big game vulnerability or ability to manage populations in the area.

Proposed activities would reduce tree densities on up to 6,817 acres. Roughly 2,517 acres (59% of available habitat) of big game hiding cover would be altered. This includes roughly 1,684 acres (37%) of commercial treatments where hiding cover would largely be removed for

10 to 20 years as ponderosa pine and Douglas-fir seedlings and shrubs fill in and provide adequate cover for big game and 833 acres (19%) of pre-commercial treatments where the hiding cover would likely continue to be suitable cover for big game. Generally, up to 63% of existing hiding cover for big game would persist that could benefit big game during the hunting season in the project area. Overall, these alterations in hiding cover occur on 1,569 acres of hiding cover in those contiguous blocks that may contribute to potential big game security habitats. This includes 1,014 acres (18% of security habitats) of commercial treatments where vegetation management would be expected to reduce hiding cover for big game, but some of these are likely far enough from human access points that they would continue to provide these attributes, and 555 acres of pre-commercial treatments that would alter vegetation density, but would not be expected to appreciably alter big game hiding cover attributes. Overall, increased sight distances and the reduction in hiding cover may increase big game mortality risk in the project area. Within harvested stands, individual trees, unharvested areas, and retention buffers along riparian areas would remain, which would continue to provide some amount of escape cover and visual screening for big game animals. Generally, slight reductions in hiding cover could be realized from any proposed prescribed burning that may occur, but this would likely be offset by any proposed planting that may occur and overall negligible effects to big game security habitats would be anticipated from any proposed planting, noxious weed treatment, or prescribed burning that may occur. Continued use of the project area by the suite of big game species currently found in the project area would be likely. Collectively, minor adverse effects to big game security habitat would be anticipated that would affect big game vulnerability risk in the project area for 10 to 20 years since: 1) no changes in open roads or motorized access for the general public would be anticipated that would increase hunter access; 2) negligible increases in nonmotorized access could increase human access; 3) some of the big game hiding cover (59%) and big game security habitat (18%) in the project area would be altered; 4) disturbance could occur on the project area for up to 10 years, and 5) slight decreases in big game survival could potentially occur with increased access and visibility.

Action Alternative: Cumulative Effects

Any short-term disturbance (up to 10 years of potential disturbance) associated with proposed forest management activities would be additive to existing disturbance in the cumulative effects analysis area, which could increase the potential for temporary displacement of big game animals sensitive to the increased presence of humans and motorized activities. If present in the area, some individuals could be displaced into places with lower quality habitat, and/or be pressed into nearby areas possessing greater inherent risk of human or predator-caused mortality. Additionally, any displacement could move big game onto neighboring landowners where an increase in big game damage conflict issues could arise with agricultural activities. Overall, moderate temporary effects associated with disturbance and displacement of big game would be possible.

Moderate levels of motorized access in the cumulative effects analysis area facilitate recreational hunting; no changes would be anticipated in open roads or motorized access for the public that would influence big game vulnerability. Nonmotorized access via closed roads in the cumulative effects analysis area is relatively high. Negligible changes in nonmotorized traffic to a small portion of the cumulative effects analysis area would not be expected to affect big

game in the area. No appreciable changes to recreational hunter access would occur that would change big game vulnerability or ability to manage populations in the area.

Approximately 2,517 acres of hiding cover would be altered, with up to 1,687 acres not being dense enough following proposed treatments to function as hiding cover for big game. Similarly, up to 1,014 acres of potential big game security habitats in the project area would be altered with the proposed activities. These reductions in big game security habitats would be additive to losses associated with recent and ongoing harvesting, residential activities, as well as recent wildfires in the cumulative effects analysis area. Portions of the units may provide suitable cover for big game following proposed treatments; however, should all 1,014 acres (7%) of big game security habitats proposed for treatment not be suitable for big game security habitats, which is not likely, there would be 13,354 acres (25%) of potential security habitats in the cumulative effects analysis area following proposed treatment. Continued maturation in previously harvested and burned stands across the cumulative effects analysis area would improve hiding cover in those older units and may partially offset proposed losses; considerable amounts of hiding cover and connected forest patches would remain in the cumulative effects analysis area, which would maintain suitable cover conditions for moose, elk, and deer. Reductions in tree densities on 6,817 acres in a small part (13%) of the cumulative effects analysis area could make big game animals more detectable by humans in those areas altered, which would result in minor added risk of mortality, particularly in fall during the big game general hunting season. It could take 10-30 years for the treated stands to regenerate into stands that could serve as hiding cover for big game. Overall, measurable reductions in big game numbers would not be expected at the cumulative effects analysis area level or hunting district scale.

In general, minor adverse cumulative effects to big game security habitats or survival would be anticipated that would affect big game using the cumulative effects analysis area for 10 to 30 years since: 1) no changes in open roads or motorized access for the general public that would increase hunter access would be expected; 2) negligible changes to nonmotorized access would be anticipated; 3) 1,687 acres (11% of hiding cover in the cumulative effects analysis area) of commercially treated stands would likely take 10-30 years to regenerate into suitable hiding cover, 4) disturbance to big game could occur in the cumulative effects analysis area for up to 10 years, and 5) negligible changes in big game survival in the cumulative effects analysis are would be anticipated.

Wildlife Mitigations

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Should a raptor nest be identified in or near project activities, activities will cease and a DNRC biologist will be contacted. Site-specific measures will be developed and implemented to protect the nest and birds prior to re-starting activities.

- Motorized public access will be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. In instances where snags are small or deficient, retention of additional recruit trees would be required. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger with a total CWD goal of 15-25 tons per acre.
- Contractors and purchasers conducting contract operations will be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants will be stored in a bear-resistant manner.
- Limit potential stress and disturbance to big game species by restricting operations during the big game hunting seasons.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units in lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fire and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.

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