Goldielogs Timber Sale Project

ENVIRONMENTAL ASSESSMENT

May 2023
Montana Department of Natural Resources and Conservation
Southwestern Land Office
Missoula Unit

Decision Notice

Goldielogs Timber Sale

May 1, 2023

Decision

After careful consideration of several factors associated with the proposed Goldielogs Timber Sale Project, I have determined to select the Action Alternative.

Under the Action Alternative, DNRC will:

- Harvest an estimated 3.0 million board feet (MMBF) from approximately 501 acres within the project area using an Individual Tree Selection (ITS) silvicultural prescription;
- Favor seral species to bring stands back to the Desired Future Condition (DFC);
- Construct 0.5 miles of new permanent road;
- Construct 0.5 miles of new temporary road;
- Reconstruct of 0.7 miles of existing road to meet needs of proposed use (i.e. skyline/cable harvest);
- Conduct 6.8 miles of road maintenance;
- Conduct slash pile burning following project implementation;
- Conduct weed spraying;
- Plant seral tree species if natural regeneration does not occur

For a detailed description of other activities associated with the Action Alternative, please refer to *Chapter 2 – Alternatives*.

Factors Considered in Making this Decision

The following list of factors was considered in making this decision:

- Issues, concerns, and other relevant information received and collected during the scoping periods and preparation of the Goldielogs Timber Sale EA.
- Project objectives and purpose and need for action.
- Issues, related analyses, and anticipated direct, indirect, and cumulative environmental effects as presented in the EA.
- List of mitigations, stipulations, and other specifications as presented in the EA.
- Philosophy and direction outlined in the State Forest Land Management Plan (SFLMP), Administrative Rules for Forest Management (Forest Management Rules: *ARM 36.11.401 through 456*), and other applicable rules and regulations.
- Significance criteria and analysis, public participation, and other relevant requirements associated with the Montana Environmental Policy Act as stipulated by Montana Statute

(MEPA: *MCA 75-1-101 through 324*) and DNRC's Administrative Rules for MEPA (*ARM 36.2.521 through 543*).

Rationale for Selecting the Action Alternative

I have determined to select the Action Alternative because it:

- adequately addresses all issues and concerns raised by the public and internally,
- adequately meets the purpose of the project and accomplishes the project objectives,
- contains an appropriate level of mitigation for the various affected resources, and
- meets all applicable rules and regulations.

Need for Additional Analysis and Preparation of an Environmental Impact Statement (EIS)

The effects associated with the Action Alternative have been fully analyzed and mitigations for these effects have been developed in the EA. Thus, no additional analysis of the proposed action is warranted.

I find that the Interdisciplinary Team adequately addressed public comments received during the public review period (*see Attachment B — Public Comment and Response*) and that no comments warrant any additional analysis.

I have determined that none of the anticipated environmental impacts outlined in the EA are significant according to the criteria outlined in *ARM 36.2.524*. I find that no impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree. I find 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.

In summary, I find that the identified adverse impacts will be avoided, controlled, or mitigated by the design of the project to the extent that the impacts are not significant. According to these findings, I have determined that an EA is the appropriate level of analysis and that an EIS does not need to be prepared.

Amy Helena
Unit Manager
Missoula Unit

Contents

Chapter 1 Purpose and Need for Action

The Montana Department of Natural Resources and Conservation (DNRC) Trust Land Management Division (TLMD), Missoula Unit is proposing the Goldielogs Timber Sale Project (proposed action). The proposed action is located approximately 15 aerial miles east of Missoula in the Gold Creek area of Potomac, Montana. (Figure A-1, Attachment A). Under the proposed action, the DNRC would harvest an estimated 3 million board feet (3,000 MBF) from approximately 501 acres while constructing an estimated 0.5 miles of new road as well as an estimated 0.7 miles of road reconstruction. Noxious weed management, pre-commercial thinning, and tree planting may also occur under the proposed action.

Proposed activities (including harvest) would take place on approximately 501 acres within Section 36, Township 14 North (T14N), Range 17 West (R17W). This 581-acre section will herein be referred to as the project area (Figure A-2, Attachment A).

The school trust lands involved in the proposed project area are within the administrative boundaries of the DNRC Missoula Unit, located in Missoula, MT.

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	**Section 36 T14N R17W**	**581**	**501**
Public Buildings			
MSU 2nd Grant			
MSU Morrill			
Eastern College-MSU/Western College-U of M			
Montana Tech			
University of Montana			
School for the Deaf and Blind			
Pine Hills School			
Veterans Home			
Public Land Trust			
Acquired Land			

Purpose

Project Objectives were formed based on the DNRC Policies and Rules. These include the trust mandate as well as the management philosophy developed through the State Forest Land Management Plan (SFLMP: DNRC 1996) and Administrative Rules for Forest Management (Forest Management Rules: ARM 36.11401 through 471). The purpose of the project is to:

- Generate revenue for the Common Schools Trust
- Manage the forest to improve forest health, productivity, and biodiversity

The lands involved in the proposed action are held by the State of Montana for the support of the Common Schools Trust (*Enabling Act of February 22, 1889*). The Board of Land Commissioners (Land Board) and the DNRC are required by law to administer these state trustlands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions [*1972 Montana Constitution, Article X, Section 11; Montana Code Annotated (MCA) 77-1-202*].

DNRC strives to balance its fiduciary responsibilities with its stewardship responsibilities which are intended to promote biodiversity and subsequently protect the future income-generating capacity of the forest. All forested lands involved in the proposed project would be managed in accordance with DNRC's State Forest Management Plan (SFLMP), Administrative Rules for Forest Management (ARMs: ARM 36.11.401 – 456), the Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) and other applicable state and federal law.

Objectives

Many of the stands in the project area have high tree densities and increasing amounts of shade tolerant species that, due to the lack of natural or human-caused disturbance, may soon dominate these stands. Continued increases of the shade tolerant component in the project area would move these stands away from desired future conditions (DFC) as described in Chapter 3 of this section. These stands lack the seral species regeneration that is necessary to maintain and promote DFC. Active management would produce revenue for the Common Schools Trust while encouraging future stand conditions and development that reflect the DNRC's programmatic goals of managing for healthy and biologically diverse forests.

Objectives of the proposed project include:

- Generating revenue for the Common Schools Trust
- Improving stand health and vigor by reducing basal area, promoting natural regeneration, increasing uneven-aged stand dynamics, promoting species diversity, and favoring both beetle infested as well as root rot infected Douglas-fir for removal
- Reducing fuel loading and the likelihood of a stand replacing fire

Proposed Activities Include:

Action	Quantity
Proposed Harvest Activities	# Acres
Clearcut	
Seed Tree	
Shelterwood	
Selection	501
Commercial Thinning	
Salvage	
Total Treatment Acres	**501**

Action	Quantity
Proposed Forest Improvement Treatment	# Acres
Pre-commercial Thinning	
Planting	**200**
Proposed Road Activities	# Miles
New permanent road construction	0.5
New temporary road construction	0.5
Road maintenance	6.8
Road reconstruction	0.7
Road abandoned	
Road reclaimed	
Other Activities	

Duration of Activities:	48 Months
Implementation Period:	June 2023-June 2027

Need

Objectives of the proposed project were developed to address the following needs:

The DNRC has actively managed the proposed project area since the parcel was acquired on April 3, 1905. Active management in these stands has sought to produce revenue for the Common Schools Trust while encouraging future stand conditions and development that reflects the DNRC's programmatic goals of managing for healthy and biologically diverse forests. By State statute (MCA 77-5-223), the annual sustainable yield constitutes the annual timber sale requirement for the forest management program administered by DNRC on state trust lands. The Trust Land Management Division of the Montana DNRC currently has a statewide standing annual target of 60.0 MMBF (60,000,000 board feet) sold.

The most recent project within the project area, the McNamara Landing Timber Sale (2012-2014), focused on reducing the densities of shade tolerant tree species, primarily Douglas-fir (*Pseudotsuga menziesii*). Harvest units within the McNamara Timber Sale, however, excluded units unsuitable for ground-based logging systems. Stands with topographical attributes only suitable for skyline yarding (shovel or tong yarding prior to the 1960's) continue to have high tree densities of shade tolerant Douglas-fir. Overstocked stands, as well as spruce budworm and Armillaria root rot, have stressed the Douglas-fir. Stressed stands have shown an increase in Douglas-fir bark beetle activity, and subsequentially, tree mortality in larger size class Douglas-fir. By favoring beetle infested and root rot infected Douglas-fir for removal, DNRC would capture the value of the dead and dying timber, while discouraging future mortality.

Both natural and human caused disturbance encourages regeneration of early successional or seral tree species. The stands within the project area lack regeneration of seral species, such as western larch (*Larix occidentalis*) and Ponderosa pine (*Pinus ponderosa*), that is necessary to maintain and promote the DNRC's defined desired future condition (DFC). The current basal area (BA) of the stands provide an excess of shade that is unfavorable to serial species regeneration (basal area is the cross-sectional area of trees at 4.5 feet above the forest floor). Currently, an estimated 90% or more of regeneration is Douglas-fir and is trending toward a shade tolerant dominated stand and away from desired future conditions. Reduction in basal area, in combination with disturbance through harvest activities (like shelterwood or seedtree harvests) and receptive seedbeds (prepared through burning or machine scarification) can readily regenerate mixed stands containing western larch (Graham R.T, et al 1992). Arno et al. (1995) suggests that a basal area of no more than 40 to 60 feet²/acre is required for natural regeneration of ponderosa pine. Reducing stand BA through tree harvest would help to promote natural regeneration.

Relevant Agreements, Laws, Plans, Permits, Licenses and Other Authorizations

Management activities on lands within the proposed project area must comply with certain agreements, laws, plans, permits, licenses, and other authorizations. The following are some of DNRC's core guiding regulations for forest management on state trust land. Online versions of these policies, plans and agreements are available at:
https://dnrc.mt.gov/TrustLand/about/planning-and-reports

In addition to these program-wide policies, each of the resource sections will also describe those agreements, laws, plans, permits, licenses that are applicable to that resource. These descriptions can be found in Chapter 3.

State Forest Land Management Plan (SFLMP)

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

Montana Forested State Trust Lands Habitat Conservation Plan (HCP)

In December 2011, the Land Board approved the Record of Decision (ROD) for the Montana Forested State Trust Lands Habitat Conservation Plan (HCP). Approval of the ROD was followed by the issuance of an Incidental Take Permit (Permit) by the U.S. Fish and Wildlife Service (USFWS). The HCP is a required component of an application for a Permit which may be issued

by the U.S. Fish and Wildlife Service or National Marine Fisheries Service to state agencies or private citizens in situations where otherwise lawful activities might result in the incidental take of federally-listed species. The HCP is the plan under which DNRC intends to conduct forest management activities on select forested state trust lands while implementing specific mitigation requirements for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout.

DNRC Forest Management Rules

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

Montana Best Management Practices (BMPs) for Forestry

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

Sustainable Yield Calculation

In addition to the SFLMP and Forest Management Rules, DNRC is required to re-calculate the annual sustainable yield for forested trust lands at least every 10 years (*MCA 77-5-221 through 223*). DNRC defines the annual sustainable yield calculation (SYC) as:

"*….the quantity of timber that can be harvested from forested State lands each year in accordance with all applicable state and federal laws, including but not limited to the laws pertaining to wildlife, recreation and maintenance of watersheds and in compliance with water quality standards that protect fisheries and aquatic life and that are adopted under the provisions of Title 75, Chapter 5, taking into account the ability of State forests to generate replacement tree growth (MCA 77-5-221).*"

The SYC (Sustainable Yield Calculation) determines the amount of timber that can be harvested annually on a sustainable basis from state trust lands, given all applicable laws and environmental commitments described in the SFLMP and Forest Management Rules. Important ecological commitments related to biodiversity, forest health, threatened and endangered species, riparian buffers, old growth, anddesired species mix and cover types were incorporated into the SYC. After incorporating these commitments into the model, the statewide annual sustainable yield was determined to be 60.0 MMBF of timber.

Montana Forest Action Plan December 2020

The Montana Forest Action Plan is Montana's all lands, all hands plan for addressing forest health and wildfire risk issues across the state of Montana. Included within the plan are recommended

goals and strategies to achieve cross-boundary forest restoration and management, which are the result of the collaborative work done by the Montana Forest Action Advisory Council ("Montana Forest Action Plan, May 2021, www.montanaforestactionplan.org).

On May 20, 2019, the Montana Governor created Executive Order No 7-1019, which created the Governor's Montana Forest Action Advisory Council.

"The Council is chartered to develop and implement the Montana Forest Action Plan, which will include the assessment of statewide forest conditions and the statewide forest resource strategy.

This will be accomplished through collaborative, science-focused, cross-boundary and shared landscape-scale goals and management strategies to benefit the social, cultural, economic and biophysical forested landscapes of Montana. The Council will work to align national, state, tribal, private and local efforts toward achieving the vision laid out in Forests in Focus 2.0: A Cross-Boundary Collaborative Approach (State of Montana Office of the Governor Executive order No. 7-2019)."

The Montana Forest Action Advisory Council identified Priority Areas in need of active landscape-scale forest restoration and management that address wildland fire risk and forest health issues across Montana's forests (*The Montana Statewide Assessment of Forest Conditions Final Draft V10.0 12/15/2020)*.

Figure 1-1. Goldielogs Timber Sale Vicinity Map.

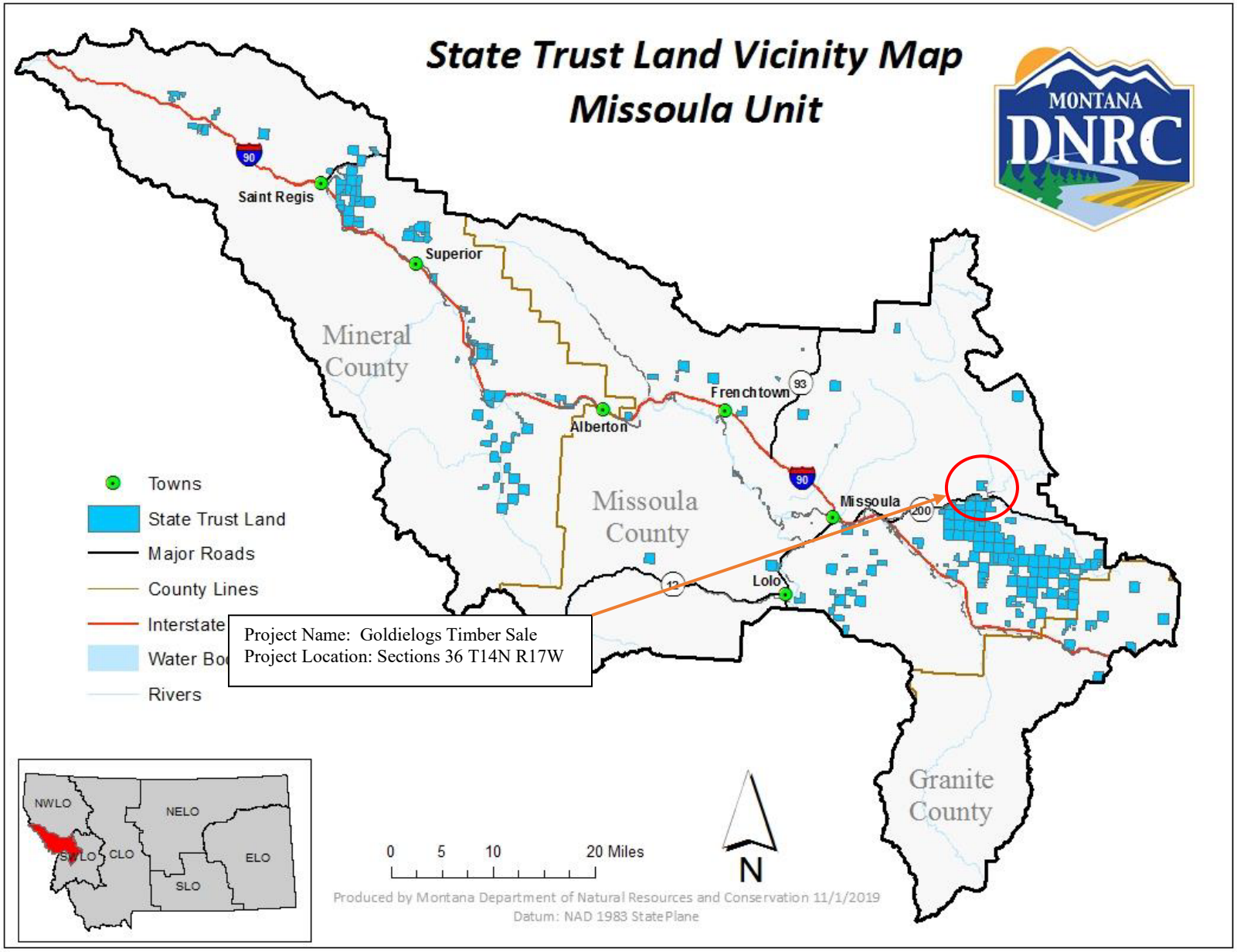
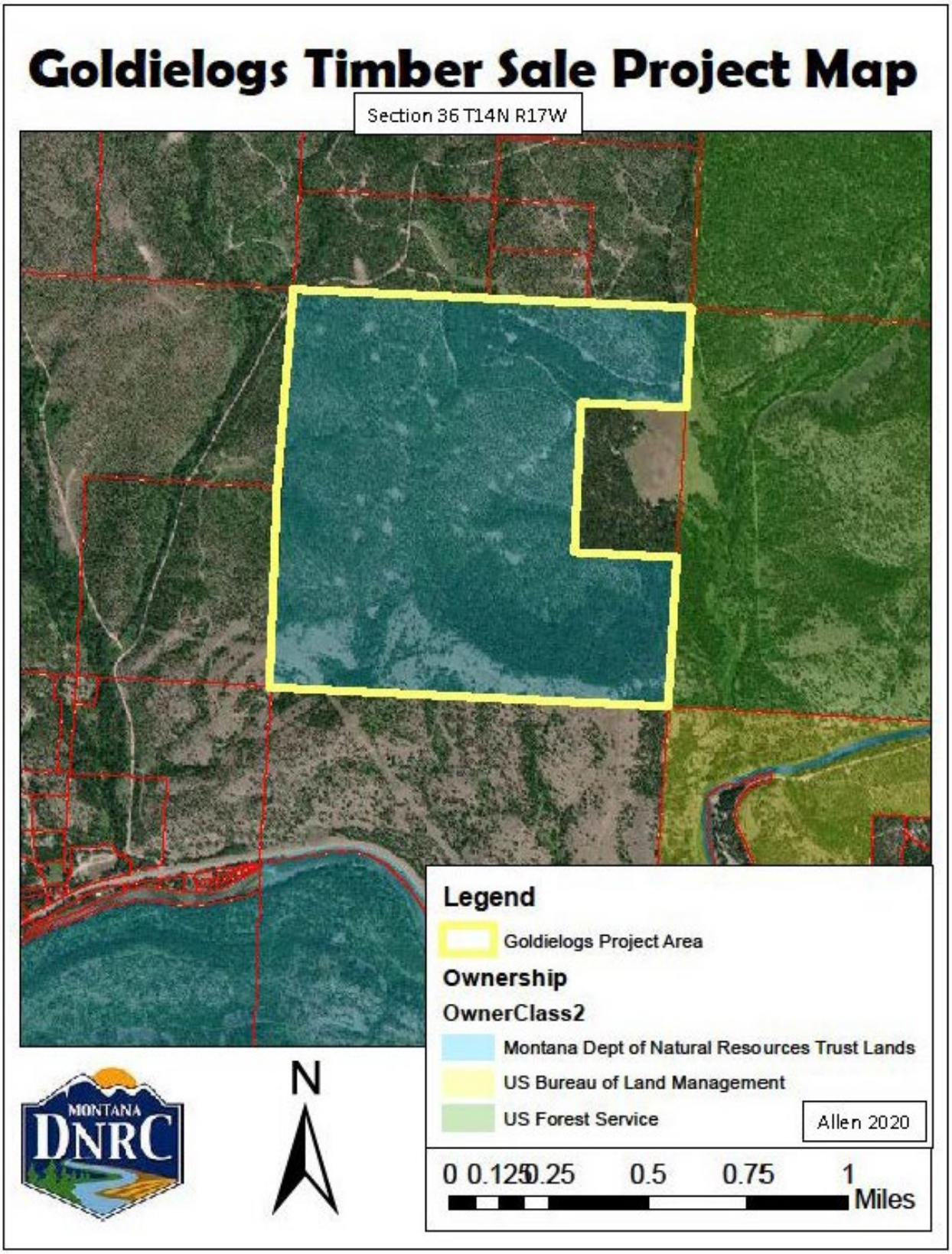


Figure 1-2. Goldielogs Timber Sale Project Area.



Chapter 2 Alternatives

Introduction

The purpose of this chapter is to describe the public scoping process, the development of the no-action and action alternatives and the comparison of both alternatives in detail.

Public Scoping Period

The ID Team held one formal scoping period from December 2, 2020 – January 4, 2021. The DNRC solicited public comment through a scoping notice with a vicinity map of the project area.

Public Scoped:

- The scoping notice was posted on the DNRC website.
- The scoping notice was mailed to adjacent landowners within 1 aerial mile of the project area boundary.
- The scoping notice was distributed via email or mail to all parties on the statewide and Missoula Unit scoping lists.
- A public notice was placed in the Missoulian newspaper.
- The scoping notice was emailed and mailed to Cathy Reem and Tarn Reem upon request.
- The scoping notice was also sent to Montana Fish, Wildlife and Parks and all Montana Tribal Nations
- The scoping period was referenced in the following article - Lundquist, Laura; "Gold Creek advocates worry timber sale could nix wildlife habitat." *Missoula Current*.

Comments Received:

- Eighteen public comments were received from local residents, recreationalists, non-profit organizations, and logging industry representatives through email, letter, phone call and in-person conversations.
- Concerns: Commenters were generally concerned about wildlife, vegetation, harvest prescriptions, recreational and educational values, economics, old growth, roads and soils, weeds, climate change and cumulative effects.
- Results: All public comments and DNRC's responses to those comments are presented in Table B-1: Scoping Comments and DNRC Responses, Attachment B.

Other Public Involvement

- An article about the Goldielogs Timber Sale was published in the Missoula Current newspaper on December 31, 2020 (Lundquist, Linda. 2020. *Gold Creek Advocates Worry Timber Sale Could Nix Wildlife Habitat*, Missoula Current.). The article referenced information from the Goldielogs Timber Sale scoping notice.
- In August 2021, the DNRC sent a project update to all commenters who expressed

interest in receiving more information about the project, which included a link to online project information.

Relevant Past, Present, and Related Future Actions

In order to adequately address cumulative effects of the proposed action, each analysis accounts for the effects of past, present, and related future actions within a determined analysis area. The locations and sizes of the analysis areas vary by resource (water resources, vegetation, etc.) and species (grizzly bear, big game, etc.) and are further described by each resource in Chapter 3. Where data were lacking on adjacent ownerships, associated impacts were considered and described qualitatively for cumulative effects.

The follow is a list of agency relevant actions considered in this EA:

Within the project area:

- Nine known previous timber harvest entries 1892-1968 *(See Stand History and Past Management Chapter 3, Vegetation Analysis)*
- 2012 McNamara Landing Timber Sale

Outside of the project area:

- Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration and Fuels Reduction Environmental Assessment (BLM June 19, 2017) DOI-BLM-MT-B010-2016-008-EA
- Montana Forest Action Plan December 2020
- GNA (Good Neighbor Authority) Blackfooot Gold Timber Sale 5/2021

Development of the Action Alternative

An ID Team was formed from DNRC Specialists to summarize, analyze and evaluate project-level issues and concerns. The ID team collectively formulated issues from comments raised internally, as well as by the public during the scoping and comment period Field reviews were conducted to collect data on potentially affected resources including: vegetation, water and hydrology, fisheries, wildlife, geology and soils, economics, air quality, recreation, archeological, and aesthetic resources. In-depth quantitative and qualitative analysis of the data assisted the ID Team in assessing the existing environment for each resource and in determining potential direct, indirect, and cumulative effects of the no-action and action alternatives. The action alternative was developed to meet the objectives of the proposed project while considering the significant and relevant issues identified. Mitigations were developed and incorporated within the action alternative (included in each section of Chapter 3 Affected Environment and Environmental Consequences) to reduce or prevent the impacts of the significant and relevant issues, while meeting project objectives.

Interdisciplinary Team **(ID):**

- Project Leader: Scott Allen *Forest Management Supervisor*
- Archeologist: Patrick Rennie *Trust Lands Archeologist*
- Wildlife Biologist: Garrett Schairer *SWLO Wildlife Biologist*
- Hydrologist: Andrea Stanley *SWLO Hydrologist/Soil Scientist*
- Soil Scientist: Andrea Stanley *SWLO Hydrologist/Soil Scientist*
- Fisheries Biologist: Mike Anderson *FMB Fisheries Biologist*
- Forester: Scott Allen *Forest Management Supervisor*
- Range Specialist: Jordan Rice *SWLO Land Use Specialist*
- Forest Management Planner: Emilia Grzesik *FMB Planner*

Other governmental agencies with jurisdiction, list of permits needed:

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.

Montana Department of Fish, Wildlife and Parks (DFWP)

A Stream Protection Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries. Such activities include:

Based on data collected from the field, and issues received from the public and internally, the ID

Team developed an action alternative to meet the project objectives while considering, to the extent practicable, the various issues and concerns raised internally as well as by the public. The action alternative incorporates harvest unit design, prescriptions, mitigations, and road development activities that allow the DNRC to conduct forest management activities consistent with direction contained in the SFLMP and the Forest Management Rules.

Description of the Alternatives Considered

No-action alternative:
Timber harvest would not occur in the project area at this time.

Action alternative:
The DNRC has developed one action alternative to meet the project objectives while considering, to the extent practicable, the various issues and concerns raised internally as well as by the public. Under the proposed action the DNRC proposes to:

- Harvest an estimated 3 million board feet (MMBF) from approximately 501 acres using an Individual Tree Selection (ITS) prescription
- Construct 0.5 miles of new permanent road
- Road maintenance
- Reconstruction of 0.7 miles of existing road to meet needs of proposed use (i.e. skyline/cable harvest)
- Construct 0.5 miles of temporary roads, that would be reclaimed post-harvest
- Conduct slash pile burning following project implementation
- Conduct weed spraying
- Plant seral species seedings if natural regeneration is unsuccessful

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	**Section 36 T14N R17W**	**581**	**501**

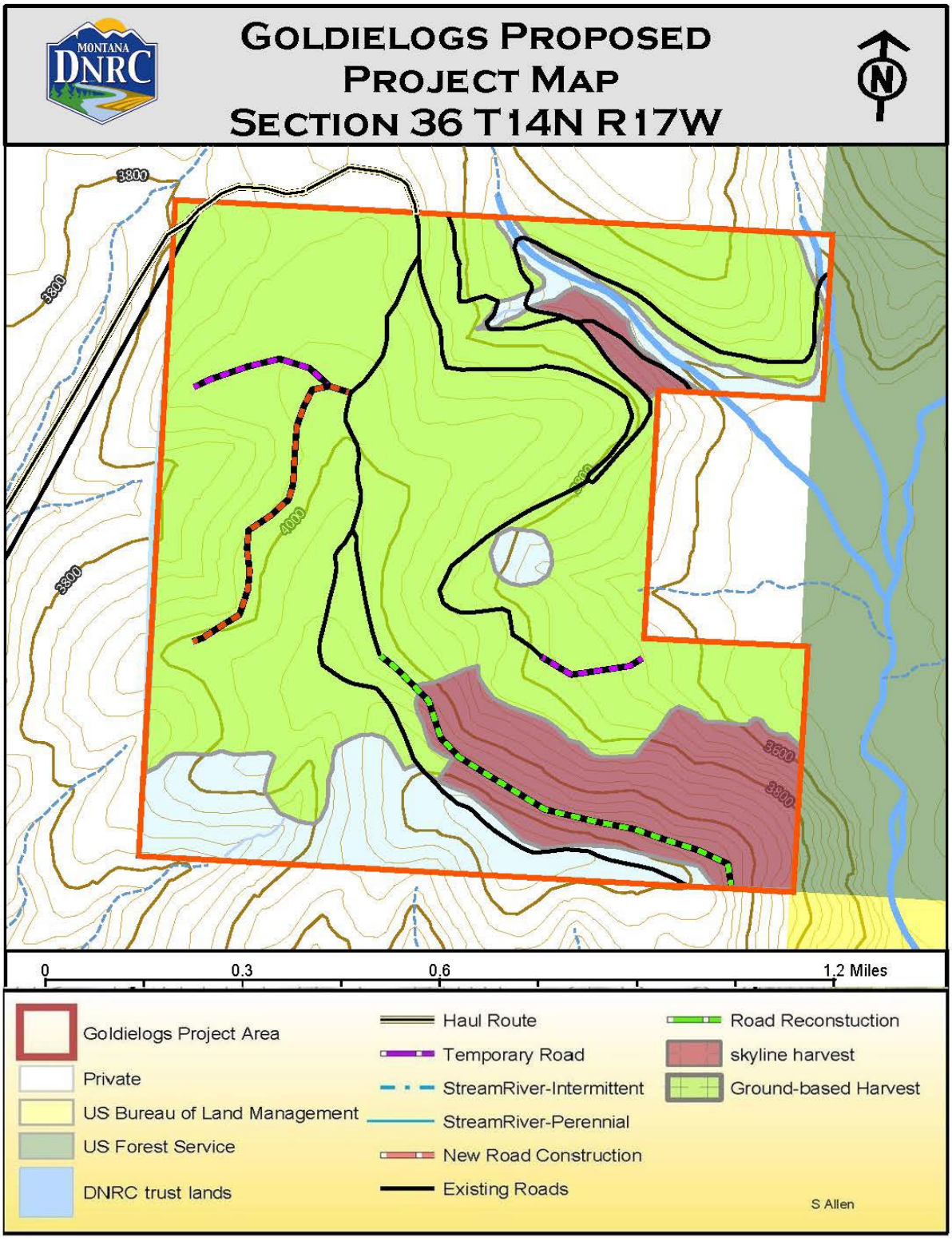
Summary Comparison of No-Action and Action Alternative

Table 2 - 1. Summary description of alternatives and comparison of project activities.

PROPOSED ACTIVITY	NO-ACTION	ACTION ALTERNATIVE
Timber Harvest	None	Harvest an estimated 3 million board feet (MMBF) from approximately 501 acres using an Individual Tree Selection (ITS) prescription (Attachment C). *
Road Construction	None	0.5 miles temporary road construction 0.5 miles new, permanent road construction 0.7 miles re-construction of existing restricted access road to allow for use by line-harvesting equipment
Road Use/Restrictions	None	No change in road use/restrictions
Reclaimed and Reclassified Road	None	No change in reclaimed and reclassified road
Weed Management	Monitor and treat roads, skid trails, landings and burn piles for weed infestations as appropriate and funding allows.	Chemical weed abatement Post Implementation: Monitor and treat roads, skid trails, landings and burn piles for weed infestations as appropriate.
Prescribed (Slash Pile) Burning	None	Conduct slash pile burning within the harvest units and along new road ROW following harvest activities.

* The estimated timber volume is based on stand volume data obtained from field reconnaissance and other available data used in the analysis. Advertised volumes may vary from preliminary estimated volumes due to increased statistical accuracy of measured data obtained during sale layout. While the estimated log volume may be different, the environmental effects are based on acres treated and postharvest stand conditions; these effects would remain similar to those shown in this Environmental Assessment.

Figure 2-2. Map of project activities associated with the action alternative



Chapter 3 Affected Environment and Environmental Consequences

Introduction

This chapter discusses the existing conditions (affected environment) and the potential environmental effects (environmental consequences) of both the no-action and the action alternative on the following resources: Vegetation (including old growth and rare, threatened, and endangered plants), Noxious Weeds, Geology and Soils, Aquatic Resources, Fisheries Resources, Wildlife, Air Quality, Historical and Archeological Sites, Recreation, Economics and Visual Quality.

Vegetation

Assessment Prepared By:
Name: Scott Allen
Title: Forest Management Supervisor, Missoula Unit DNRC

Introduction

The vegetation section describes present conditions and components of the forest vegetation in the project area, as well as the anticipated effects of both the no-action and action alternative on vegetation.

Issues Addressed

The following issues were developed during scoping and project development regarding the effects of the proposed actions to vegetation.

- The proposed action may alter the amount and distribution of rare plants.
- The proposed harvest could contribute to landscape-level management across multiple ownership boundaries.
- The proposed harvest may affect the amount, quality and connectivity of old growth forest within the project area.

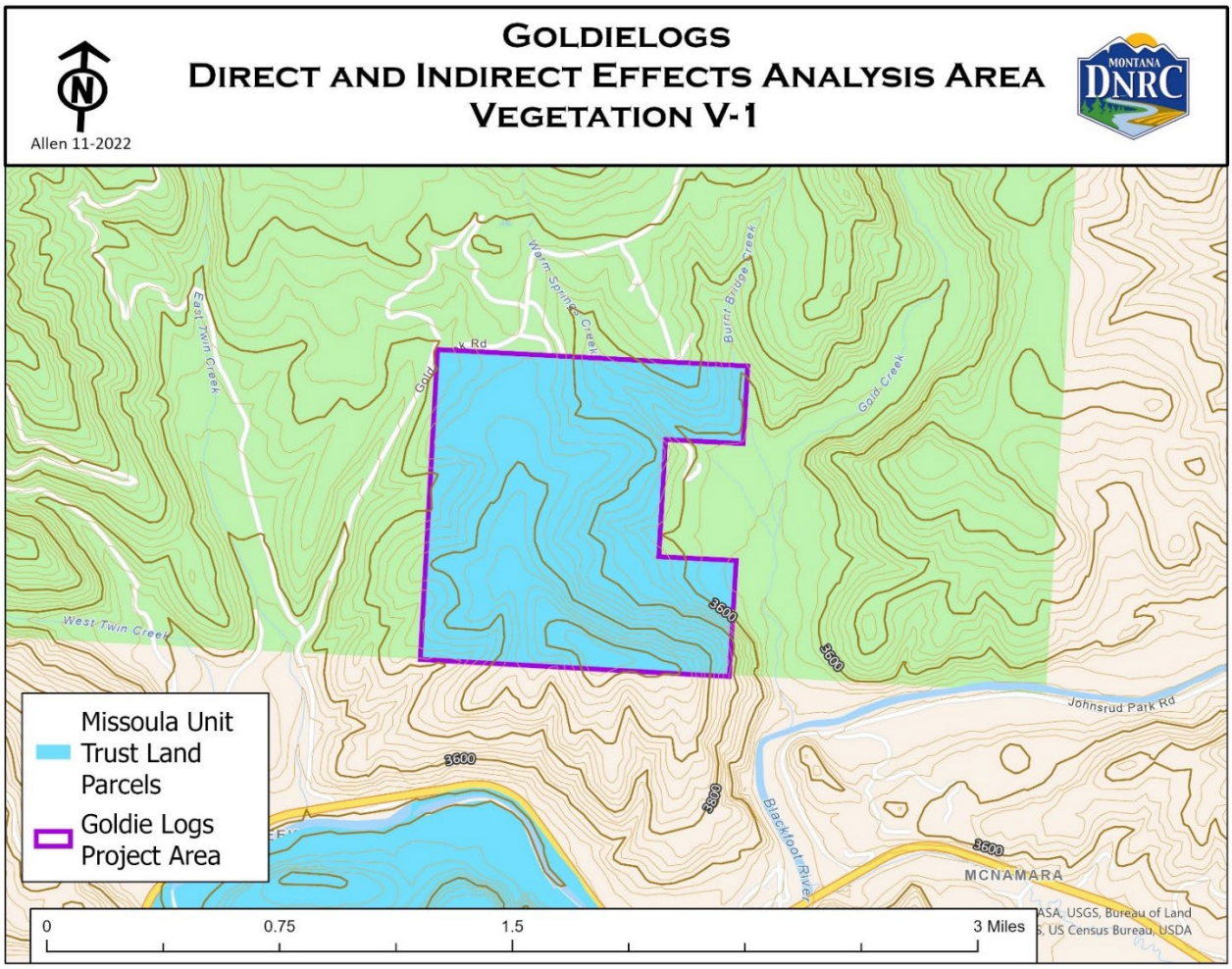
Analysis Areas

This analysis includes two geographic scales for assessing potential direct, indirect, andcumulative effects of the no-action and action alternative.

Direct and Indirect Effects Analysis Area

The analysis area used to assess direct and indirect effects includes the state-owned parcel in Section 36, Township 14 North (T14N), Range 17 West (R17W) (Figure V-1). This area is referred to as the project area (*see Chapter I — Purpose and Need*). The project area falls within the Bitterroot-Blackfoot Climatic Section (M332B).

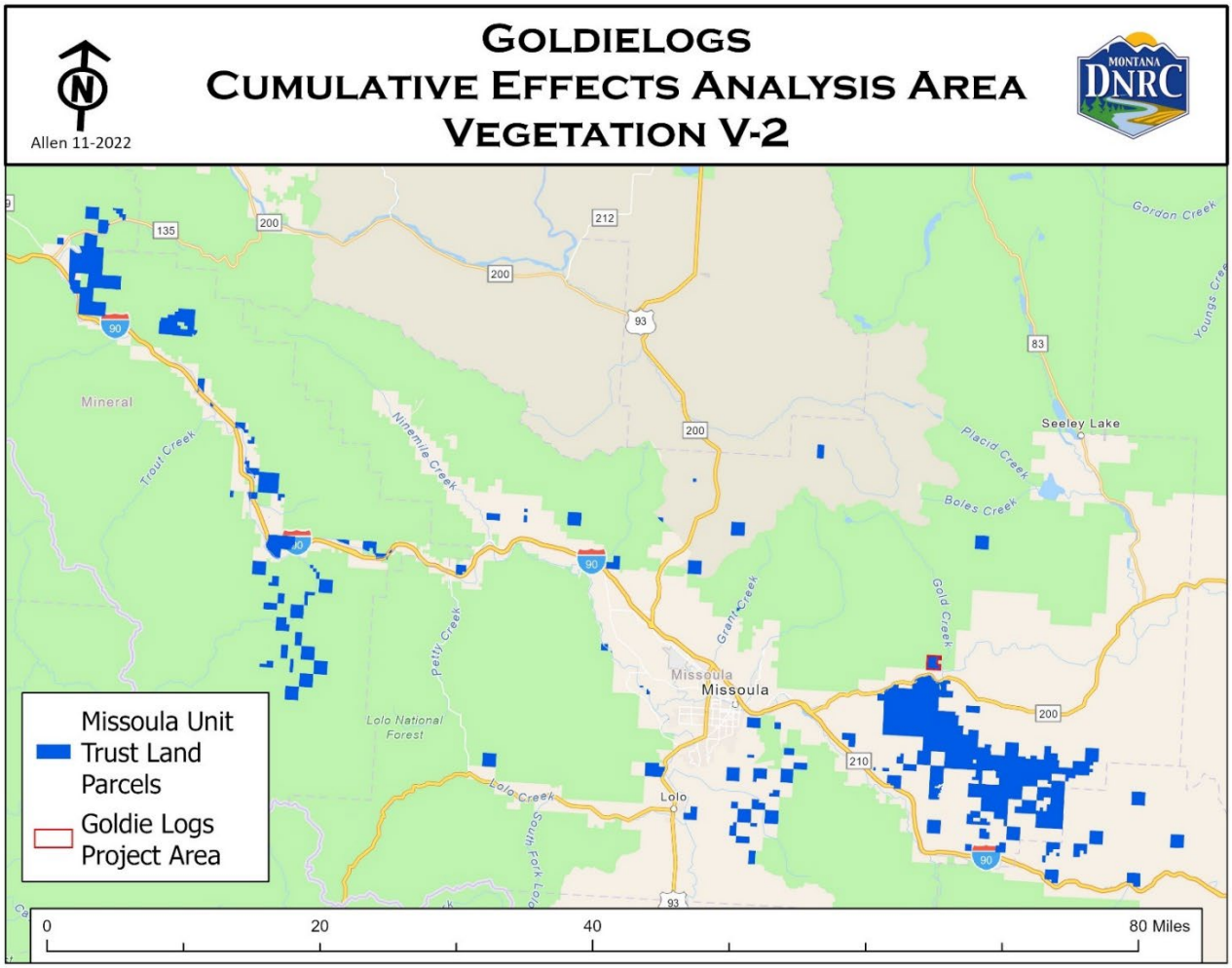
Figure V-1. Direct and Indirect Effects Analysis Area.



Cumulative Effects Analysis Area

The analysis area used to assess cumulative effects to forest vegetation includes all forested trust land parcels, administered by the Missoula Unit DNRC. These approximately 88,542 acres consist of both blocked and scattered parcels administered by the Missoula Unit Office (Figure V-2). The cumulative effects area falls within two climatic sections as defined by B. John Losensky in Historical Vegetation of Montana (1997) --Lower Flathead Valley Climatic Section (M333B) and Bitterroot-Blackfoot Climatic Section (M332B) and includes school trust lands in Mineral County, MT, all but the northeastern portion of Missoula County, MT, and the northwestern portion of Granite County, MT. The project area falls within the Bitterroot-Blackfoot Climatic Section (M332B).

Figure V-2. Vegetation analysis area for cumulative effects.



Stand History and Past Management

The current stand conditions in the project area have been influenced by past timber management and wildfire activity and/or suppression. The State of Montana acquired the approximately 640-acre section on April 3, 1905. On December 5, 1925, 60 acres were sold. Active forest management has been implemented within the project area as far back as 1892, possibly earlier, however no earlier records were found. In conjunction with past forest management, wildfires were actively suppressed. Few fire scars are observed within the project area. It is uncertain if the fire scars are from wildfire or prescribed (RX) burns.

Known past management activities include:

- 1892 - Big Blackfoot Milling Company (presumed seed tree cut) unknown volume removed (see *V-3 1924 Anaconda Copper Mining Company Stand Exam)*
- 1947 – 1,415 Christmas tress harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 1949 – 7.6 MBF (thousand board feet) of western larch and ponderosa pine sawlogs

were harvested along with 75 bales of Christmas trees *(see Figure V-4. Section Card documenting previous harvest entries)*

- 1954 - 554 Christmas trees harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 1955 - 1.3 MMBF (million board feet) of western larch, ponderosa pine, and Douglas-fir sawlogs were harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 1957 - 3 MBF of Douglas-fir and ponderosa pine sawlogs harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 1958 - 4 MBF of Douglas-fir and ponderosa pine sawlogs harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 1961 - 70 MBF of western larch, ponderosa pine, and Douglas-fir sawlogs were harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 1968 - 1 MBF of ponderosa pine and western larch sawlogs were harvested *(see Figure V-4. Section Card documenting previous harvest entries)*
- 2012 - McNamara Landing Timber Sale harvested 1.8 MMBF of Douglas-fir, western larch, ponderosa pine, and lodgepole pine sawlogs using a sanitation/commercial thin prescription

Figure V-3. 1924 Anaconda Copper Mining Company Stand Exam

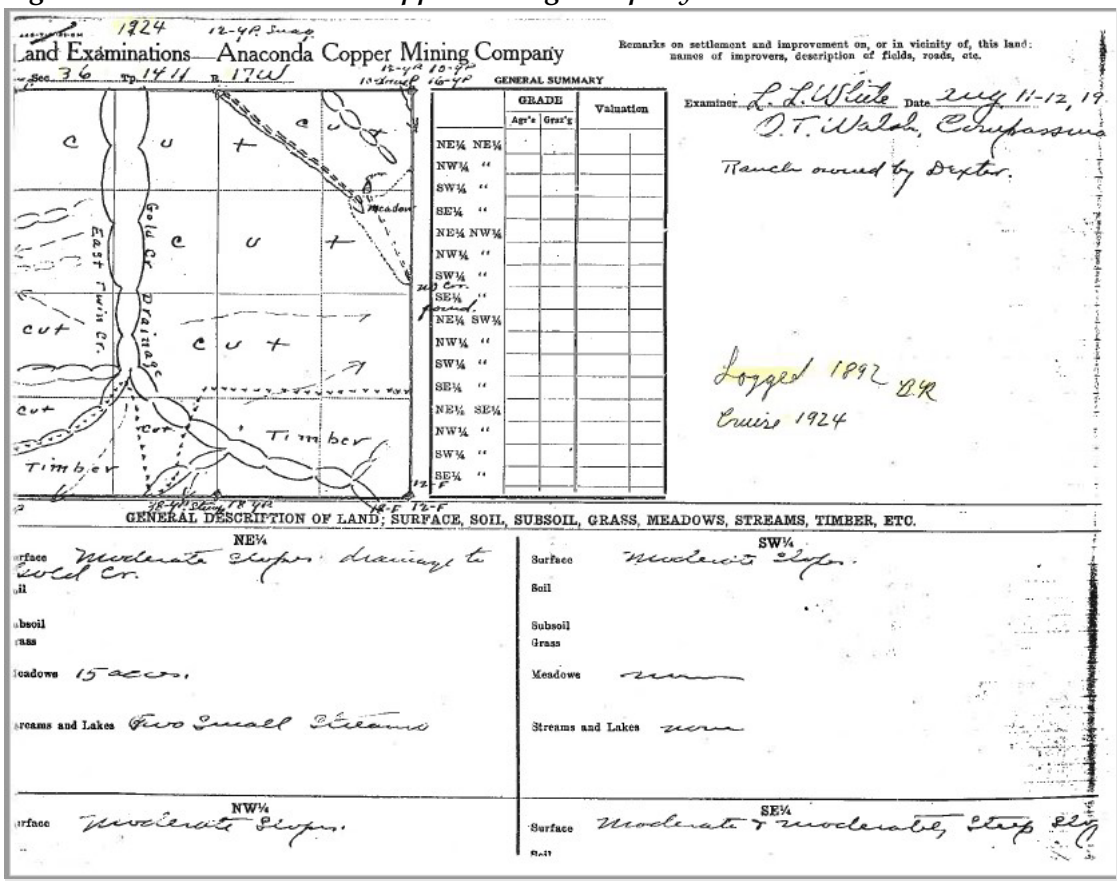
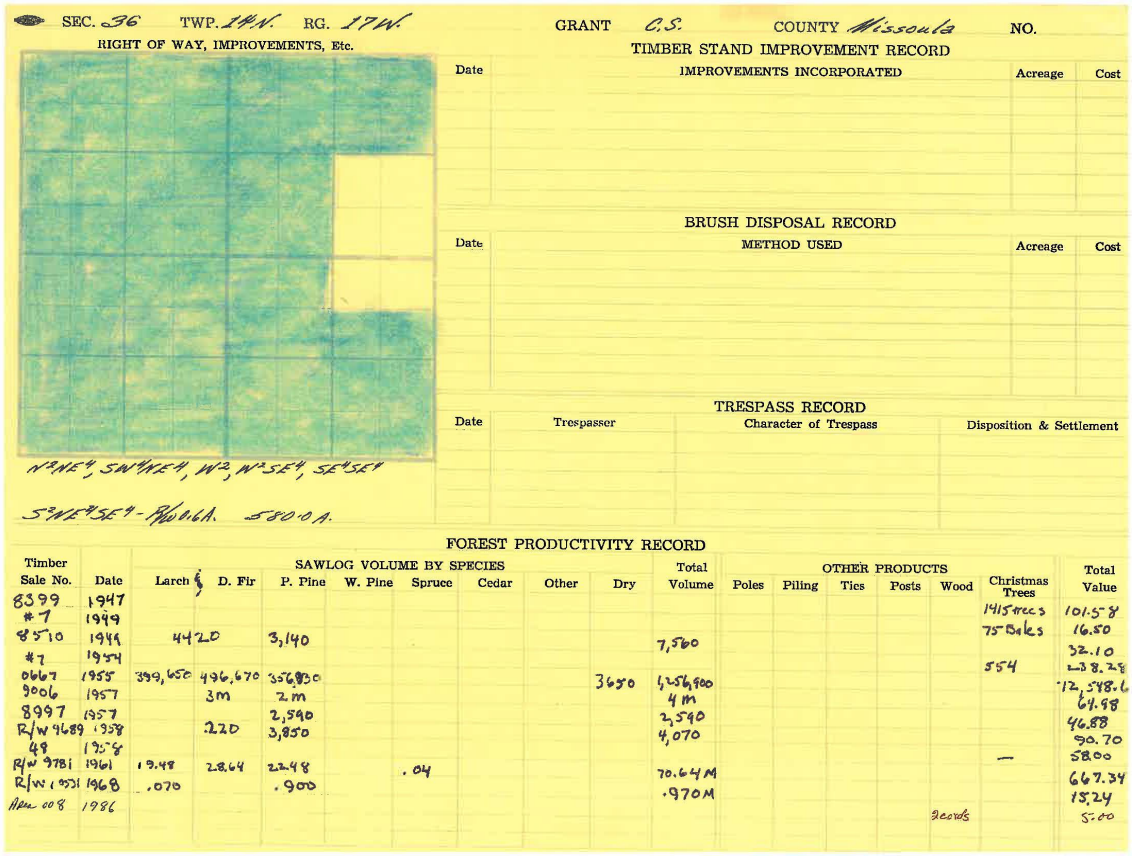


Figure V-4. Section Card documenting previous harvest entries



SEC. 36 TWP. 14N. RG. 17W. GRANT C.S. COUNTY Missoula NO.

RIGHT OF WAY, IMPROVEMENTS, Etc.

TIMBER STAND IMPROVEMENT RECORD

Date	IMPROVEMENTS INCORPORATED	Acreage	Cost

BRUSH DISPOSAL RECORD

Date	METHOD USED	Acreage	Cost

TRESPASS RECORD

Date	Trespasser	Character of Trespass	Disposition & Settlement

N½NE¼, SW¼NE¼, W½, N½SE¼, SE¼SE¼

S½NE¼SE¼ - R/W 0.6A. 580.0A.

FOREST PRODUCTIVITY RECORD

Timber Sale No.	Date	SAWLOG VOLUME BY SPECIES Larch	D. Fir	P. Pine	W. Pine	Spruce	Cedar	Other	Dry	Total Volume	OTHER PRODUCTS Poles	Piling	Ties	Posts	Wood	Christmas Trees	Total Value
8399	1947																
#7	1949															1415 trees	101.58
8510	1949		4420	3,140						7,560						75 Bales	16.50
#7	1954																32.10
0667	1955	399,650	496,670	356,830					3650	1,256,900						554	2838.28
9006	1957		3M	2M						4M							12,548.6
8997	1957			2,590						2,590							64.98
R/W 9689	1958		220	3,850						4,070							46.88
48	1958																90.70
R/W 9781	1961	19.48	28.64	22.48		.04				70.64M						—	58.00
R/W 10531	1968	.070		.900						.970M							667.34
Area 008	1986																15.24
															Records		5.00

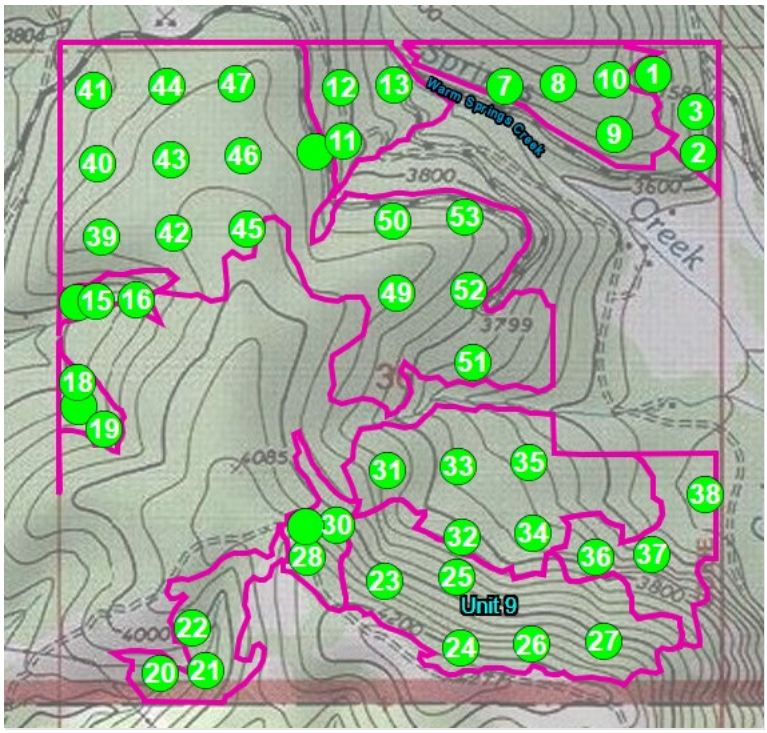
Old Growth

Introduction

The DNRC's Missoula Unit actively inventories old growth according to the Green et al. (1992) criteria for determining old growth stands on state lands (ARM 36.11.403). Green et. al. (1992) describes characteristics of old growth forests in Montana and defines the minimum number of trees per acre of a specified diameter at breast height (DBH) and age for each old growth type. DNRC's Stand Level Inventory (SLI) provides an initial classification of old growth stands on State lands. These stands are verified through field reconnaissance and/or the collection of field data during project development. The field verification process may, in some cases, identify old growth stands that were not classified as old growth in the SLI and in other cases may change stands that were identified as old growth in the SLI to a non-old growth classification. Stand Level Inventories (SLI) did not identify any stands within the Goldielogs project area as old growth. Additionally, no old growth was identified during the 2012 McNamara Timber Sale.

During project development, foresters from the Missoula Unit conducted a field cruise of all potential stands within the project area (Figure V-4). No old growth stands according to Green et al. (1992) criteria were identified during the possible old growth verification cruise.

Figure V-4. Possible Old Growth Verification Cruise Plot Locations



Results

No old growth stands according to the Green et al. (1992) were located within the Goldielogs project area. Stand Level Inventories (SLI) and conducted field surveys confirmed the absence of old growth.

Threatened, Endangered, or Sensitive Plants

Analysis Methods

The Montana Natural Heritage Program (MTNHP) was used to identify the presence of Species of Concern, including threatened, endangered, or sensitive plant species, in the project area. Species of Concern are native species that are considered at risk of extirpation in Montana due to declining populations, threats to their habitats, restricted distribution, or other factors. In addition, MTNHP was used to identify Potential Species of Concern. Potential Species of Concern are defined by the MTNHP as native taxa for which current, often limited, information suggests potential vulnerability. Also included are plant species for which additional data are needed before an accurate status assessment can be made. A field reconnaissance survey for sensitive plant species was conducted on this section on June 3, 1992 by Montana Natural Heritage Program Botanist J. Stephen Shelly. This survey identified the presence of the plant *Madia minima* (Small Headed Tarweed) on an open slope in the SW ¼ of the SW ¼ of the section. The same June 3, 1992 survey found no occurrences of *Cypripedium fasciculatum* (Clustered Orchid) in this section. The *Pseudotsuga menziesii**Physocarpus malvaceus* (Douglas fir\ninebark)

habitat type has been closely associated with this plant species and is present in this section. Another survey conducted June 9, 1993 by Robert Ethridge, Department of State Lands (now DNRC), Southwestern Land Office Silviculturist, and Peter Stickney, U.S. Forest Service Ecologist, found no occurrences of *Cypripedium fasciculatum* in the section either.

Figure V-5. M T N H P Observed Locations of Howell's Gumweed (*Grindelia howellii*)

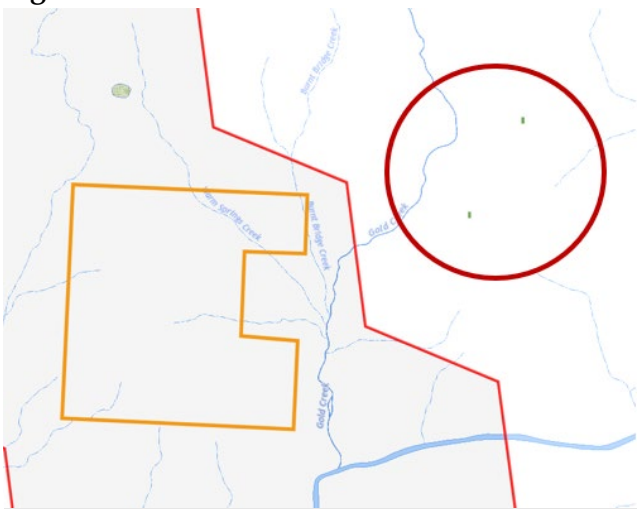
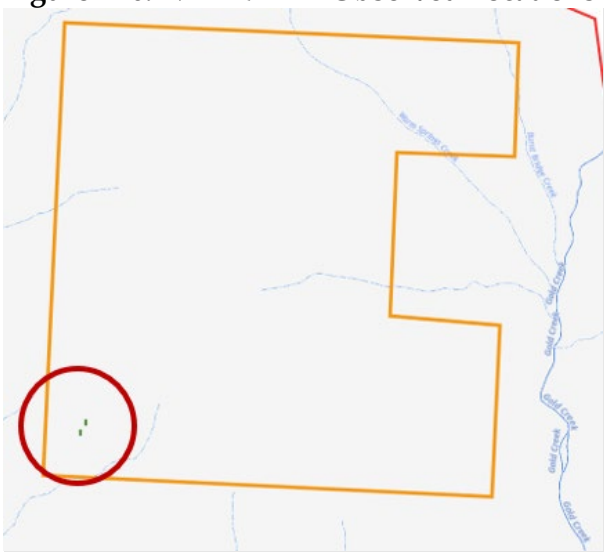


Figure V-6: M T N H P Observed Locations of Small Headed Tarweed (*Madia minima*)



Direct, Indirect, and Cumulative Environmental Effects of the No-Action Alternative

There are no anticipated effects on threatened, endangered, or sensitive plants with the no-action alternative.

Direct, Indirect, and Cumulative Environmental Effects of the Action Alternative

No plant Species of Concern were identified in the project area. A query of The Montana Natural Heritage Program listed only Howell's Gumweed (*Grindelia howellii*) as a species of concern approximately 1 air mile outside of the project area (Figure V-5). The previous inventory

conducted during the McNamara Timber Sale Environmental Analysis supports this latest query. The sighting locations were outside of the Goldielogs project area and proposed haul route. There are no anticipated effects on plant Species of Concern.

Madia minima (Small Headed Tarweed), listed as Potential Species of Concern, was documented in the SW 1/4 of the SW 1/4 of Section 36 (Goldielogs project area; Figure V-6). The total area occupied by the plant was approximately 1,500 square feet. The area occupied by this plant species is outside of the proposed harvest units which would prevent any damage to the plant by harvest and equipment operations. Thus, there are no anticipated effects of the action alternative on Potential Species of Concern plants.

Forest Cover Types, Age Classes, and Stand Structure

Analysis Methods

To assess the effects of the action alternative on forest cover types in the project area, the DNRC stand level inventory (SLI) was used. The DNRC maintains an active, accurate inventory using walk-through sampling. The SLI was additionally field verified within the project area by DNRC foresters during the development of the action alternative. Attributes included within the SLI inventory used to assess the effects include; stand delineations, habitat type, acres, current cover type, DFC (desired future condition), snag per acre, and fire group.

Affected Environment

Project Area Cover Types and DFCs

The DNRC is committed to maintaining biodiversity by managing for appropriate stand structures and compositions on state lands (ARM 36.11.404). Appropriate stand cover types are determined by a site-specific model (ARM 36.11.405) that considers the ecological characteristics of the site (habitat type, current stand conditions, climate, disturbance regime, etc.) and estimated historical cover type conditions that existed on the site prior to European settlement. Within the project area, there are approximately 581 acres of forested land (Table V-1). Of the forested acres, ponderosa pine is the most commonly occurring cover type; it is found on approximately 74 percent (433 acres) of the project area, followed by western larch/Douglas-fir comprising 17 percent (100 acres), as well as mixed conifer comprising 8 percent (48 acres) (Table V-1).

Table V-1 also shows DNRC's Desired Future Conditions (DFC) for the stands in the project area. The DFC represents the cover type that DNRC aims to manage toward within a given stand in order to implement its coarse-filter approach to managing for biodiversity (*ARM 36.11.404*). All proposed silvicultural harvest prescriptions have been designed to move the stands toward the appropriate DFC *(see appendices RX1 - RX4).*

Table V-1. Current cover types and desired future conditions for the project area.

Current Cover Type vs. Desired Future Conditions for the Project Area				
Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Ponderosa pine	433	74.5%	489	84%
Western larch/Douglas fir	100	17.2%	92	16%
Mixed conifer	48	8.3%	0	0%
Total	581	100%	581	100%

*Numbers may not sum to total due to rounding.

Cumulative Effects Area Cover Types and DFCs

Current cover types within the cumulative effects area (or within the boundaries of the lands managed by the Missoula Unit DNRC -Table V-2), are represented in the table below:

Table V-2. Current cover types and desired future conditions for the Cumulative Effects Area

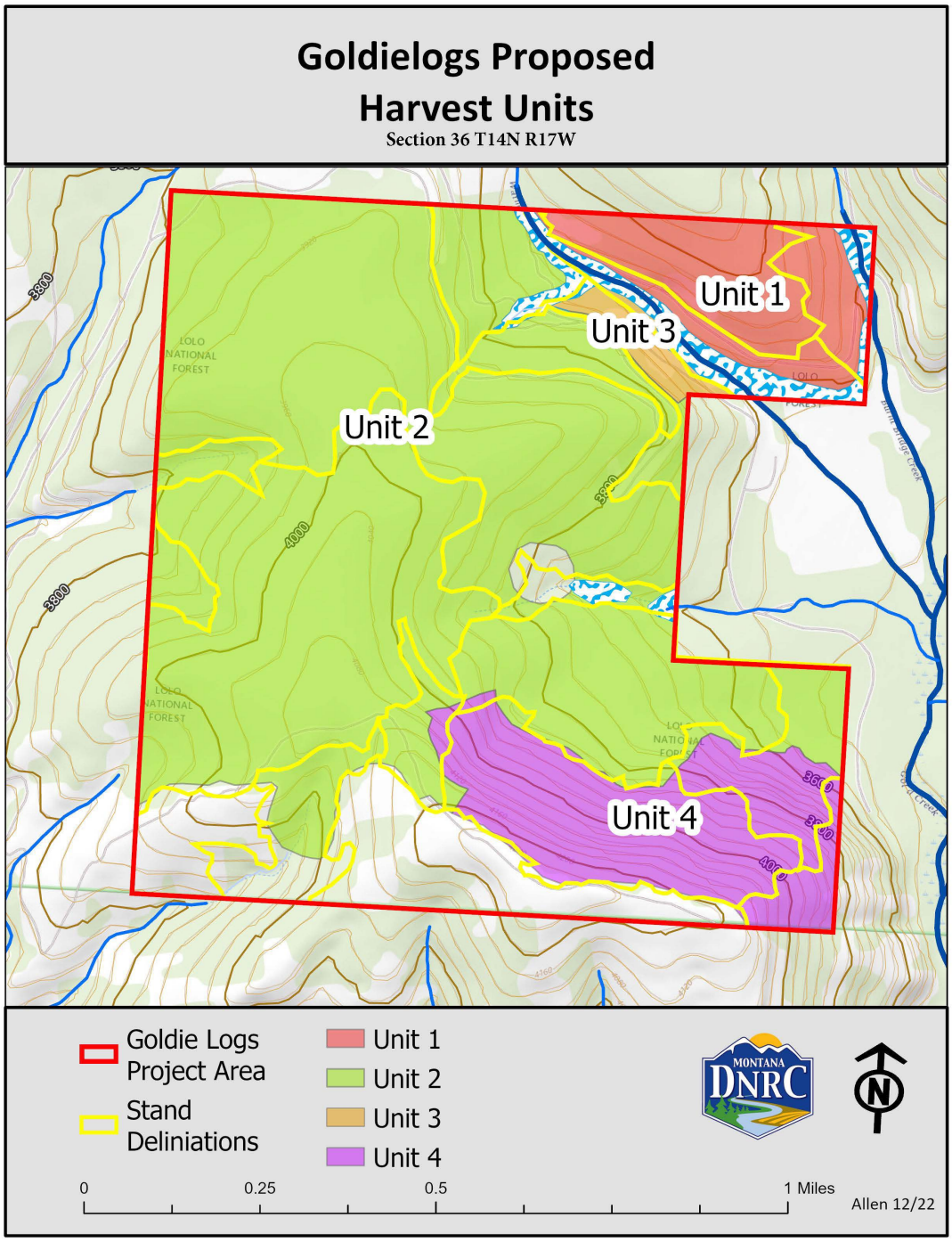
Current Cover Type vs. Desired Future Conditions for the MSO Unit Analysis Area				
Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Ponderosa pine	39814.6	46.5%	52004	60.7%
Douglas fir	15562.1	18.2%	8732	10.2%
Western larch/Douglas fir	15371.7	17.9%	19134	22.3%
Mixed conifer	3960.1	4.6%	449	0.5%
Subalpine fir	3730	4.4%	830	1.0%
Lodgepole pine	3334.3	3.9%	2865	3.3%
Nonstocked	3264.7	3.8%	318	0.4%
Western white pine	292.3	0.3%	927	1.1%
Hardwood	229.5	0.3%	211	0.2%
Not inventoried	94.6	0.1%	184	0.2%
Total	85654	100.0%	85654	100.0%

*Numbers may not sum to total due to rounding

Project Area Stand Structure and Composition

For descriptive purposes, SLI delineated stands within the project area have been grouped within their respective proposed harvest units. Descriptions of the current stand conditions coincide with the proposed harvest units 1-4 (Figure V-7). Current stand conditions can also be referenced in the attached appendices RX1 -RX4.

Figure V-7. Proposed Harvest Units for the project area



Current Conditions Unit 1

HABITAT TYPE(s): PSME/SYAL-CARU phase
FIRE GROUP: Group 6
CURRENT COVER TYPE: Ponderosa pine
ACRES: APPROXIMATELY 43 acres
DESIRED COVER TYPE: Ponderosa pine

Stands within Unit 1 consist primarily of two differing stands delineated by an aspect break: A south southwest facing aspect and an east facing aspect. The dryer south southwest aspect consists of an un-even aged multistoried forest type. Large (greater than 12-inch dbh), relic ponderosa pine (PP), from previous cuts, as well as regeneration initiated during previous harvests dominate the overstory. Large Douglas-fir (DF) and a few scattered western larch (WL) are also members of the overstory. The mid-level canopy is a multi-age mix of 80% DF and 20% PP. Regeneration consists primarily of clumps of DF. The east facing portion the unit consists primarily of two strata. DF 40%, PP 35%, and WL 5%. Most regeneration is comprised of advanced Douglas-fir. Douglas-fir bark beetles are very active and have been the cause of noticeable mortality. Knapweed and thistles are established within both stands.

Current Conditions Unit 2

HABITAT TYPE(s): PSME/VACA
PSME/LIBO-SYAL phase
FIRE GROUP: Group 6
CURRENT COVER TYPE: Ponderosa Pine (85%), Mixed Conifer (12%), Western Larch/Douglas-fir (3%)
ACRES: APPROXIMATELY 377 acres
DESIRED COVER TYPE: Ponderosa Pine (93%), Western Larch/Douglas-fir (7%)

Stands within Unit 2 consist primarily of mature PP (ponderosa pine), WL (western larch), and DF (Doulas-fir) overstory. Current cover types match the DFC (Desired Future Condition) cover types with the exception of two stands within the unit; approximately 48 acres in the southeast portion are currently mixed conifer and approximately 13 acres located in the northeast portion of the unit are currently DF/WL. Both dominant and co-dominant stems were retained during the previous harvest. The mid-level canopy consists of a mix of a suppressed age-class similar to the overstory as well as pockets of a younger age class primarily consisting of Douglas-fir. Natural regeneration has only been successful in over 30% of the unit. Regeneration primarily consists of clumps of more shade tolerant DF. Douglas-fir bark beetles and root-rot are prevalent within the stands, causing multiple half acre or larger pockets of tree mortality. At the time of analysis, more than 20 acres were infested with bark beetles. Knapweed and thistles are established within both stands.

Current Conditions Unit 3

HABITAT TYPE(s): PSME/VACA
FIRE GROUP: Group 6
CURRENT COVER TYPE: Ponderosa Pine
ACRES: APPROXIMATELY 7 acres
DESIRED COVER TYPE: Western Larch/Douglas-fir

Stands within Unit 3 consists primarily of uneven-sized PP (ponderosa pine), WL (western larch), and DF (Doulas-fir) overstory. Dominant PP and WL are scattered among inferior or co-dominant WL stems. A portion of the larger DF in the 12–22-inch dbh (diameter at breast height) size class within the unit have been infested with Douglas-fir bark beetles. Unit 3 was not harvested during the McNamara Landing Timber Sale. Little to no natural regeneration of seral species has been successful. Regeneration consists primarily of clumps of DF. Douglas-fir bark beetles and root-rot are prevalent in the stands causing multiple half acre or larger pockets of tree mortality. At the time of analysis, ocular estimates suggested more than 20 percent of the Douglas-fir were infested with bark beetles. Knapweed and thistles are established within both stands.

Current Conditions Unit 4

HABITAT TYPE(s): ABLA/LIBO-XETE phase (71%), PSME/VACA (18%), PSME/CAGE (11%)
FIRE GROUP: Group 6
CURRENT COVER TYPE: Western Larch/Douglas-fir (89%), Ponderosa Pine (11%)
ACRES: APPROXIMATELY 70 acres
DESIRED COVER TYPE: Western Larch/Douglas-fir (83%), Ponderosa Pine (17%)

Stands within Unit 4 were left uncut during the McNamara Landing Timber Sale. The unit consists primarily of uneven-aged size class WL (western larch), DF (Doulas-fir), and PP (ponderosa pine) overstory. Dominant western larch and Douglas-fir are scattered among inferior or co-dominant western larch and Douglas-fir stems. A portion of the larger DF in the 12–22-inch dbh (diameter at breast height) size class within the unit have been infested with Douglas-fir bark beetles. Little to no natural regeneration of seral species has been successful. Regeneration consists primarily of clumps of DF.

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

Under the no-action alternative, natural processes would be the primary driver of forest conditions within the Goldielogs project area. Within the project area, it would be expected that;

- Douglas-fir bark beetle, root rot, and western spruce budworm would continue to suppress productivity/growth or cause mortality.
- shade tolerant species would out-compete seral species, eventually changing the historic cover type and species distribution or the DFC of stands.

- Older age class early seral species would eventually be outcompeted for water, nutrients, and sunlight, causing mortality, and in turn, unavailable for future old growth recruitment.
- Young, intermediate, and overstory stems that are currently overstocked would remain suppressed.
- Fuels would continue to build in stands increasing the potential for a stand replacing wildfire.

Direct, Indirect, and Cumulative Effects of the Action Alternative

The action alternative is expected to improve stand health and vigor by reducing basal area, promoting natural regeneration of early seral species, increasing uneven-aged stand dynamics, as well as mimic natural disturbance, while changing or maintaining desired future conditions within the project area. The action alternative would also reduce fuel loading and the likelihood of a stand replacing fire. The action alternative would not be expected to alter cover types, age classes, or stand structure in untreated areas within the project area.

Direct and indirect effects of the action alternative are described by proposed harvest units below.

Unit 1

The action alternative would utilize an individual tree selection (ITS) prescription to reduce overall basal area throughout the size class spectrum. Large, dominant early seral species (WL and PP) would be preferred for leave trees to aid in the recruitment of future old growth. All DF of inferior phenotype, regardless of size, would be favored for cut trees. Targeting DF for removal would help maintain the current PP future desired condition. In addition, it would be expected to suppress the amount of DF beetle within the stand. Trees exhibiting dominate traits within their respective strata; i.e. good crown ratio or other signs of vigor, would be preferred to leave in all other size classes. If areas of multiple species of similar size and phenotypical attributes existed the following species preference would be used to select leave trees: PP, WL, and DF.

Unit 2

An ITS would be used to reduce overall basal area throughout the size class spectrum. To aid in the recruitment of Old Growth in the future, large, dominant PP and WL would be preferred for leave trees. Any DF of inferior phenotype, regardless of size, would be favored for cut trees. This would not only help transition the stand to the PP future desired condition, but it would also suppress the amount of DF beetle within the stand. Trees exhibiting dominate traits within their respective strata; i.e. good crown ratio or other signs of vigor, would be preferred for leave in all other size classes. If areas of multiple species of similar size and phenotypical attributes existed the following species preference would be used to select leave trees: PP, WL, and DF. Seral species selection of leave trees is expected to move the stand closer to DFC within the 48 acres of mixed conifer cover type.

Unit 3 and 4

An ITS would be used to reduce overall basal area throughout the size class spectrum. To aid in the recruitment of old growth in the future, large, dominant WL and PP would be preferred for leave trees. Suppressed, codominant WL would be harvested from even-age clumps of WL. Any DF of inferior phenotype, regardless of size, would be favored for cut trees. This would not only help transition the stand to the WL/DF future desired condition, it would also suppress the amount of DF beetle within the stand. Trees exhibiting dominate traits within their respective strata; i.e. good crown ratio or other signs of vigor, would be preferred for leave in all other size classes. If areas of multiple species of similar size and phenotypical attributes existed WL would be the preferred leave tree species. Reduction of basal area is expected to promote natural regeneration of early seral species.

Anticipated Future Treatments

- Slash disposal/hazard reduction: immediate post-harvest burning of slash
- Planting: as needed depending on seral species regeneration
- Regeneration survey: monitoring of seral species regeneration
- Evaluate for pre-commercial thinning (PCT): If seral species regeneration is excessive, a PCT may follow 5-15 years post-harvest
- Weeds: pre and post-harvest weed mitigation as needed (see Noxious Weeds section)

Vegetation Mitigations

- Favor seral trees such as ponderosa pine and western larch for leave tree selection to move stands toward a more historic species composition and the DNRC's Desired Future Condition.
- Develop and implement a silvicultural prescription that emulates natural disturbance historically present on the landscape.
- In all timber harvest units post-harvest, the department shall retain an average of approximately two snags and two snag recruits over 21 inches DBH, per acre, if snags or recruits over 21 inches DBH are not present, the next largest size snag or recruit shall be retained.
- Monitor regeneration; If planting is needed post-harvest, planting of seral species (WL, PP) in treatment areas to promote the DFC (desired future condition).
- If any species of concern or potential species of concern are encountered during activities associated with this project, activities within the immediate vicinity would cease until DNRC evaluates the occurrence and develops appropriate site-specific mitigations to protect the species and its habitat.

Noxious Weeds

Assessment Prepared By:
Name: Jordan Rice
Title: Land Use Specialist, SWLO DNRC

Issues Addressed

The following issues were developed during scoping and project development regarding the effects of the proposed actions to weeds.

- The proposed project may introduce or spread noxious weeds in the project area. In addition, noxious weeds were introduced through past management and are currently present on site.

Analysis Methods

The presence of noxious weeds in the project area was determined through field observation and evaluation of current grazing activities.

Existing Conditions

State-listed spotted knapweed (*Centaurea maculosa*), houndstongue (*Cynoglossum officiale L.*), tall buttercup (*Ranunculus acris),* oxeye daisy *(Leucanthemum vulgare),* sulfur sinquefoil (*Potentilla recta),* and Canada thistle (Cirsium *arvense*) noxious weeds were observed in the Goldielogs project area. Other noxious weed species that were not observed may also be present. Spotted knapweed was found primarily along roads as well as other areas of disturbance throughout the project area. Houndstongue was found mostly along historic skid trails and in small patches on previous disturbance. Historic cattle grazing, timber harvest activities, wildlife use, and recreational uses are most likely the reasons for the existing presence and spread of noxious weeds and the potential future spread and introduction of noxious weeds. Lessees of State land for grazing activity are required to monitor and manage noxious weed populations on their leased parcels. Monitoring and management of existing populations would continue.

Tall buttercup is classified as priority 2A. These weeds are common in isolated areas of Montana. Management criteria would require eradication or containment where less abundant.

Spotted knapweed, oxeye daisy, sulfur sinquefoil, Canada thistle, and houndstongue are classified as priority 2B. These weeds are abundant in Montana and widespread in many counties. Management criteria would require eradication or containment where less abundant.

In addition to the listed noxious weeds, the following regulated plants have been observed in the project area and surrounding landscape: cheatgrass (*Bromus tectorum*) and mullein (*Verbascum thapsus*). Regulated plants have the potential for significant negative impacts to native flora and may not be intentionally spread or sold other than as a contaminant in agricultural products (MDA 2013). Cheatgrass and mullein have a limited distribution in the project area and typically occur in isolated, small patches.

Post-Scoping Herbicide Application

On June 28, 2022, Missoula Unit DNRC contracted WMA Noxious Weed/Range Specialists, LLC to apply chemical weed abatement within the Goldielogs project area (See Figure WD-1). This post-scoping, but pre-project treatment was part of a Missoula Unit DNRC weed mitigation management plan based on priorities and funding available.

Figure WD-1: 2022 Goldielogs herbicide application

ATTN SCOTT ALLEN

WMA Noxious Weed/Range Specialists, LLC
PO Box 917
Bonner, MT 59823
406-303-4630
License # 103088-12

Customer DNRC : MSLA OFFICE Phone # 406-396-1969

Address Goldie Logs SALE - Gold crK Road, Bonner

App Name:	R. Grant	W. Andrews	S. BeneficL	R. Grant	W. Andrews	S. Benefic l
	Start/Stop Time: 3pm - 5:45pm	Start/Stop Time: 3pm - 545pm	Start/Stop Time: 3pm - 6pm	Start/Stop Time: 6pm - 7pm	Start/Stop Time: 5:50pm - 7pm	Start/Stop Time: 6/0pm - 7:15pm
	Date: 06/17/2022	County: Missoula ✓ Other___	Temp 82-73 F Wind 3-6 MPH Direction SW			
	Equipment used Truck GPA 25	Equipment used UTV #1 GPA 10	Equipment used UTV #2 GPA 10	Equipment used HandLine GPA 20	Equipment used HandLine GPA 20	Equipment used HandLine GPA 20
	1 Herbicide 2 2 Herbicide 8 3 Herbicide___	1 Herbicide 2 2 Herbicide 8 3 Herbicide___	1 Herbicide 2 2 Herbicide 8 3 Herbicide___	1 Herbicide 2 2 Herbicide 8 3 Herbicide___	1 Herbicide 2 2 Herbicide 8 3 Herbicide___	1 Herbicide 2 2 Herbicide 8 3 Herbicide___
RATE	1 Rate 5 (oz) / pt / qt per ac	1 Rate 5 (oz) / pt / qt per ac	1 Rate 5 (oz) / pt / qt per ac	1 Rate 5 (oz) / pt / qt per ac	1 Rate 5 (oz) / pt / qt per ac	1 Rate 5 (oz) / pt / qt per ac
	2 Rate 1 (oz) / pt / qt per ac	2 Rate 1 (oz) / pt / qt per ac	2 Rate 1 (oz) / pt / qt per ac	2 Rate 1 (oz) / pt / qt per ac	2 Rate 1 (oz) / pt / qt per ac	2 Rate 1 (oz) / pt / qt per ac
	3 Rate___ oz / pt / qt per ac	3 Rate___ oz / pt / qt per ac	3 Rate___ oz / pt / qt per ac	3 Rate___ oz / pt / qt per ac	3 Rate___ oz / pt / qt per ac	3 Rate___ oz / pt / qt per ac
GALLONS OUT	381.3 gal	100 gal	45 gal	18 gal	26 gal	12.8 gal
WEEDS	Spotted Knapweed, Oxeye Daisy, Tall buttercup, Houndstongue, Sulfur C., B Thistle, Common Mullein					
SITE	Campgrnd. Forest. (ROW), Rangeland. Pasture Other___	Campgrnd. Forest. (ROW) Rangeland. Pasture Other___	Campgrnd. Forest. (ROW) Rangeland. Pasture Other___	Campgrnd. Forest. ROW. Rangeland. Pasture Other Landings	Campgrnd. Forest. ROW. Rangeland. Pasture Other Landings	Campgrnd. Forest. ROW. Rangeland. Pasture Other Landings

Surfactant/Adjuvant:	Rainier EA
Ingredient Type:	NON-IONIC
Rate Applied (oz/ac)	4oz/ac

Surfactant/Adjuvant:	
Ingredient Type:	
Rate Applied (oz/ac)	

	Product Name	EPA Registration #	Active Ingredient (AI)	AI Rate
1	Tordon 22K	62719-6	Picloram	2 lb/gal
2	Milestone	62719-519	Aminopyralid	2 lb/gal
3	BaseCamp 2,4-D Amine	71368-1-2935	2,4-Dichlorophenoxyacetic Acid	3.8 lb/gal
4	Weedar 64 2,4-D Amine	71368-1	2,4 Dichlorophenoxyacetic Acid	3.8 lb/gal
5	E2	228-442	2,4-D, Fluroxypyr, Dicamba	3.8, 0.4, 0.4 lb/gal
6	Transline	62719-259	Clopyralid	3 lb/gal
7	Telar	432-1561	Chlorsulfuron	75% by weight
8	Escort	432-1549	Metsulfuron-Methyl	60% by weight
9	Vanquish	228-397	Dicamba	4 lb/gal
10	Plateau	241-365	Imazapic	23% by weight
11	Rejuvra	432-1609	Indaziflam	1.67 lb/gal
12	Esplanade 200 SC	432-1516	Indaziflam	1.67 lb/gal
13	Panoramic	66222-141-81927	Imazapic	2 lb/gal
14	Outrider	524-500	Sulfosulfuron	75% by weight
15	Method 240 SL	432-1565	Aminocyclopyrachlor	2 lb/gal
16	Glystar Plus	42750-61	Glyphosate	4 lb/gal

Completed By: RG

Treatment Type: [Initial] Touch-Up

Comments:
- Sprayed all open roads.
- Some roads were not treated due to access.
- ALL Landings were treated & mapped

Environmental Effects

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

Under the no-action alternative, the current extent of noxious weeds may continue to spread along roads and may increase in abundance. Following disturbance events such as timber harvest activities, fires, or grazing, the establishment and spread of noxious weeds can be more prevalent than in undisturbed areas. DNRC would treat selected sites on DNRC roads based on priorities and funding availability. If new weed invader species are found, they would have the highest priority for management. The grazing licensees are required to continue weed control efforts consistent with their license agreement.

Direct, Indirect, and Cumulative Effects of the Action Alternative

The action alternative would involve ground-disturbing activities that have the potential to introduce or spread noxious weeds. Under the action alternative, an Integrated Weed Management (IWM) approach would be considered for treatment of existing and prevention of potential future noxious weeds. Prevention, revegetation, and weed control measures for spot outbreaks are considered the most effective weed management treatments for the proposed project. Prevention measures would require operators to clean off-road equipment prior to arrival on site. Roadsides would be sprayed prior to operations. Weed control and revegetation would slow noxious weed spread and reduce weed density and occurrence compared to no-action. There would be a similar or slightly increased weed infestation within harvest units due to soil disturbance and reduction of tree canopy. The silvicultural prescriptions are designed to control disturbance and scarification to achieve goals needed for sustained forest growth. Control efforts would promote rapid revegetation and emphasize treatment of any new noxious weeds.

Herbicide application would be completed on segments of DNRC roads along the haul route where weeds are present to reduce weed spread along roads and promote desired vegetation for weed competition to reduce sedimentation. Herbicide would be applied as needed to control weeds observed off roads. Herbicide would be applied according to labeled directions and related laws and rules and would be applied with adequate buffers to prevent herbicide runoff to surface water. Implementation of IWM measures listed in the mitigations would reduce existing weeds, limit the possible spread of weeds, and improve current conditions to promote existing native vegetation. More weed control would occur under the action alternative compared to the no-action alternative.

Noxious Weed Mitigations

To reduce current noxious weed infestations and limit the future spread of weeds, the following integrated weed management mitigation measures would be implemented:

- All road construction and harvest equipment would be cleaned of plant parts, mud, and weed seed to prevent the introduction of noxious weeds. Equipment would be subject to inspection by the Forest Officer prior to moving on-site.
- All newly disturbed soils on temporary road cuts and fills would be promptly reseeded to protect the site from erosion.
- Chemical weed abatement would be performed prior to first disturbance along

existing roads to limit weed seed transportation. Chemical weed abatement would also be performed on all roads (temporary and permanent). Best practice is to monitor the area for noxious weeds annually and to perform follow-up treatment 1-3 years after the completion of management. All herbicide application would be performed by a licensed applicator in accordance with label directions, State laws, and rules of the Missoula County Weed District.

- DNRC would monitor the project area for noxious weeds as part of on-going timber sale administration. If new noxious weeds occur following the harvest, a control plan would be developed and implemented that may include herbicide treatments. If herbicides are used, application would be done using a licensed applicator in accordance with label directions, State laws, and rules of the Missoula County Weed District.

Geology and Soils

Assessment Prepared By:
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Title: Hydrologist/Soil Scientist, SWLO DNRC

Issues Addressed

The following issues regarding the effects of the proposed actions to geology and soils were developed during scoping and project development.

- Traditional ground-based harvest operations have the potential to **compact and displace** surface soils which can reduce hydrologic function, macro-porosity, and/or soil function.
- Areas of impacted soil function have the potential to **increase rates of erosion** which may affect productive surface soils.
- The removal of large volumes of both coarse and fine woody material through timber harvest reduces the amount of organic matter and nutrients available for **nutrient cycling** possible affecting the long-term **productivity** of the site.
- The proposed project would change vegetative cover with the potential to **modify the local soil moisture** conditions and soil biological function.
- Harvest activities associated with the proposed project may **cumulatively affect** long term soil **productivity**.

The concern for **slope destabilization has been eliminated from further analysis.** This issue is not relevant because unstable slopes or evidence of recent or historic slides, topples, rock falls, or earthflows have not been observed in the project area. Areas surveyed include areas of historic road construction (cut and fill), areas proposed for reconstruction, and areas proposed for timber harvest.

Existing conditions

The project area is located in the Rattlesnake Mountains. Underlying bedrock is composed of upper Belt sedimentary rocks. Parent materials are a mixture of shallow to deep soils derived from mixed bedrocks of argillite and quartzite with surface deposits of tertiary mudstones/clay along the access road and mid-slope terrain. Rock outcrops and shallow soils are common on ridgelines. No unique, unusual, or unstable geology have been observed or documented in the project area.

Elevations in the project area range from 3,600 to 4,100 feet. Average annual precipitation is 16 to 20 inches and mainly is snow. Project area vegetation range from dryer ponderosa pine sites to moderately moist north-facing slopes Douglas-fir stands. The majority of the project area is located on moderate slopes less than 45% with some steeper north facing slopes. Field review included inspection of the proposed road work areas including reconstruction and new construction.

Five soil types or units occur within the project area (USDA NRCS, 2007). A description of these

map units is listed in ***Table GS-1.*** The soils in the project area are mainly gravelly loam residual soils on hillslopes. Areas of heavier textured, silty clay loam, tertiary age sediments are located on the moderate slopes less than 30% in the NW quarter of the section.

The Bignell and Shooflin soils are deep silt loams with clayey subsoils forming in tertiary age mudstones on generally concave terrain and occur along portions of the road used for residential access and the NW ¼ of the project section. The fertile Bignell soils are well drained and have higher cobble contents with cobbly clay loam subsoils. Shooflin soils occur in the north ½ of the section and have a higher clay content and a lower coarse fragment content. Both soils tend to retain moisture into spring and are susceptible to soil displacement, compaction, and rutting if operated on when wet. Despite the slower infiltration and moisture retention, the infiltration rate exceeds precipitation rates. Areas of ponding were observed only on existing road surfaces. These higher clay content soils generally dry out adequately by June for ground skidding operations without causing excessive soil effects. Areas of harvest and skidding in the last entry (McNamara Timber Sale, 2012) do not show excessive soil effects. Some skid trails are still visible due to less tree regeneration (Figure GS-1), outside of skid trails, forest productivity and soil health appear resilient. The higher moisture retention leads to higher productivity, and thus greater forest growth than the more gravelly Winkler soils. Bignell soils have a moderate susceptibility for erosion and Shooflin soils have moderate to high potential for erosion. Material quality for road construction is limited by low gravel contents and low soil strength when wet. The existing forest access roads cross Shooflin and Bignell soils and segments of the secondary roads have ruts and inadequate drainage. The main access road is in good condition and adequate for all season use but requires maintenance blading. Roads would require average drainage spacing and segments of ditching based on site specific conditions. These limitations can be mainly overcome by reducing soil disturbance, operating when soils are dry, frozen, or snow covered and grading the roads.

The coarse textured, gravelly Winkler soils are well drained and form good road materials. Winkler soils are moderately deep very gravelly loam soils forming in fractured bedrock and colluvium and occur mainly on convex slopes where soil depth is shallower. Winkler soils in this area are somewhat excessively well drained (soil infiltration exceeds precipitation) and the subsoils have high gravel contents exceeding 50% by volume. These coarse textured soils have a long season of use and have low rates of erosion. High gravel content soils and drier sites on road cut and fill-slopes can be slow to revegetate, unless promptly reseeded. Where Winkler soils occur on southerly aspects and ridges, the surface soils are shallow with lower moisture retention and productivity. Northerly aspects have slightly deeper surface soils, moisture retention and productivity, supporting Ponderosa pine and Douglas-fir. There is a draw with short steep slopes in the east half of the project section with Winkler soils on 30-60 % slopes and common bedrock outcrops.

The Mitten soils occur on the northerly aspects in the project area and on the steeper ground proposed for harvest. These soils are moderate to high productivity soils and support Douglas-fir, Lodgepole pine, and western larch. Both soils have a low potential for erosion on slopes <

45% which can be effectively controlled by limiting disturbance and standard drainage practices. Erosion potential is low for both of these soils and moderate on short steep slopes> 45%. The main soil concern is displacement of the shallow topsoils, which are important for seedling establishment. Displacement potential for ground based operations is high for slopes over 45%. Soil displacement can be mitigated by limiting ground based operations to slopes less than 45%. Few soils related problems are expected in these areas.

Figure GS-1: Existing Roads in the Goldielogs Project Area.

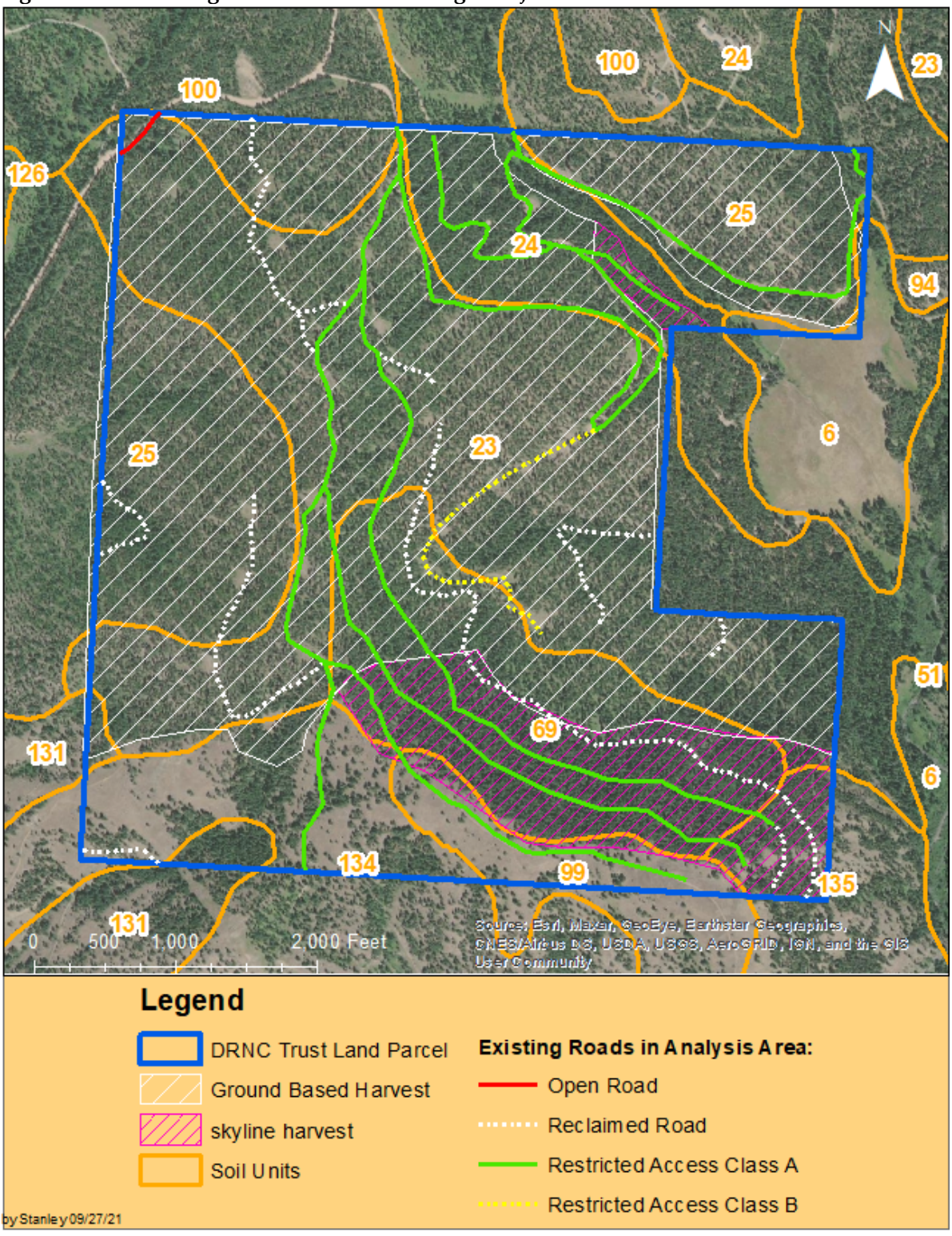


Table GS-1: Goldielogs Timber Sale Project Area, Soil Map Units Missoula County Area, Montana Soil Survey (USDA NRCS, 2007)

Map unit symbol and name	Slopes	Soil texture	Soil depth	Percent coarse frag-ments	Plast-icity index	Liquid limit	Infiltration capacity	Unified Class-ification	Erosion factor
23 - Bignell	8 to 30%	gravelly loam	Very deep	27%	5	20	Slow infiltration when thoroughly wet due to clays at shallow depths.	GC-GM, GM, SC-SM, SM (sandy and gravelly soils)	Mod-erate (K = 0.25)
25 - Bignell, warm-Winkler complex	30 to 60%	gravelly clay loam	Very deep	27%	5	20	Slow infiltration when thoroughly wet due to clays at shallow depths.	GC-GM, GM, SC-SM, SM (sandy and gravelly soils)	Mod-erate (K=0.24)
69 - Mitten	30 to 60%	gravelly ashy silt loam	Very deep	27%	5	30	Moderate infiltration rate when thoroughly wet.	GM, ML (sandy and gravelly to silty and clayey soils)	Mod-erate (K-0.17)
24 - Bignell-Winkler, cool, complex	30 to 60%	gravelly clay loam	Very deep	27%	5	20	Slow infiltration when thoroughly wet due to clays at shallow depths.	GC-GM, GM, SC-SM, SM (sandy and gravelly soils)	Mod-erate (K=0.24)
100 - Shooflin	4 to 15%	silt loam	Deep	10%	10	30	Very slow infiltration rate (high runoff potential) when thoroughly wet due to high clay content.	CL-ML, CL (silty and clayey soils)	High (K=0.49)

Soil Physical Properties and Productivity – Areas and Extent of Existing Disturbance

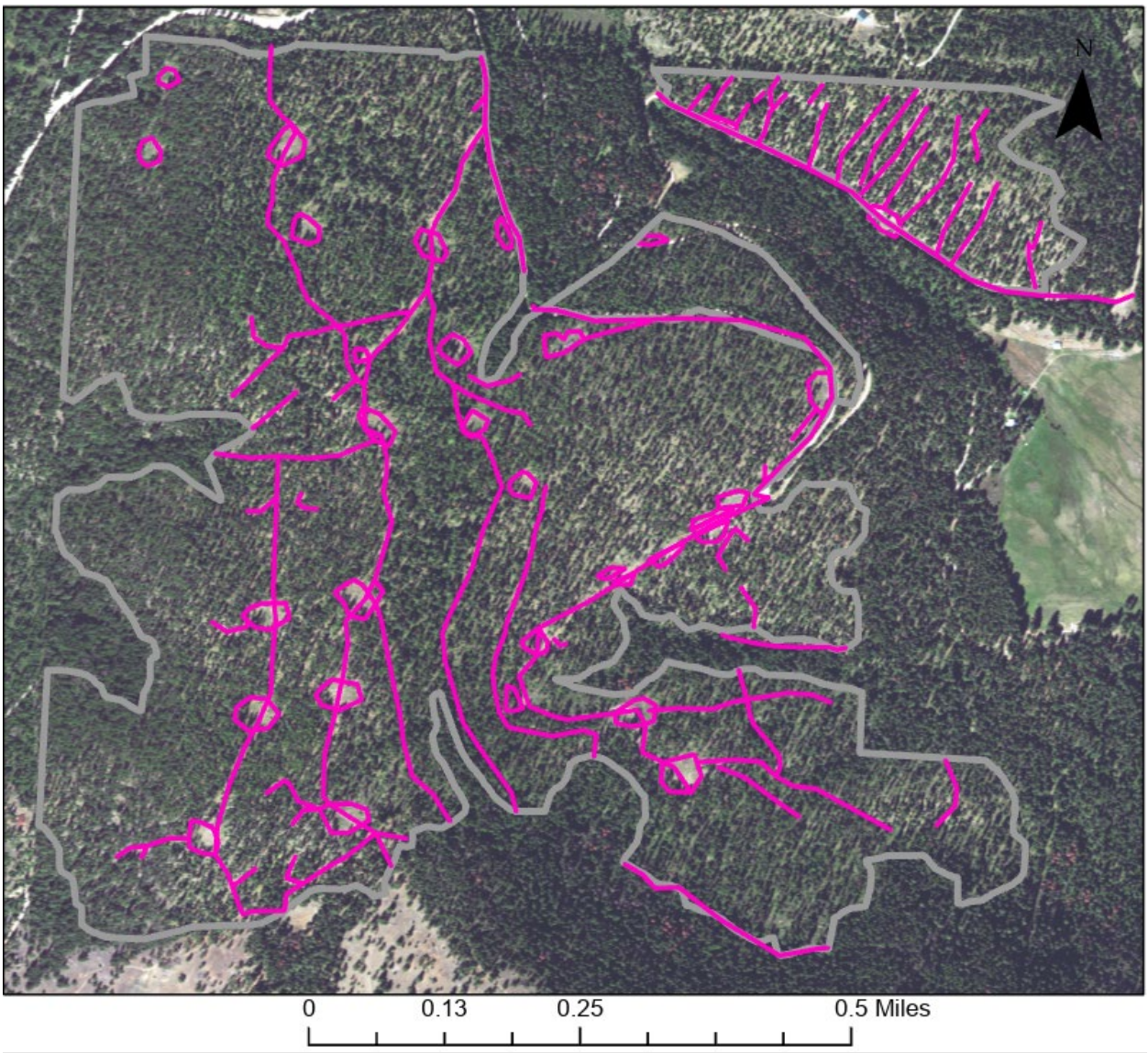
The project area has been used in timber production for over 100 years. There are nine known previous timber harvest entries 1892-1968 as well as the most recent McNamara Timber Sale harvested in 2012 (See Stand History and Past Management Chapter 3, Vegetation Analysis).

The roads accessing the majority of the project area and traversing the southeastern portion of the project area appear to have been constructed during the Anaconda Company sale based on historic aerial imagery and observed condition of the roads. The McNamara Timber Sale used mainly existing roads while improving road drainage BMPs and constructed a 0.5 mile road segment currently classified as Restricted Access Class B in Figure GS-1.

The only area where soil productivity, local moisture, and soil biological function appear to be compromised by timber harvest actions in the project area are the roads, landings, and main skid trails. Beyond these areas, soil productivity (including moisture conditions and biological function) residual soil effects are minimal and are regenerating well to conifer species.

The area of the last entry (McNamara Timber Sale) is outlined in grey in the figure below (Figure GS-2; aerial image is 2021 NAIP). Areas of residual effects are outlined in pink and include landings, roads, and some skid trails (some of these areas were residual effects from entries pre-dating 2012, and are included in this quantification). Areas outside the maintained road prism, such as skid trails and landings had detectible residual impact such as observable low regeneration of conifer species. The area of disturbance mapped below is approximately 23 acres. The area of the McNamara Sale is 330 acres. Therefore, the residual impact of harvest activities in 2012 and earlier within the McNamara harvest areas is 7%.

Figure GS-2: McNamara Timber Sale project area (grey outline) and area of existing residual effects (pink).



The eastern portion of the project area has been held in a grazing license for over 45 years. The current allowed use is 8 AUM on 140 acres between May and September of each year.

Soil Erosion - Areas and extent of existing erosion

The project area was reviewed for areas of existing erosion within hillslope areas. Please note that erosion within existing and proposed road corridors that risk surface water sedimentation is discussed in the water resources section of this EA. Indicators of erosion that were absent on hillslopes include gullying, rilling, pedestal erosion, and areas with no vegetative cover. Some revegetation was thin on landings, but signs of erosion or loss of soils from the site were not observed.

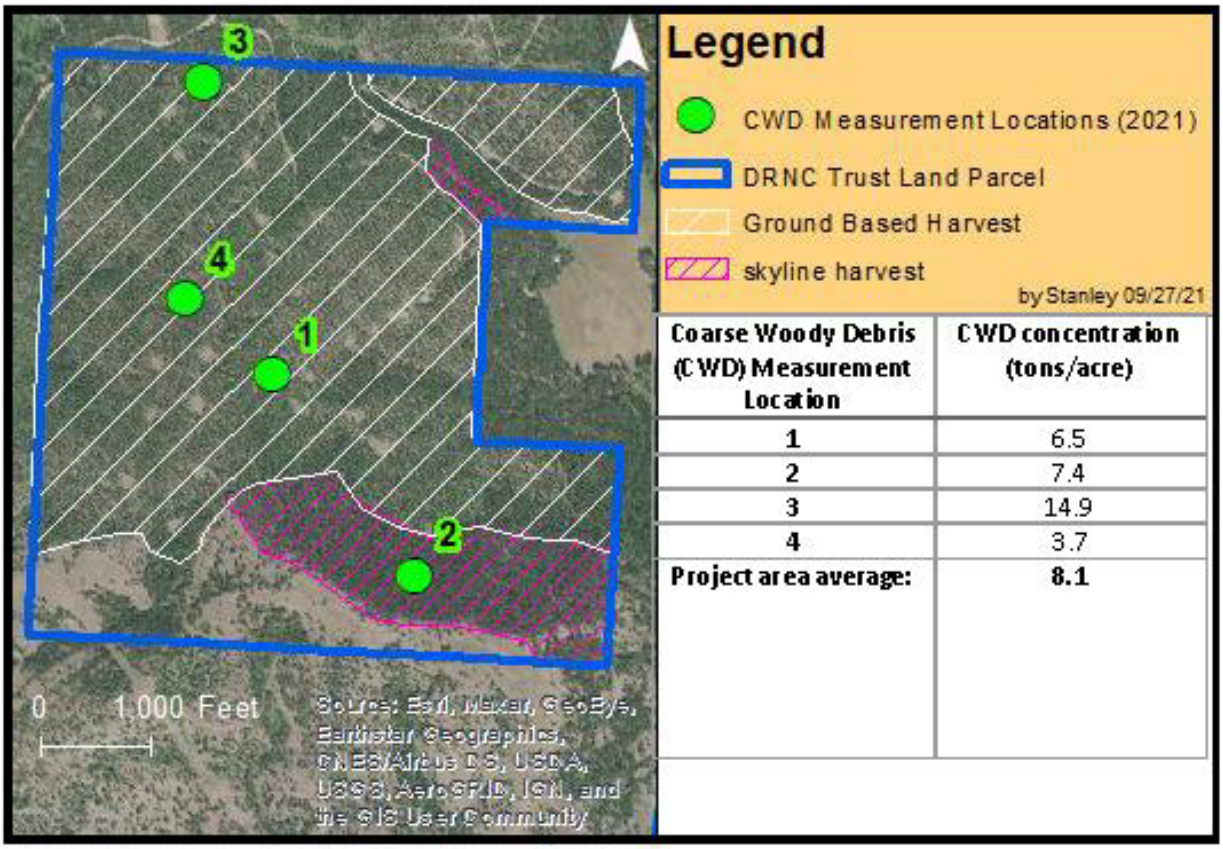
Erosion from past vegetation management in areas beyond the road corridors was not observed. Reclaimed roads and skid trail surfaces have vegetation growing on historically disturbed areas including grass, scrubs, and some conifer regeneration.

Review of the roads within the project area indicated that most are meeting BMP standards for implementation and effectiveness. Some repairs, and at least one ditch relief pipe require replacement. Some of the drain dips would require cleaning and cross-grading to maintain effectiveness and design-life. Some cut and fill slopes are poorly vegetated due to being over-steeped or undercut.

Soil nutrients

Existing coarse woody debris (CWD) concentrations observed in the field are listed below (Figure GS-3) along with the location of each measurement within the project area. Variability of CWD volume in forests is relatively high. Two separate transects using differing sampling methods were used to collect estimates of course woody debris within *Chapter 3 Affected Environment and Environmental Consequences*. The methodologies for observations in the Geology and Soils section differ from the Wildlife section within Chapter 3.

Figure GS-3: Existing CWD within the Goldielogs project area (Sec 36, T14N R17W)



Coarse Woody Debris (CWD) Measurement Location	CWD concentration (tons/acre)
1	6.5
2	7.4
3	14.9
4	3.7
Project area average:	**8.1**

Applicable Laws, Plans, and Contract Specifications

Below is a summary of the laws and plans relevant the proposed action and the project area. These documents include measures to protect soil resources and set thresholds for the state's interpretation of significance.

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. Forestry BMPs related to the protection and management of soil resources that are specifically mentioned in our Timber Sale Contracts include the following: *(Note that many of these requirements are also specified in the Administrative Rules of Montana for Forest Management (discussed in the following section).)*

- A requirement of at least 5 tons per acre of downed woody material be retained
- A requirement to retain a minimum number of snags and recruitment trees that are >21 inches diameter at breast height (DBH). Per ARM 36.11.411, this project would include the required retention of an average of approximately two snags and two snag recruits over 21 inches DBH per acre.
- Skid trail layout and yarding planning must include concurrence with the Forest Officer prior to felling timber. Because this project area includes existing roads, landings, and skid trails – the planning would include using these existing disturbances when feasible and when they meet other requirements such as equipment exclusion areas near streams. Use of existing skid trails and landings would reduce the addition of new disturbance areas.
- Equipment restrictions would include no operation on soft soils, boggy areas, or areas where skidding would cause excessive compaction and displacement.
- Erosion control measures would be required concurrent with operations and at conclusion of use of skid trails and landings. For example:
    - Construction of slash and debris erosion barriers, dips, water bars or ditches as needed at skid trails and landings.
    - Recontouring of excavated skid trails following use.
    - Grass seeding would be required at landings, at disturbed areas adjacent to roads, and finally after slash piles have been burned.

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 in two reports listed below:

DNRC, 2009. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects, 1988-2005, 2nd Reprint. Department of Natural Resources and Conservation, Forest Management Burau, Missoula, MT.

DNRC, 2011. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects, 2006-2010, 1st Edition. Department of Natural Resources and Conservation, Forest Management Burau, Missoula, MT.

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.

Environmental Effects

Direct, Secondary, and Cumulative Effects of the No-Action Alternative

Under the no-action alternative, none of the proposed actions would be implemented. Soil physical properties would continue as described in the existing conditions described earlier in this section. Amounts of CWD and FWD would continue to increase with recruitment from the existing stand of trees. Nutrient pools would also be likely to increase associated with the accumulation of

organic material on the forest floor.

Direct and Secondary Effects of the Action Alternative

Soil Physical Properties and Productivity

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, which is partially summarized below, provides additional information for estimating risk of impacts to project area soils with the proposed action.

Table GS-2: Soil disturbance rates for harvest systems on forested State Trust Lands for periods covering 22 years (MT DNRC 2006, 2011).

Harvest System	Sites (n)	Total Detrimental Disturbance* (%)
Ground-Based Equipment	75	13.2
Hand Crew Cutting and Cable Yarding	7	6.2
*Including displacement, severe compaction, and erosion		

The proposed harvest includes 424 acres of ground-based equipment yarding and 76 acres of cable/skyline yarding. Using the measured detrimental disturbance of DNRC monitoring of 82 sites (Table GS-2), the detrimental effects forecasted within the proposed project area would be approximately 60.7 acres or 12.1%. Note that much of the anticipated 60.7 acres 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.

The Mitten soils occurring on the northerly aspects of the proposed project area are the highest risk for detrimental effects due their composition, texture, and location on steeper slopes. These

areas are proposed for skyline/cable yarding which present less risk for physical disturbance to soils. Disturbances expected would be displacement resulting from partial suspension of the trees, which would drag across soils resulting in displacement and rutting (Youngblood, 2000). Youngblood (2000) observed ruts ranging from 4.7 to 14.6%

The 76 acres proposed for cable/skyline yarding may be cut either by hand crew, or by tethered ground-based cutting equipment (TCE). DNRC post-harvest soil monitoring (MT DNRC 2006, 2011) did not include monitoring of disturbances associated with use of TCE in-lieu of hand crew cutting, mainly because TCE cutting was not in practice at the time. The DNRC is currently designing a monitoring study to quantify disturbances associated with use of TCE in-lieu of hand crew cutting on steep slopes (>45%) and does not currently have agency data to inform risk. However, an observational study was completed in Washington and Oregon (in 30 harvest units) and results suggest TCE cutting (and yarding) did not have extensive negative impacts on soils (Chase et al., 2019). The mean soil disturbance observed with TCE on steeper slopes are described as broadly similar to those seen with untethered equipment operated on less steep slopes (Chase et al., 2019). Based on the observations of Chase et al. (2019) we anticipate the detrimental disturbances associated with the action alternative implemented with TCE cutting equipment to be similar to the amount of detrimental disturbance observed with ground-based equipment on shallower slopes, which averages 13.2% (MT DNRC 2006, 2011).

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. This includes areas of permanent soil disturbance including the 0.5 miles of new road construction, 0.5 miles of temporary road construction, and the 0.7 miles or road reconstruction.

Soil organisms would be affected directly and indirectly by the proposed action. Soil organisms can also have an important role in ameliorating the effects of soil disturbance, especially compaction (Crawford et al., 2021). How much soil organisms (soil fauna) are able to influence a recovery and/or survive the impact depends on the degree of the compaction (Crawford et al., 2021). Literature review of the effect of soil compaction on bacteria and fungi have pointed to an indefinable or varied effect (Cambi et al. 2015). For this analysis it is assumed that lasting detrimental effects to soil organisms (including bacteria and fungi) would occur in the same areas expected to have detrimental and lasting effects to soil physical properties. This area is not expected to exceed a threshold of significance (20%), but rather is expected to be near 12.1 to 14.6% of the project area (including existing and proposed roads).

Soil 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.

Local Moisture Conditions

Effects to water transport and storage in the soil profile is expected with the proposed action alternative. The risk of adverse effects is generally limited to areas where equipment would be operated. For this analysis soil moisture includes the soil's ability to retain moisture, make it available to plants, and to infiltrate. There are several mechanisms by which timber harvest activities could impact soil moisture:

- increased water reaching soils due to the reduced interception from the reduced forest canopy
- increased water availability due to reduced transpiration from the reduced forest canopy
- reduced pore space in soils due to soil compaction associated with equipment operation

Changes in water yield are evaluated in the Water Resources Analysis of this Environmental Assessment.

Soil compaction presents the risk to soil function in moisture availability. Specific changes observed include reduced overall porosity of soils and the reduction macropores to the size of micropores (Crawford et al., 2021). This reduces how much water can move through the soil profile, reduces how much water is available/accessible to plants, and reduces infiltration rates (Crawford et al., 2021). Some of these effects ameliorate with time through physical, chemical, and biologic processes such as revegetation, freeze/thaw, bioturbation, and recruitment of coarse and fine organic material.

Increased local water availability due to reduced interception and transpiration from the reduced forest canopy is expected to be project-wide but not detrimental or lasting more than a few years. Regenerating trees and other vegetation is expected to quickly establish and return water interception and transpiration to pre-project conditions within a few years.

Soil moisture content is also an important factor influencing disturbance (Crawford et al., 2021). The mitigation and contract specification that limits ground-based operations to frozen, snow-covered, or relatively dry soil conditions reduces the risk of soil deformation and compaction.

Nutrient Cycling and Long-Term Productivity

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 of the Action Alternative

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 for over 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 between 12.1 and 14.1 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, moisture regulation, 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.

Soil Mitigations

The proposed project includes the following strategies and mitigations measures to comply with the laws and plans and to minimize potential risk to soil resources:

Soil physical properties and productivity – including physical disturbance (compaction, displacement)

- Ground-based mechanical felling and yarding would be restricted to periods when one or more of the following conditions occur:

    - 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, loose, or 12 inches, packed.
- Ground-based logging equipment (tractors, skidders, and mechanical harvesters) would be limited to slopes less than 45% unless on stable slopes for short distances and not causing excessive disturbance. Factors in determining excessive disturbance include disturbances that would not be ameliorated within one to two years by natural processes including revegetation, freeze/thaw, and recruitment of coarse and fine organic material.
- Cable (skyline) yarding would be required in harvest units 3 and 4. The 76 acres proposed for cable/skyline yarding may be cut either by hand crew, or by tethered ground-based cutting equipment (TCE). These units have the steepest slopes within the project area and the use of the cable yarding would reduce the risk of excessive soil disturbance.
- The contractor and forest management officer would agree to a general skidding plan prior to operations. Strategies include minimizing skid distances to landings and roads, use of existing skid trails and landings, and minimizing adverse skidding.
- Use existing roads wherever possible to reduce the amount of new ground disturbance. Use of the existing roads, proposed additional road, and proposed temporary road would assist with a strategy that minimizes skidding lengths and passes on the forest floor, which would reduce the amount and intensity of soil disturbances associated with skidding.

Soil erosion

- At the beginning of project implementation, areas disturbed during road construction or reconstruction would be seeded with grass seed.
- At the end of project implementation, landings, reclaimed or closed roads, and burn pile scars would be seeded with grass seed.
- Drainage BMPs would be repaired and maintained on all roads within the project area throughout project implementation thereby minimizing the risk of concentrated runoff and erosion during precipitation or snowmelt.

Local moisture conditions

- Retention of CWD and FWD. Maintain duff and fines. Coarse (CWD) and fine (FWD) woody debris provides many necessary functions to sustain soil productive which includes site moisture retention, soil temperature modification, physical soil protection, nutrient cycling as well as providing a long-term supply of soil wood which is paramount to soil microbial activity (Harmon et al., 1986).
- The SFLMP requires all prescribed silvicultural treatments to maintain the long-term productivity of the soil and site in order to ensure the long-term capability to produce trust revenue and maintain soil hydrologic function (See Silviculture Standards in the Record of Decision for the SFLMP). The prescriptions in the harvest units qualify as Individual-Tree Selection (ITS). ITS is an uneven-aged method where individual trees of all size classes are removed more or less uniformly throughout a stand, to promote growth of remaining trees and to provide space for regeneration. The average retention across the project area would be greater than 50% and would provide continued distributed shade, wind barriers, root

mass, and forest floor detritus that all contribute to the soil hydrologic function.

Nutrient Cycling and Long-Term Productivity

- A minimum of 5 tons/acre and up to 15 tons/acre, of coarse and fine woody debris would be maintained on site to meet the concentration for the DF/PHMA habitat type recommended by Graham et al (1994).

Aquatic Resources

Assessment Prepared By:
Name: Andrea Stanley
Title: Hydrologist/Soil Scientist, SWLO DNRC

Issues Addressed

The following issues are compiled from concerns expressed during public scoping and from internal agency review.

- Timber harvesting and related road activities may impact surface **water quality** through increased erosion and sediment delivery to streams (**sedimentation**).
- Timber harvest and associated road activities may affect the timing, distribution, and amount of **water yield** in the affected watersheds. There is concern that increases in water yield resulting from the proposed timber harvest could increase the risk of flooding and may impact stream channel stability.

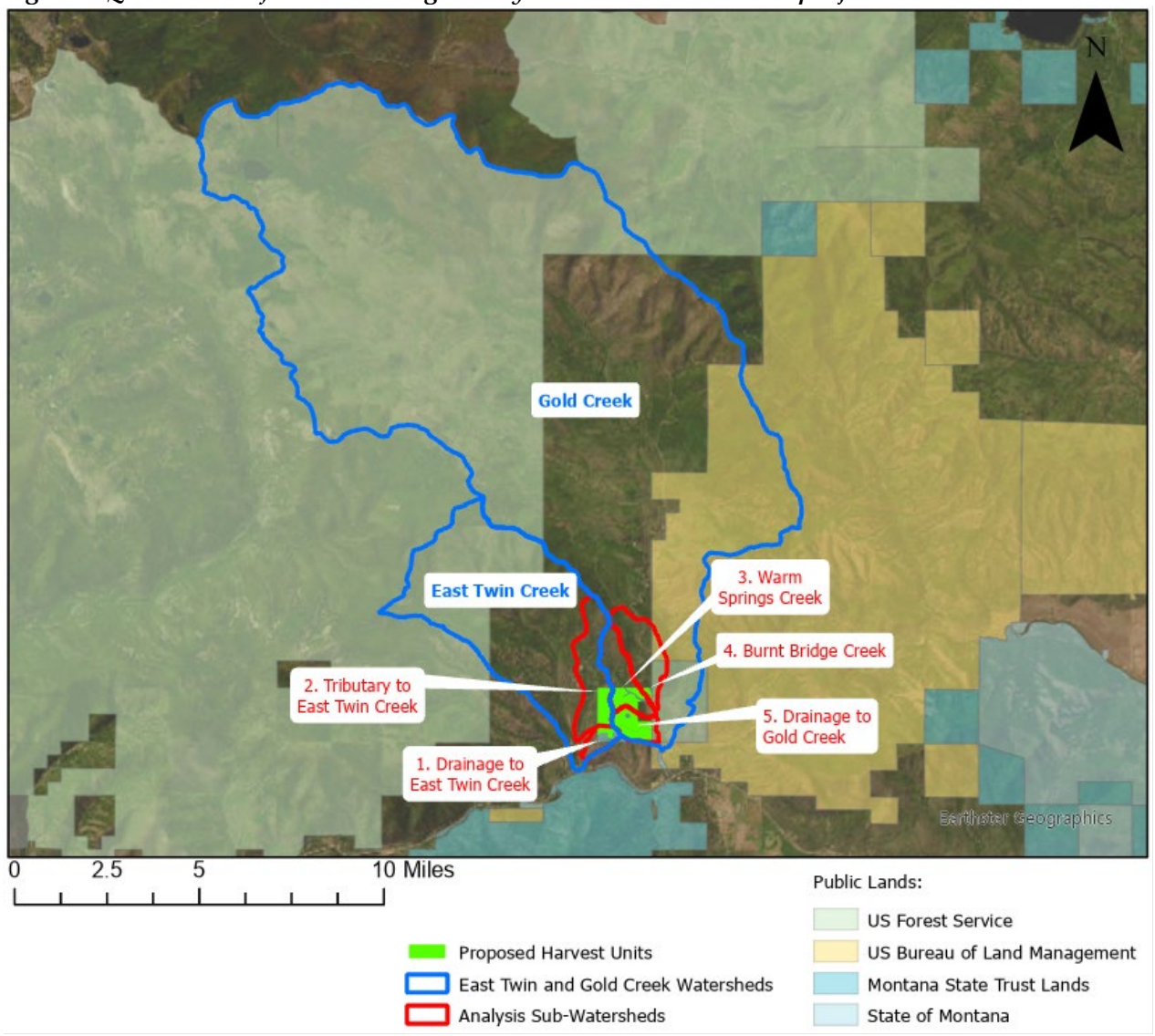
Existing Conditions of Watersheds, Waterbodies, and Wetlands

The proposed project is located in the lower Blackfoot River basin. The project area is divided between the Gold Creek and East Twin Creek drainages that flow to the Blackfoot River. The project area does not include harvest adjacent East Twin Creek and Gold Creek, rather the project area is drained by several tributaries that contribute flow to these larger creeks. This water resources analysis for water quality, water yield, and cumulative effects consider potential impacts to East Twin Creek and Gold Creek, as well as five sub-drainages, for a total of seven watershed analysis areas. See Figure AQ-1 for a map of the extent of the analysis areas relative to the project area.

Except for riparian areas adjacent to stream channels, the project section has relatively dry mountain hillslopes of 16-20" average precipitation/year mainly received as snow. Soil infiltration rates generally exceed precipitation within the project area with little sign of scour from erosion. See further discussion of erosion in the soil resources analysis section of the Environmental Assessment.

East Twin Creek, Gold Creek, and their tributaries are not listed as impaired. And the reach of the Blackfoot River below the project is also not listed as impaired. However, the 2020 DEQ reporting cycle points to insufficient data to assess if aquatic life beneficial uses are fully supported within this reach of the Blackfoot River.

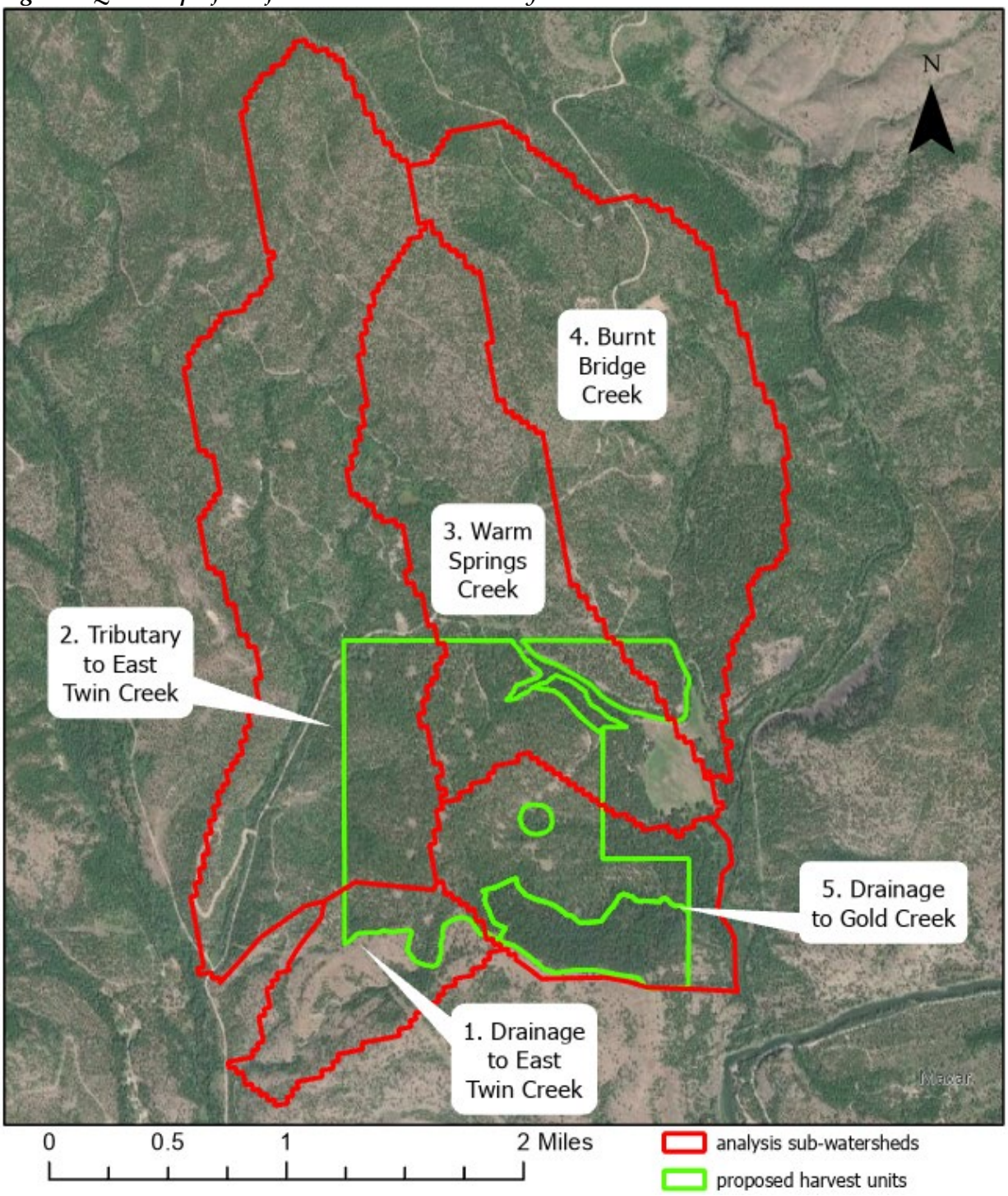
Figure AQ-1: Extent of the Goldielogs analysis area relative to the project area.



The five sub-watershed analysis areas include:

1. An **unnamed tributary to East Twin Creek** (Drainage 1).
2. A **second unnamed tributary to East Twin Creek** (Drainage 2).
3. **Warm Springs Creek**
4. **Burnt Bridge Creek**
5. An **unnamed tributary to Gold Creek**.

Figure AQ-2: Map of the five sub-watershed analysis areas.



East Twin Creek

Analysis for <u>direct effects</u> to **East Twin Creek** from the proposed project is dismissed from further analysis because the project boundary is located greater than 2,000 feet from the stream. Similarly, risk for indirect effects to East Twin Creek from the proposed project is considered low due to the physical distance of the project from the Creek.

The East Twin Creek Watershed contributes directly to the Blackfoot River and has a total area of approximately 6,280 acres. The US Forest Service manages 41 percent of the upper watershed. DNRC Trust Lands owns approximately 3 percent (190 acres) of the watershed. The remaining watershed area is privately owned. This watershed is dismissed from further analysis for indirect or cumulative effects because the proposed project occupies 3 percent of the watershed area, and consequently has a very low probability of having a measurable or noticeable impact on the Creek. Risk for Direct, Indirect, and Cumulative effects to tributaries of East Twin Creek are analyzed in sub-watershed analysis areas 1 and 2.

Gold Creek

Analysis for direct effects to **Gold Creek** from the proposed project is dismissed from further analysis because the project boundary is located greater than 400 feet from the stream. Similarly, risk for indirect effects to Gold Creek from the proposed project is considered low due to the physical distance of the project from the Creek.

The Gold Creek Watershed contributes directly to the Blackfoot River and has a total area of approximately 40,050 acres. The **US Forest Service manages 56 percent** in the upper watershed and an additional 710 acres along the lower portion of the watershed. The **BLM manages approximately 12 percent** (4830 acres) in the eastern watershed located mainly in the Cow Creek drainage. The **DNRC owns less than 1 percent** (370 acres) of the watershed. The remaining watershed area is privately owned.

Approximately 38% of the Gold Creek watershed burned during the Mineral-Primm Fire in 2003. Two other smaller fires, Gold Creek (90 acres) and Bolder Lake (244 acres), burned in the 1990s and also occurred within the Gold Creek watershed. These areas have revegetated over the past 20+ years.

The Bureau of Land Management and the US Forest Service (USFS) completed environmental review and has initiated implementation of the Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction Project. Proposed work includes lower portions of Gold Creek owned by the BLM (estimated 725 acres) and planned activities include prescribed fire, manual, and mechanical treatments in the Gold Creek watershed and some hauling through DNRC ground. Work along Gold Creek includes resource protection measures including buffer distances for commercial and non-commercial activities, and no direct ignition within riparian areas with the allowance for fire to back into riparian areas. Work initiated 2021, and some hauling has occurred through the Goldilogs project area. Hauling activities included improvements to the roads (drainage structures such as dips and a ditch relief pipe) that would also be used for hauling with the Goldilogs Project.

Existing and likely continued grazing will occur on DNRC and BLM ground in the Gold Creek watershed.

Existing and likely continued development of former industrial timber ground into residential housing has occurred and is anticipated to continue in the Gold Creek watershed.

Analysis for indirect or cumulative effects to Gold Creek from the proposed project is dismissed from further analysis because there is very low risk of a measurable or noticeable change in water quality or water yield in Gold Creek as a result of this project. DNRC Trust Lands owns less than 1 percent of the watershed and this area contributes to the bottom reach.
Risk for Direct, Indirect, and Cumulative effects to tributaries of Gold Creek are analyzed in sub-watershed analysis areas 3, 4, and 5.

Sub-watershed analysis area 1: Unnamed Tributary to East Twin Creek

This analysis area includes 160 acres that drains towards East Twin Creek. A Class 3 ephemeral channel initiates south of proposed harvest Unit 2 in this sub-watershed. The channel has a rocky bed consisting of angular rocks, and no vegetation to suggest long periods of inundation. This feature does not have a visible channel connection with East Twin Creek downslope. However, this area does drain in the direction of East Twin Creek and surface runoff likely occurs during heavy rain and snowmelt events. The watershed area is forested except for open hill sides, meadows, areas cleared for a powerline easement, and existing roads. Land within this analysis area is privately owned except for 72 acres (46%) under DNRC ownership in the upper portion of the watershed. Comparison of historic and recent aerial imagery do not indicate a history significant industrial harvest on the private ground. A portion of the ground owned by the DNRC (19 acres) was commercially thinned in 2012 and 2013.

There are approximately **1.8 miles** of existing roads within this analysis area, of which **0.8 miles** are within DNRC land and ownership, the majority of these are abandoned or reclaimed (i.e., brushed in, significant down material, and revegetated). Review of the DNRC roads indicate these roads meet Montana Forestry BMPs; specifically, the roads were observed to be stable, not show signs of excessive erosion, and have adequate surface drainage to prevent the concentration of runoff at rates that could cause significant road scour or sediment transport.

Sub-watershed analysis area 2: Second Unnamed Tributary to East Twin Creek

This analysis area includes 780 acres that drains towards East Twin Creek. This area is drained by an unnamed Class 1 stream with perennial flow to East Twin Creek. The 780-acre sub-watershed is forested except for existing roads, several residential structures, and small meadows. Land within this analysis area is privately owned except for 120 acres (15%) under DNRC ownership. The privately owned ground has been historically managed as industrial timber ground. According to historical aerial imagery most of the watershed was most recently harvested in the 1990s, when the private ground was owned and managed by a commercial lumber company. The ground owned by the DNRC is located along a ridge and upper slopes on the east side of this sub-watershed. The state-owned ground within this sub-watershed was commercially thinned in 2012 and 2013 and excluded the draw bottoms located near the western property boundary. There are no streams within the state ownership.

There are approximately **8.8 miles** of existing roads within this analysis area, of which **0.8 miles** are within DNRC land and ownership, the majority of these are abandoned or reclaimed (i.e., brushed in, significant down material, and revegetated) and meet forestry BMPs for abandoned

or reclaimed roads. The forestry BMP for abandoned road is to leave them "in a condition that provides adequate drainage without further maintenance. Close these roads to traffic; reseed and/or scarify; and if necessary recontour and provide water bars or drain dips."

The proposed haul route includes Gold Creek Road which is an unpaved road located within 100 feet of the unnamed tributary to East Twin Creek for approximately 1 mile. This road is not county-maintained and used year around by private residents, agencies (USFS, BLM, and DNRC), and recreationists. The road is wide enough to allow for two directions of traffic and produces airborne dust with vehicle use during dry conditions.

Sub-watershed analysis area 3: Warm Springs Creek

This analysis area includes the 510-acre watershed of a Warm Springs Creek, a perennial tributary to Gold Creek. The stream flows through DNRC ownership and the proposed project area along the lower half of its total reach. The reach that flows through the project area appears to be in an equilibrium state and has a bankfull width of 4-6 feet, has a substrate composed of cobble, gravel, and sand. Banks are well-vegetated with grass and shrubs and well-shaded by adjacent conifer stands. The channel banks and grade appear to be stable with subtle meandering and poor riffle sequences. The project area includes an existing road crossing over Warm Springs Creek. The crossing is an open-bottom metal arch crossing. The crossing is appropriately sized to the creek and appears to be fully functioning for conveying streamflow and bedload. The top of the arch is 2 feet above the streambed and is 5 feet wide. Downstream of the DNRC ownership the creek flows through a privately-owned residential area including irrigated hayland. Water is diverted from Warm Springs Creek to the Dexter Ditches. Finally, the Creek runs through USFS ground for the last 1,000 feet before joining with Gold Creek.

The watershed is forested except for existing roads, several residential structures, small meadows, and a large meadow/hayland area near the mouth of the creek. Land within this analysis area is privately owned except for 143 acres (28%) under DNRC ownership and 7 acres (1%) under USFS ownership. The privately owned ground upstream of the DNRC ground has been historically managed as industrial timber ground. According to historical aerial imagery, this ground was most recently harvested in the 1990s, when the ground was owned and managed by a lumber company. Most of the ground owned by the DNRC (96 acres) was commercially thinned in 2012 and 2013. Areas harvested excluded areas near the creek and several other tributary draw bottoms.

There are approximately **7.5 miles** of existing roads within this analysis area, of which **3.1 miles** are within DNRC land and ownership. The DNRC roads are restricted access roads (i.e., gated) that are currently in use for administrative purposes and by adjacent landowners and managers including the USFS, BLM, and private residential easement.

Review of the DNRC roads indicate these roads meet Montana Forestry BMPs; specifically, the roads were observed to be stable, not show signs of excessive erosion, and have adequate surface drainage to prevent the concentration of runoff at rates that could cause significant road scour or sediment transport.

Farnum Road, used by an adjacent landowner for year-around access, does not meet BMPs. The length of this road is approximately 0.5 miles. Observed departures include inadequate road surface drainage, cut slopes oversteepend in places by undercutting with maintenance equipment, and a drainage ditch in need of cleaning in order to properly function. At the time of observation (2021) these departures were not resulting in water quality impacts but were impacting the road surface and drainage functions.

Sub-watershed analysis area 4: Burnt Bridge Creek

This analysis area includes the 640-acre watershed of Burnt Bridge Creek, a perennial tributary to Gold Creek. The stream flows east of the proposed project area along the lower portion of its total reach. This section of the stream appears to be in an equilibrium state and has a bankfull width of 4 feet, has a substrate composed of cobble to sand-sized material. Banks are well-vegetated with grass and shrubs and well-shaded by adjacent conifer stands. The channel banks and grade appear to be stable with subtle meandering and poor riffle sequences.

There is an existing road crossing of Burnt Bridge Creek. The crossing site contributes minor sediment and needs a drain dip east of the crossing. The culvert has a 24" diameter and is slightly undersized (determined by observing the rust height at greater than 50 percent at the outlet and the average channel width is greater than 2 feet). The pipe should also be longer, with the road fill slope at the outlet too steep and armored only partially with established vegetation. This is a shared crossing and bisects the property line between DNRC Trust Lands and the US Forest Service. The crossing would not be used for the timber harvest or haul.

The watershed is forested except for existing roads, several residential structures, small meadows, and a large meadow/hayland area near the mouth of the creek. Land within this analysis area is privately owned except for 97 acres (15%) under USFS ownership, 70 acres (11%) under BLM ownership, and 20 acres (3%) under DNRC ownership. The upper portion of the watershed is privately owned and has historically been managed as industrial timber ground. According to historical aerial imagery, this ground was most recently harvested in the 1990s when the ground was owned and managed by a commercial lumber company. The eastern portion of the watershed is owned by the BLM and USFS. The DNRC owns a few acres near the lower reach of the creek and harvested a small area (5 acres) in 2012 and 2013 in areas buffered by more than 300 feet from the creek.

There are approximately **7.5 miles** of existing roads within this analysis area, of which **0.2 miles** are within DNRC land and ownership. The DNRC roads are restricted access roads that are currently in use for administrative purposes and by adjacent landowners and managers including the USFS, BLM, and private residential easement. Review of these DNRC roads in 2021 indicated they currently meet BMP standards, except for the culvert crossing of the Creek – however this feature is outside of the proposed project area.

Sub-watershed analysis area 5: Unnamed Tributary to Gold Creek

This analysis area includes the 260-acre watershed area that drains towards Gold Creek south of the Warm Springs tributary. An unnamed Class 2 stream initiates near the boundary of DNRC Trust Lands and private ownership. Within the state ownership the channel is narrow (1-3 feet wide) and has a sandy to gravel-sized substrate. The stream is classified as Class 2 for this analysis because within state ownership, flows within the channel occur less than 6 months in the average year. The connection of the channel with Gold Creek or other surface waters after it enters private ground was not verified for this analysis. However, the EA for the McNamara Sale indicates that there is no channel connectivity from the DNRC ownership downslope to Gold Creek. Based on the Missoula County water resources survey, flow from this channel is likely intercepted by the Dexter irrigation ditches (Missoula County).

The watershed is forested except for existing roads and small meadows. DNRC Trust lands owns the majority of this analysis area (81% or 210 acres). The remaining watershed area is owned privately (15 acres) and by the US Forest Service (35 acres). The USFS owns the ground adjacent to Gold Creek. 104 acres of the ground owned by the DNRC was commercially thinned in 2012 and 2013. Areas harvested excluded areas near the creek, and the steeper slopes located in the southern portion of the analysis area.

There are approximately **4.3 miles** of existing roads within this analysis area. These roads are all within DNRC land and ownership. These roads are a mix of drivable restricted access roads (i.e., gated), and abandoned roads (i.e., closed with an earthen berm or with heavy brush). All roads meet BMP standards.

Applicable Laws, Plans, and mitigation

Below is a summary of the laws and plans relevant the project. These documents include measures to protect water resources and set thresholds for the state's interpretation of significance.

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. BMPs related to the protection and management of soil resources include skid trail planning and drainage to reduce soil impacts and erosion, and use of slash and grass seed to prevent accelerated erosion. These BMPs are within the contract language used to administer the sale. During the 2022 field review of nine randomly selected State Trust land timber sales, the interdisciplinary and interagency review teams found 97.1 percent of the 343 practices rated met or exceeded application standards, and 98.5 percent were effective in providing resource protection. Visit the following website for more information on Montana Forestry BMPs including how recent State Trust lands timber sales have performed during interagency monitoring in 2022: https://dnrc.mt.gov/Forestry/Forest-Management/best-management-practices

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."

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 will 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

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. The SMZ law and rules would apply to activities near Warm Springs Creek and Burnt Bridge Creek which are both are perennial, fish bearing, Class 1 streams; and would apply to the unnamed Class 2 tributary in sub-watershed 5. The Class 3 ephemeral tributary in sub-watershed 1 initiates more than 50 feet from the boundary of the proposed harvest area and therefore an SMZ would not be needed within the nearby harvest unit.

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.

Environmental Effects

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

Under the no-action alternative, none of the proposed actions would be implemented, including road construction and timber harvesting. No BMP improvement or maintenance on existing roads would occur. Watershed conditions would continue as described in the existing conditions described earlier in this section.

Direct and Indirect Effects of the Action Alternative

Water Quality and Sedimentation

The risks to water quality from the proposed action are sediment delivery from roads and increased erosion from disturbed soils. Existing conditions impacting water quality in adjacent streams were not observed within the project area. Specifically, issues such as signs of sediment delivery from roads, over-grazing or trampling of riparian areas, or unstable streams were not observed.

Existing road infrastructure and proposed temporary and permanent road construction are consistent with the infrastructure needs for managing the 581-acre trust land parcel that includes the project area. For example, these roads assist with minimizing skid distances, and minimize new detrimental impacts to the forest floor. Roads that are not in regular use have been abandoned or reclaimed to stable conditions. The project area does not include existing or proposed roads within SMZs outside of where they have already been established to cross these features.
Unauthorized motorized recreational use has impacted some areas outside of the project area, and is discouraged with gates, kelly humps, and slash.

Montana 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 source 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, the application of Forestry BMPs, Administrative Rules including SMZ law, and HCP protections – the proposed action would have a low risk of causing detrimental effects to water quality – directly, indirectly, or cumulatively.

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 unnamed tributary to Gold Creek. Changes to steam flow hydrology resulting from the action alternative would likely not be detectible in Warm Springs Creek, Burnt Bridge Creek, East Twin Creek or tributaries to East Twin Creek.

Enough vegetation is proposed for removal from sub-watershed analysis area 5, Unnamed Tributary to Gold Creek, 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 the unnamed Class 2 tributary to Gold Creek. Gold Creek itself would not have a detectable change.

Table AQ-1: Percent vegetation removal anticipated with proposed action.

Analysis Area	Proposed Harvest Area within Analysis Area	% Analysis area proposed for harvest	Estimated % vegetation proposed for removal considering prescriptions within analysis area
1: Unnamed Tributary to East Twin Creek	33 acres	21%	4%
2: Second Unnamed Tributary to East Twin Creek	118 acres	15%	2%
3: Warm Springs Creek	134 acres	26%	7%
4: Burnt Bridge Creek	16 acres	2%	<1%
5: Unnamed Tributary to Gold Creek	200 acres	76%	59%

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.

Aquatic 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 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.
- Cut slopes, fill slopes, ditches, and road shoulders would be seeded following construction.
- 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.
- As harvest operations conclude in each area, slash and debris erosion barriers, dips, or water bars would be constructed in skid trails and landings.
- 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.

Below are summaries of the road work anticipated with the proposed action alternative within each sub-watershed analysis area:

Sub-watershed analysis area 1: Unnamed Tributary to East Twin Creek

- A Class 3 stream initiates more than 50 feet below the boundary of the proposed harvest area.
- The existing abandoned or reclaimed roads within the harvest unit area (0.8 miles) are not proposed for use with the proposed action, except for potentially as main skid trails. If used in the action alternative, these roads/trails would be abandoned per forestry BMP standards at the

conclusion of the harvest operations.

Sub-watershed analysis area 2: Second Unnamed Tributary to East Twin Creek

- No streams are located within DNRC ownership of this analysis area.
- The nearest distance of project harvest activities to the perennial unnamed tributary to East Twin Creek is approximately 200 feet at the NW corner of the project boundary.
- **The existing 0.8 miles** of existing DNRC roads within this analysis area are abandoned or reclaimed. Some are proposed for use with the proposed action. If existing abandoned roads are used, it would be as main skid trails and would be returned to an abandoned status per forestry BMPs at the conclusion of harvest operations.
- The proposed project would include an additional **0.3 miles** of temporary road and approximately **0.5 miles** of new road within this analysis area. This construction would comply with the applicable laws, plans, and mitigations listed earlier in this analysis.

Sub-watershed analysis area 3: Warm Springs Creek

- The existing roads within this harvest unit area are proposed for use with the proposed action and would include road maintenance and grading activities to repair and maintain drainage BMPs during and at the completion of the proposed project. No new road construction is proposed within this analysis area.

Sub-watershed analysis area 4: Burnt Bridge Creek

- An existing 0.1 miles of road (all west of Burnt Bridge Creek) within this analysis area is proposed for use with the proposed action and would include road maintenance and grading activities to repair and maintain drainage BMPs during and at the completion of the proposed project. No new road construction is proposed within this analysis area.

Sub-watershed analysis area 5: Unnamed Tributary to Gold Creek

- Approximately 0.7 miles of existing road would be reconstructed to meet the needs of the proposed use. Also, approximately 0.2 mile of temporary road would be constructed within this watershed area. All proposed road use and construction within this analysis area would be greater than 500 feet from any stream.

Fisheries Resources

Assessment Prepared By:
Name: Mike Anderson
Title: Fisheries Biologist, Montana DNRC

Introduction

The following assessment will disclose anticipated effects to fisheries resources within the Goldielogs Timber Sale project area. The proposed actions under consideration in this analysis include commercial timber harvest on approximately 501 acres, riparian management zone harvest of less than 5 acres, construction of 0.5 miles of new permanent road, construction of up to 0.5 miles of new temporary road, reconstruction of approximately 0.7 miles of existing abandoned road, and road maintenance and timber hauling on existing open and restricted access road. No new perennial stream crossings are proposed under the Action Alternative.

Issues Addressed

For the purposes of this environmental assessment, issues will be considered actual or perceived effects, risks, or hazards as a result of the proposed alternatives. Issues, in respect to this environmental assessment, are not specifically defined by either the Montana Environmental Policy Act or the Council on Environmental Quality.

Fisheries resource issues raised publicly include:

- Sediment delivery from road systems may adversely affect fisheries habitat
- Upland timber harvest may adversely affect fisheries habitat through increased sediment delivery and increased stream discharge

Fisheries resource issues raised internally include:

- Fisheries connectivity may be affected by existing road stream crossings
- Large woody debris, stream shade, and subsequent indirect effects on stream temperature may adversely affect fisheries habitat

Assessment Areas

To evaluate the potential direct, indirect, and cumulative effects of the proposed No-Action and Action Alternative, assessment areas were selected because it included 1) a watershed with known or potential fish-bearing streams and 2) the proposed actions in the Action Alternative have the potential for foreseeable, measurable, or detectable impacts on fisheries resources.

The Goldielogs Timber Sale project area includes two 6th code watersheds (Lower Gold Creek and Blackfoot River-Twin Creeks) within the Blackfoot River watershed (4th code HUC: 17010203), Missoula County, Montana (Figure F-1). The potential for the proposed actions to have a measurable impact on fisheries resources varies with both the resource being evaluated as well as the scope of the proposed action. As such the assessment areas for each of the fisheries resources evaluated in further detail in this analysis were selected to consider the appropriate spatial scale. To evaluate the direct, indirect, and

cumulative impacts to fisheries populations, genetics, connectivity, the potential effects are evaluated at the 6th code watershed level (Table F-1). Assessment of the potential impacts on fisheries habitat include the direct, indirect, and cumulative effects of road construction and maintenance, upland timber harvest, and riparian timber harvest on sediment delivery, channel form, flow regime, and instream physical and thermal habitat characteristics. Based on the activities described in the Action Alternative (see Chapter 2 for Action Alternative description), evaluation of the direct, indirect, and cumulative effects of road construction, use, and maintenance, and upland timber harvest will occur on the sub-watershed level (Table F-1). Potential impacts to instream habitat and the thermal regime will be assessed on the subwatershed level to evaluate direct and indirect impacts to large wood recruitment, stream shade, and stream temperature, with cumulative effects of the proposed riparian timber harvest assessed on the 6th code watershed level to consider other known disturbance that has impacted the fish-bearing streams in the assessment area.

Table F-1: Assessment areas used to evaluate the potential impact of the proposed actions on fisheries resources.

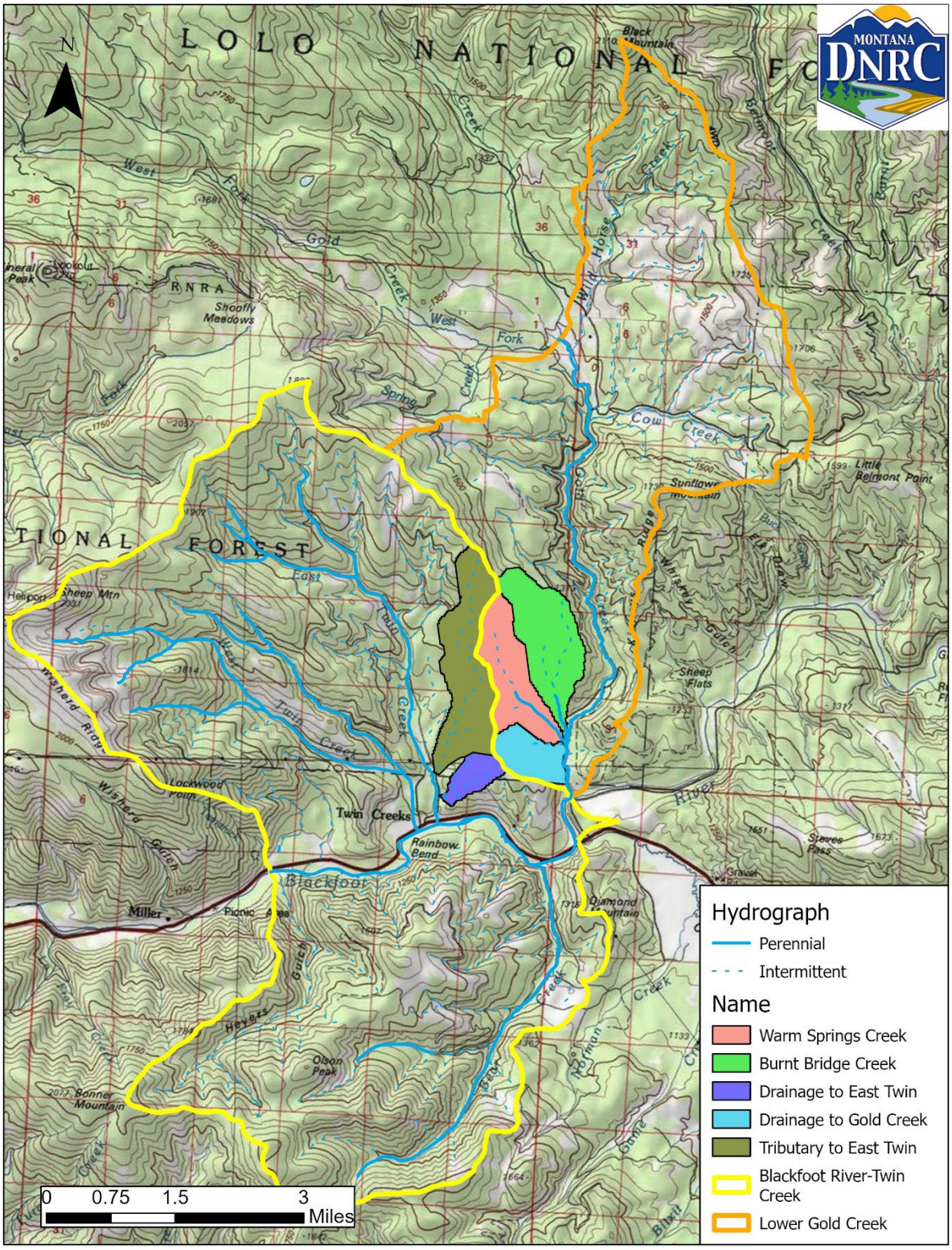
	Assessment Area	Total Acres	Percent DNRC Ownership	Proposed Acres Timber Harvest	Percent Watershed Harvested	Classified Stream Miles within 500 feet of a Harvest Unit			Miles of New Road		Miles of New Road within 300 feet of Classified Stream	New Perennial Stream Crossings
						1	2	3	Perm	Temp		
Subwatersheds	Warm Springs Creek	511	28	133	26	0.60	0.06	0.05	0.0	0.1	0.0	0
	Burnt Bridge Creek	634	3	16	2	0.32	0.07	-	0.0	0.0	0.0	0
	Tributary to East Twin Creek	781	15	117	15	-	0.38	-	0.5	0.2	0.0	0
	Drainage to East Twin Creek	158	45	33	21	-	0.08	0.10	0.0	0.0	0.0	0
	Drainage to Gold Creek	259	80	196	76	-	0.25	-	0.7	0.2	0.0	0
6th Code Watersheds	Lower Gold Creek	11,615	3	346	3	0.92	0.38	0.05	0.7	0.3	0.0	0
	Blackfoot R-Twin Creek	22,459	39	151	1	-	0.46	0.10	0.5	0.2	0.0	0

Assessment Methods

Assessment methods are a function of the types and quality of data available for analysis, which varies among the different assessment areas. The assessments may either be quantitative or qualitative. The best available data for both populations and habitats will be presented for the assessment area(s). In order to adequately address the issues raised, the existing conditions and foreseeable environmental effects to fisheries in the assessment area will be explored using the following outline of issues and sub-issues. Sedimentation will be addressed through an assessment of effects to channel forms.

- Fisheries Populations – Species Distribution, Genetics
- Fisheries Habitat – Connectivity
- Fisheries Habitat – Channel Forms
  - Fisheries Habitat – Sediment
  - Fisheries Habitat – Flow Regimes
  - Fisheries Habitat – Woody Debris
- Fisheries Habitat – Stream Temperature
  - Fisheries Habitat – Stream Shading
- Fisheries Habitat – Cumulative Effects

Figure F-1: Fisheries resource assessment areas for the Goldielogs Timber Sale.



The descriptions of foreseeable adverse impacts to fisheries resources are described in Table F-2 – Descriptions of foreseeable adverse impacts. Positive impacts to fisheries resources will also be described, if applicable, using information on impact extent and duration.

Table F-2 – Descriptions of foreseeable adverse impacts.

Impact Description	Probability of Impact	Severity of Impact	Duration of Impact
Negligible	The resource impact is not expected to be detectable or measureable	The impact is not expected to be detrimental to the resource	Not applicable
Low	The resource impact is expected to be detectable or measureable	The impact is not expected to be detrimental to the resource	Short- or long-term
Moderate	The resource impact is expected to be detectable or measureable	The impact is expected to be moderately detrimental to the resource	Short- or long-term
High	The resource impact is expected to be detectable or measureable	The impact is expected to be highly detrimental to the resource	Short- or long-term

Cumulative impacts are those collective impacts on the human environment of the proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (75-1-220, MCA). The potential cumulative impacts to fisheries resources in the assessment area(s) are determined by assessing the collective anticipated direct and indirect impacts, other related existing actions, and future actions affecting the fisheries resources.

Regulatory Framework

Westslope cutthroat trout are listed as S2 Montana Animal Species of Concern. Species classified as S2 are considered to be at risk due to very limited and/or potentially declining population numbers, range, and/or habitat, making the species vulnerable to global extinction or extirpation in the state (Montana Fish, Wildlife and Parks, Montana Natural Heritage Program, and Montana Chapter American Fisheries Society Rankings). DNRC has also identified bull trout and westslope cutthroat trout as sensitive species (ARM 36.11.436).

DNRC is a cooperator and signatory to the following relevant agreement: Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana (2007). This agreement contains land management conservation strategies or action items utilized by DNRC as decision-making tools.

Fisheries-specific forest management ARMs (36.11.425 and 36.11.427), the SMZ Law and rules, and other site-specific prescriptions would be implemented as part of any action alternative.

All waterbodies contained in the fisheries analysis area(s) are classified as B-1 in the Montana

Surface Water Quality Standards (ARM 17.30.608[b][i]). The B-1 classification is for multiple beneficial-use waters, including the growth and propagation of cold-water fisheries and associated aquatic life. Among other criteria for B-1 waters, a 1-degree Fahrenheit maximum increase above naturally occurring water temperature is allowed within the range of 32 to 66 degrees Fahrenheit (0 to 18.9 degrees Celsius), and no increases are allowed above naturally occurring concentrations of sediment or suspended sediment that will harm or prove detrimental to fish or wildlife. In regard to sediment, naturally occurring includes conditions or materials present from runoff or percolation from developed land where all reasonable land, soil, and water conservation practices have been applied (ARM 17.30.603[19]). Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses (ARM 17.30.603[24]). The State has adopted BMPs through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities.

Assessment Areas Dismissed from Further Analysis

Based on the proposed Action Alternative, public comment raised during scoping, and internally identified resource concerns, the following Assessment Areas were dismissed from further analysis due to a low probability of detectable or measurable impacts to specific fisheries resources in the project area. Table F-1 includes the various metrics evaluated prior to dismissal of the potential for effects on fisheries resources.

1. Tributary to East Twin Creek: No perennial, fish bearing streams within 500 feet of proposed harvest unit, no new road construction within 300 feet of any classified stream segment, no new or existing road-stream crossings present in the assessment area, no riparian timber harvest proposed. Timber hauling and road maintenance are the only proposed actions that have potential for impacting water resources and are unlikely to have measurable effects on fisheries resources in Twin Creek, which is the only fish bearing stream in the assessment area.
2. Drainage to East Twin Creek: No fish bearing streams in the assessment area. No perennial, fish bearing streams within 500 feet of proposed harvest unit, no new road construction within 300 feet of any classified stream segment, no new or existing perennial road-stream crossings present in the assessment area, no riparian timber harvest proposed.
3. Drainage to Gold Creek: No fish bearing streams in the assessment area. No perennial, fish bearing streams within 500 feet of proposed harvest unit, no new road construction within 300 feet of any classified stream segment, no new or existing perennial road-stream crossings present, no riparian timber harvest proposed.
4. Blackfoot River-Twin Creek: Less than 1 percent of the watershed harvested, no perennial, fish bearing streams within 500 feet of a harvest unit, no riparian timber harvest, no new road construction within 300 feet of classified stream segment, no new or existing road-stream crossings proposed for use or construction.

Existing Conditions and Environmental Effects

Fisheries Populations, Genetics, and Connectivity

Portions of the project area are present in both the Lower Gold Creek and Blackfoot River-Twin Creeks 6th code watersheds in the Blackfoot River watershed. Current species presence-absence and estimated occupied stream miles are presented in Table F-3. Competition, predation, displacement, and hybridization by and with non-native have been shown to have direct and indirect negative effects on both Bull trout and Westslope Cutthroat trout (Leary et al. 1993, Kanda et al. 2002, Rieman et al. 2006, Al-Chokhachy et al. 2016). For comparison, project related occupied stream miles are provided which address the extent of the known fisheries populations that may be affected directly or indirectly through the proposed action alternative. Cumulative effects of the proposed action alternative will be addressed on the 6th code watershed level. Designated Bull trout critical habitat (USFWS 2010) is present in the Blackfoot River (5.0 miles) in the Blackfoot River-Twin Creek watershed and in lower Gold Creek (6.4 miles) in the Lower Gold Creek watershed.

Table F-3 – Fisheries populations in the Goldielogs Timber Sale Assessment Areas.

		Project Area				Cumulative Effects Area			
		Warm Springs Creek		Burnt Bridge Creek		Lower Gold Creek		Blackfoot R-Twin Creek	
Range/Status	Species	Present	Miles	Present	Miles	Present	Miles	Present	Miles
Native-Threatened	Bull Trout	-	-	-	-	X	6.4	X	11.6
	Designated critical habitat	-	-	-	-	X	6.4	X	5.0
Native	Westslope cutthroat trout	X[1]	1.1	X[1]	1.7	X	9.7	X	21.8
	Mountain whitefish	-	-	-	-	X	6.4	X	5.0
	Longnose dace	-	-	-	-	X	3.5	X	12.7
	Redside shiner	-	-	-	-	-	-	X	5.0
	Northern pikeminnow	-	-	-	-	-	-	X	5.0
	Sculpin spp	-	-	-	-	X	2.0	X	5.0
	Longnose sucker	-	-	-	-	-	-	X	5.0
	Largescale sucker	-	-	-	-	-	-	X	5.0
Non-native	Rainbow trout	X	1.1	X	1.5	X	7.4	X	20.2
	Brown trout	X	1.1	-	-	X	7.5	X	10.9
	Eastern brook trout	X	1.1	X	1.5	X	10.4	X	15.1
	Northern pike	-	-	-	-	-	-	X	5.0

Existing Conditions

Warm Springs Creek Assessment Area

Warm Springs Creek is the only fish bearing stream in the Assessment Area and has been surveyed by MFWP and DNRC personnel in 1998, 2010, and 2021. During all surveys no native species were collected or observed, indicating that the likely historic population of Westslope cutthroat has been locally extirpated (Table F-3). The absence of Westslope cutthroat is likely due to a combination of factors including historical introduction of non-native sportfish which have subsequently displaced native species through competition, predation, and hybridization throughout the range of the species (Shepard et al. 2005). Currently the fish community is comprised of non-native Rainbow (*O. mykiss*), Brown (*Salmo trutta*), and Eastern brook (*S. fontinalis*) trout. Fisheries connectivity in Warm Springs Creek has been impacted by both existing road-stream crossings and irrigation diversions on private land downstream from the project area. On DNRC ownership, one perennial stream crossing is present on Warm Springs Creek. The crossing was replaced in 2012 during the McNamara Timber Sale project (DNRC 2012), prior to replacement the crossing

precluded fish access to the upper 0.4 miles of Warm Springs Creek. The current structure provides passage to all life stages of fish between base and bankfull discharge. The irrigation diversion downstream on private land likely limits connectivity for portions of the year based on irrigation use and stream discharge. The full extent of this limitation is unknown, and outside the scope of this project to address. Based on the current fish assemblage in comparison to the expected historical fish assemblage, there is an existing high impact to native fish populations in the Assessment Area. The existing impact to fisheries connectivity is moderate due to likely periods when the connection between Warm Springs and Gold creeks is limited or absent.

Burnt Bridge Creek Assessment Area

Burnt Bridge Creek is the only fish bearing stream in the Assessment Area and has been surveyed by MFWP and DNRC personnel in 1998 and 2021. During all surveys no native species were collected or observed, indicating that the likely historic population of Westslope cutthroat has been locally extirpated (Table F-3). The absence of Westslope cutthroat is likely due to a combination of factors including historical introduction of non-native sportfish which have subsequently displaced native species through competition, predation, and hybridization throughout the range of the species (Shepard et al. 2005). Currently the fish community is comprised of non-native Rainbow and Eastern brook trout. Fisheries connectivity in Burnt Bridge Creek has been impacted by both existing road-stream crossings and irrigation diversions on private land downstream from the project area. One perennial stream crossing on Burnt Bridge Creek occurs on mixed USFS/DNRC ownership, the structure currently limits connectivity during most discharge. Currently, adult fish may be able to pass upstream from the crossing during specific discharges, however no juvenile passage is provided. One irrigation diversion is present on Burnt Bridge Creek, which routes water cross-basin to Warm Springs Creek on private land for irrigation of the meadow immediately downstream and east of DNRC ownership. Based on the current fish assemblage in comparison to the expected historical fish assemblage, there is an existing high impact to native fish populations in the Assessment Area. The existing impact to fisheries connectivity is high due to the limitation of access to approximately 0.3 miles of stream upstream from the crossing structure as well as the irrigation diversion which may dewater Burnt Bridge during low discharge portions of the year.

Lower Gold Creek

The Lower Gold Creek watershed encompasses portions of the Blackfoot River from the confluence with Gold Creek upstream to the confluence with West Fork Gold Creek. Bull trout designated critical habitat (spawning and rearing) is present in the mainstem Gold Creek. The fish assemblage in the Assessment Area includes both native and non-native species (Table F-3). Due to the presence of non-native species, likely hybridization of native and non-native species including both Bull and Westslope cutthroat hybrids there is an existing high impact on fisheries populations and genetics in the project area.

Environmental Effects

The primary mechanism through which fisheries populations and genetics are impacted by the proposed no-action and action alternative would be through the introduction, removal, or

suppression of native or non-native species in the project area. As none of these actions are proposed as a part of this project, the existing high direct, indirect, and cumulative effects of competition, predation, and hybridization are likely to occur regardless of selection of the no-action or action alternative.

The primary mechanism through which fisheries connectivity is affected would be through construction of new stream crossings. No new stream crossing installation or replacement of existing fish bearing stream crossings are proposed under either the no-action or action Alternative. Existing impacts from the irrigation diversions on both Warm Springs and Burnt Bridge creeks would continue to have seasonal impacts to connectivity based on diversion rates and stream discharge. These impacts are outside of the scope of this project as both diversion sites are recognized points of diversion with associated water rights (DNRC Water Right Query; http://wrqs.dnrc.mt.gov, Accessed January 2023). Given proposed activities in the no-action and action alternatives, the existing impact to connectivity in the Warm Springs Creek Assessment Area is expected to remain at moderate levels, and connectivity in Burnt Bridge Creek Assessment Area is expected to remain at high levels.

Fisheries Habitat

The primary effect mechanisms through which fisheries habitat may be affected by the proposed activities in the no-action and action alternatives include; upland and riparian timber harvest, and forest road use, maintenance, and construction. Fisheries habitat resources potentially impacted by these actions include physical instream habitat that fulfills spawning, rearing, foraging, and overwinter needs, and thermal habitat which drives the presence or absence of fish species in the assemblage, growth and survival, and food availability. Potential direct, indirect, and cumulative impacts of the proposed actions are assessed on both the subwatershed and 6th code watershed level.

Warm Springs Creek

Existing Condition

Warm Springs Creek is a Class-1 tributary to Gold Creek, field reviews were conducted in 2021 and 2022 to evaluate instream habitat conditions within the fish bearing stream reach in the project area. Warm Springs Creek is a B4 (Rosgen 1996) channel type, with gravel-dominated substrate with interspersed sand and cobble. Instream spawning habitat is present throughout the stream, which in combination with the multiple size classes of non-native species present suggests that spawning and rearing habitat is capable of supporting self-sustaining populations. Qualitative assessment of stream habitat stability noted few areas of streambank disturbance, largely associated with large woody debris and wildlife trail crossings. Discharge is largely driven by stable spring flows, which influence the size and distribution of instream substrate. Flow regime components include total annual water yield and peak seasonal flow timing, duration and magnitude. In addition to the physical geography of a watershed, this variable is also greatly affected by both nature disturbances and land management activities. The Aquatic Resources analysis indicates that the existing condition in the assessment area is expected to be within the historic range of variability. Approximately 5.9 miles of existing open or restricted access road are

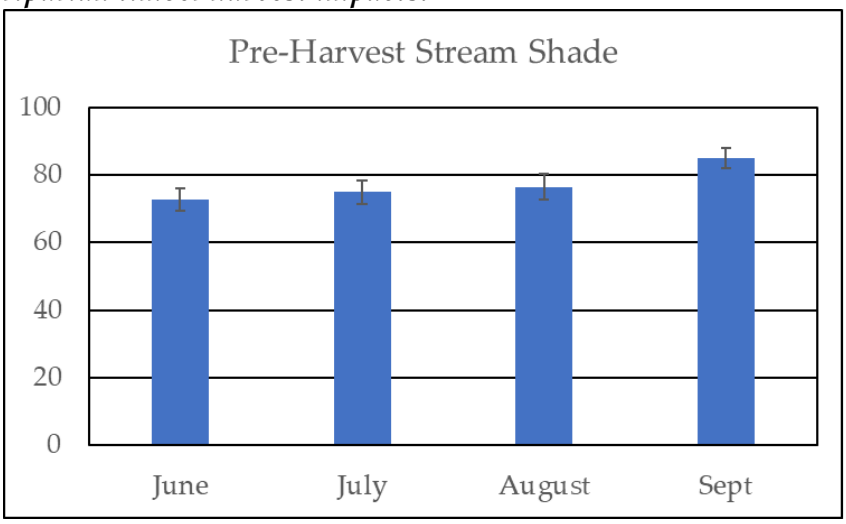
present in the Assessment Area, of which 2.9 miles of restricted access road would be utilized during this project. There is approximately 1.0 miles of road within 300 feet of perennial or intermittent streams, which have the capacity to deliver sediment to classified streams. Currently, 0.6 miles of existing road within 300 feet meets forestry BMPs have a very low likelihood of delivery to waterbodies in the project area. The remaining 0.4 miles of road within 300 feet do not currently meet BMPs and may be delivering sediment to perennial or intermittent streams. One perennial stream crossing is present on Warm Springs Creek that currently meets BMPs (Table F-4). Based on the existing habitat conditions with respect to sediment delivery from roads, alteration to the existing flow regime, and existing channel form in the Assessment Area, there is an existing moderate risk of moderate impacts to fisheries habitat.

Riparian stands are well stocked saw-timber adjacent to Warm Springs Creek. Riparian stands are composed of mixed conifer primarily western larch and Douglas fir, average site potential tree height was determined to be 100 feet. Large woody debris surveys conducted in 2021 noted appropriate levels of stocking (38 pieces/1000 stream feet) given the stream type (DNRC 2012). Minor levels of riparian harvest may have occurred in the upper portions of the watershed on private land that may have affected the current LWD loading rates in the Assessment Area. Stream shade measurements collected during field review in 2021 noted adequate levels of stream shade to maintain the existing thermal regime (Figure F-2). Stream

Table F-4 – Road system metrics in the Goldielogs Timber Sale Assessment Areas.

				Project Road BMP Status		Road Miles Within 300 feet of Classified Stream			Stream Crossings	
Assessment Area	Road Classification	Total Road Miles	Project Road Miles	Yes	No	BMP YES	BMP NO	Total	Peren. (BMP NO)	Interm. (BMP NO)
Warm Springs Creek	Existing-Open	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
	Existing-Restricted Access	2.9	2.9	2.4	0.5	0.6	0.4	1.0	1 (0)	0
	Road Reconstruction	-	0.0	-	-	-	-	-	-	-
	New Permanent Road Construction	-	0.0	-	-	-	-	0.0	0	0
	New Temporary Road Construction	-	0.1	-	-	-	-	0.0	0	0
Burnt Bridge Creek	Existing-Open	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0	0
	Existing-Restricted Access	0.8	0.3	0.3	0.0	0.2	0.0	0.2	1 (1)	0
	Road Reconstruction	-	0.0	-	-	-	-	-	-	-
	New Permanent Road Construction	-	0.0	-	-	-	-	0.0	0	0
	New Temporary Road Construction	-	0.0	-	-	-	-	0.0	0	0

Figure F-2 – Preharvest stream shade data collected in Warm Springs Creek to evaluate potential riparian timber harvest impacts.



temperature monitoring conducted in 2021 and 2022 noted some departure from the expected thermal regime, with slightly elevated Mean Weekly Maximum Temperature (MWMT) observed in 2021 and 2022 (Table F-5; Figure F-3). Based on the current thermal regime, the stream would be expected to provide suitable instream habitat for both native and non-native species at or near the thermal optima for growth and survival (Bear et al. 2007). Use of surface flow for irrigation in the lower portion of Warm Springs Creek may result in seasonal increases in stream temperature in the lower reach, which may result in additional adverse effects to temperature. Based on existing riparian conditions in the Assessment Area, there is an existing moderate risk of low impact to large woody loading rates due to previous riparian harvest, a low risk of low impact to stream shade, and a moderate risk of moderate impacts on stream temperature.

Other related existing direct and indirect effects within the Assessment Area may include minor livestock trampling of redds, riparian soil compaction, and potential browse effects on riparian deciduous vegetation.

Considering the existing high impacts to native species presence, existing moderate impacts to the sediment budget of the stream from riparian roads, low existing impact to the flow regime, and moderate existing impacts to instream physical and thermal habitat, there is an existing moderate adverse cumulative impact on fisheries resources in the Assessment Area.

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

As a result of implementing the no-action alternative, no additional direct or indirect effects to fisheries resources would be expected to occur within the assessment area beyond those described in the Existing Conditions.

Future-related actions considered part of cumulative impacts include other forest management practices; continued high impacts to native fish species by nonnative species; a stable to declining

number of road-stream crossings that affect habitat connectivity; ongoing stream dewatering for agricultural or other purposes. Consequently, foreseeable cumulative impacts to fisheries resources are expected to be similar to those described in Existing Conditions.

Direct, Indirect, and Cumulative Effects of the Action Alternative

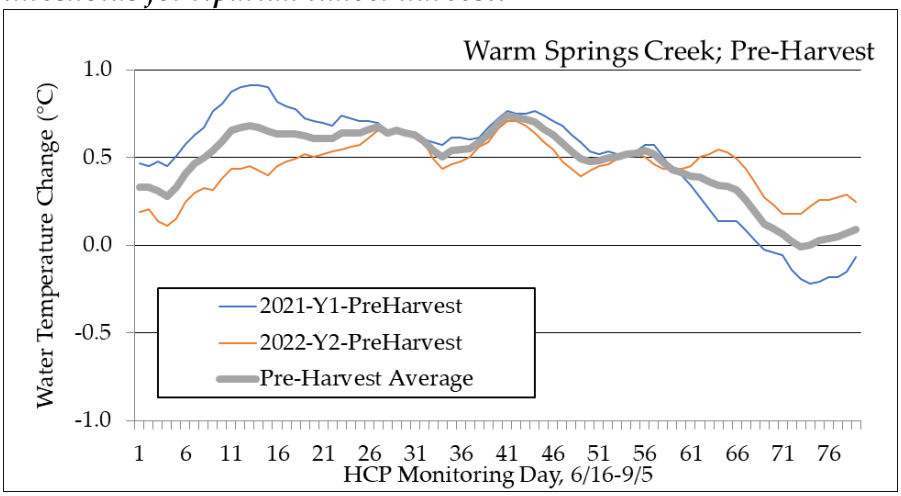
The proposed actions and affected fisheries resources in all analysis areas are broadly described in Chapter 2 (Proposed Action). Project-specific BMPs and road maintenance would be applied to all segments of the haul routes through the assessment area (see Aquatic Resources analysis). All impact descriptions are short-term unless otherwise noted.

Increased truck traffic can accelerate the mobilization and erosion of roadbed material at road-stream crossings and roads located adjacent to streams. However, through the implementation of project-specific BMPs and road maintenance, the associated road sites would be expected to deliver most mobilized sediment away from the stream and road prism and filter eroded material through roadside vegetation. One perennial road-stream crossing is present in the Assessment Area on the haul route and would be used for hauling approximately 45 loads of timber from Unit 1. The length of roads that would be used within 300 feet of all streams is 1.0 miles. Project-specific BMPs and road maintenance would be applied to all segments of road in the project area and would result in decreased sediment delivery on 40 percent of the roads within 300 feet of a classified stream (Table F-4). Implementation of BMPs would be expected to substantially offset the risk of increased sediment delivery due to project-specific vehicle traffic (Sugden 2018, DNRC 2022). No new road construction is proposed in the Assessment Area. Application of relevant BMP improvements is expected to result in reduction in sediment delivery from existing road-stream crossings and

Table F-5 – Stream temperature monitoring data from Warm Springs Creek.

			Sampling Period		Daily Maximum		MWMT		Days >			Hours >		
Stream	Site	Year	Start	End	Date	Temp	Date	Temp	10.0 C	15.0 C	21.1 C	10.0 C	15.0 C	21.1 C
Warm Springs Creek	Lower	2021	06/16/21	09/30/21	07/31/21	16.2	07/01/21	16.0	107	44	0	2,398	280	0
	Upper		06/16/21	09/30/21	07/31/21	15.4	08/01/21	15.2	107	18	0	2,496	52	0
	Lower	2022	05/20/22	10/18/22	07/29/22	16.5	07/30/22	16.3	152	49	0	3,226	306	0
	Upper		05/20/22	10/18/22	08/11/22	15.7	07/30/22	15.6	152	29	0	3,459	112	0

Figure F-3 – Preharvest mean weekly maximum stream temperature to develop monitoring thresholds for riparian timber harvest.



road surfaces resulting in an improvement in sediment loading rates, as such a low risk of low impact is expected in the assessment area, an improvement over the existing condition.

Upland harvest on sites with risk of erosion may mobilize material that could be delivered to adjacent stream channels; however, the Aquatic Resources analysis indicates that the anticipated impacts from this action are low risk. This assessment takes into consideration the implementation of the SMZ Law and Rules and supplemental ARMs for Forest Management on high risk of erosion sites. As described in the Aquatic Resources analysis, the levels of proposed timber harvest are not expected to consequent changes in flow regime.

Measurement of site-index tree height resulted in application of a Riparian Management Zone (RMZ) buffer of 100 feet. Riparian harvest of 50 percent of merchantable trees between 50 and 100 feet away from fish-bearing and non-fish-bearing perennial streams would occur in the assessment area. An analysis of this same riparian harvest prescription in the Environmental Impact Statement for the Forested State Trust Lands Habitat Conservation Plan indicates a low risk of impacts to woody debris and stream shading (and stream temperatures affected by direct solar radiation). The proportion of affected riparian area within the Assessment Area is 18 percent (Table F-6). Due to the limited magnitude and extent of this management action, a moderate risk of moderate impact to woody debris and stream shading is expected in the assessment area. Stream temperature is indirectly affected by the proposed action alternative through removal of stream shade, which results in increased solar radiation reaching the stream. Monitoring conducted in 2021 and 2022 to establish pre-harvest temperature profiles noted a MWMT of 16.3°C in 2021. Temperature thresholds established in the HCP (DNRC 2012) stipulate that for streams with a pre-harvest MWMT between 15.5°C and 18.0°C, post-harvest stream temperatures should not exceed a 0.6°C increase compared to pre-harvest condition for more than 8 monitoring days, and that intra-day temperatures should not exceed 18.6°C for 6 consecutive 30-minute intervals. Based on the current thermal regime and the magnitude or proposed RMZ harvest, there is an existing moderate risk of moderate indirect impacts to stream temperature in the Assessment Area

Table F-6: Riparian management zone characteristics in the Goldielogs Timber Sale Assessment Areas.

	Assessment Area	Total Acres	SMZ Acres			RMZ Acres		
			Total	Proposed Harvest	% Harvested	Total	Proposed Harvest	% Harvested
Project Level Effects	Warm Springs Creek	511	20	0	0	10	1.8	18
	Burnt Bridge Creek	634	26	0	0	5.4	0.35	6.5
Cumulative Effects	Lower Gold Creek	11,615	572	0	0	115	2.15	1.9
	Blackfoot R-Twin Creek	22,459	1,098	0	0	354	0	0

As part of the consideration of cumulative effects, all direct, indirect and other related impacts described in the Existing Conditions and Environmental Effects for the no-action alternative would be expected to continue. High impacts to native fish populations and genetics and moderate risk to connectivity resulting from surface water diversion will continue. Additionally, low to moderate direct and indirect impacts may occur to sediment and channel forms, and moderate indirect impacts may occur to stream temperature as a result of implementing the proposed actions. Considering all of these impacts collectively, high cumulative impacts to fisheries resources are expected in the Assessment Area.

Burnt Bridge Creek

Existing Condition

Burnt Bridge Creek is a fish bearing Class-1 tributary to Warm Springs Creek (Table F-2). Qualitative assessment of stream habitat conditions were completed during electrofishing surveys in 2021. Burnt Bridge Creek is a B4 (Rosgen 1996) channel type, with gravel dominated substrate with interspersed fine sediments and cobble. Instream spawning habitat is present throughout the reach downstream from DNRC ownership. Streambank stability was high, with few noted points of disturbance. Flow regime components include total annual water yield and peak seasonal flow timing, duration and magnitude. In addition to the physical geography of a watershed, this variable is also greatly affected by both nature disturbances and land management activities. The Aquatic Resources analysis indicates that the existing condition in the assessment area is expected to be within the historic range of variability. Approximately 5.0 miles of existing open or restricted access road are present in the Assessment Area, of which 0.3 miles (6 percent) of restricted access road would be utilized during this project. There is approximately 0.2 miles of road within 300 feet of perennial or intermittent streams, which have the capacity to deliver sediment to classified streams. Currently, all existing road within 300 feet meets forestry BMPs and have a very low likelihood of delivery to waterbodies in the project area. One perennial stream crossing is present on Burnt Bridge Creek that currently does not meet BMPs, however this crossing is not expected to be used for timber haul and is largely on USFS ownership (Table F-4; see Aquatic Resources Analysis for detail). Based on the existing habitat conditions with respect to sediment delivery from roads, alteration to the existing flow regime, and existing channel form in the Assessment Area, there is an existing moderate risk of moderate impacts to fisheries habitat.

Riparian stands are well stocked saw-timber adjacent to Burnt Bridge Creek and are composed of mixed conifer primarily western larch and Douglas fir, average site potential tree height was determined to be 100 feet. Large woody debris surveys were not conducted on Burnt Bridge Creek,

however loading rates are expected to be similar to Warm Springs Creek given the proximity of sites and similarities in the riparian stand conditions. Minor levels of riparian harvest may have occurred in the upper portions of the watershed on federal or private land that may have affected the current LWD loading rates in the Assessment Area. Use of surface flow for irrigation may result in seasonal increases in stream temperature in the lower reach, which may result in additional adverse affects to temperature. Based on existing riparian conditions in the Assessment Area, there is an existing moderate risk of low impact to large woody loading rates due to previous riparian harvest, a low risk of low impact to stream shade, and a moderate risk of moderate impacts on stream temperature.

Other related existing direct and indirect effects within the Assessment Area may include minor livestock trampling of redds, riparian soil compaction, and potential browse effects on riparian deciduous vegetation.

Considering the existing high impacts to native species presence, existing moderate impacts to the sediment budget of the stream from riparian roads, low existing impact to the flow regime, and moderate existing impacts to instream physical and thermal habitat, there is an existing moderate adverse cumulative impact on fisheries resources in the Assessment Area.

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

As a result of implementing the no-action Alternative, no additional direct or indirect effects to fisheries resources would be expected to occur within the assessment area beyond those described in the Existing Conditions.

Future-related actions considered part of cumulative impacts include other forest management practices; continued high impacts to native fish species by nonnative species; a stable to declining number of road-stream crossings that affect habitat connectivity; ongoing stream dewatering for agricultural or other purposes. Consequently, foreseeable cumulative impacts to fisheries resources are expected to be similar to those described in Existing Conditions.

Direct, Indirect, and Cumulative Effects of the Action Alternative

The proposed actions and affected fisheries resources in all analysis areas are broadly described in Chapter 2 (Proposed Action). Project-specific BMPs and road maintenance would be applied to all segments of the haul routes through the assessment area (see Aquatic Resources analysis). All impact descriptions are short-term unless otherwise noted.

Increased truck traffic can accelerate the mobilization and erosion of roadbed material at road-stream crossings and roads located adjacent to streams. However, through the implementation of project-specific BMPs and road maintenance, the associated road sites would be expected to deliver most mobilized sediment away from the stream and road prism and filter eroded material through roadside vegetation. No perennial road-stream crossings would be used for hauling in the Assessment Area. The length of roads that would be used within 300 feet of all streams is 0.2 miles (Table F4). Implementation of BMPs would be expected to substantially offset the risk of

increased sediment delivery due to project-specific vehicle traffic. No new road construction is proposed in the Assessment Area. Application of relevant BMP improvements is expected to result in reduction in sediment delivery from existing road-stream crossings and road surfaces resulting in an improvement in sediment loading rates (Sugden 2018, DNRC 2022), as such a low risk of low impact is expected in the assessment area, an improvement over the existing condition.

Upland harvest on sites with risk of erosion may mobilize material that could be delivered to adjacent stream channels; however, the Aquatic Resources analysis indicates that the anticipated impacts from this action are low risk. This assessment takes into consider the implementation of the SMZ Law and Rules and supplemental ARMs for Forest Management on high risk of erosion sites. As described in the Aquatic Resources analysis, the levels of proposed timber harvest are not expected to lead to consequent changes in flow regime.

Measurement of site-index tree height resulted in application of a Riparian Management Zone (RMZ) buffer of 100 feet. Riparian harvest of 50 percent of merchantable trees between 50 and 100 feet away from fish-bearing and non-fish-bearing perennial streams would occur in the assessment area. An analysis of this same riparian harvest prescription in the Environmental Impact Statement for the Forested State Trust Lands Habitat Conservation Plan indicates a low risk of impacts to woody debris and stream shading (and stream temperatures affected by direct solar radiation). The proportion of affected riparian area (0.35 acres of harvest) within the Assessment Area is 6.5 percent (Table F6). No SMZ harvest would occur. Due to the very limited magnitude and extent of this management action, a very low risk of low impact to woody debris and stream shading is expected in the assessment area. Stream temperature is indirectly affected by the proposed action alternative through removal of stream shade, which results in increased solar radiation reaching the stream. Based on the expected thermal regime and the magnitude or proposed RMZ harvest, there is an existing very low risk of moderate indirect impacts to stream temperature in the Assessment Area.

As part of the consideration of cumulative effects, all direct, indirect and other related impacts described in the Existing Conditions and Environmental Effects for the no-action alternative would be expected to continue. High impacts to native fish populations and genetics and moderate risk to connectivity resulting from surface water diversion will continue. Additionally, low to moderate direct and indirect impacts may occur to sediment and channel forms, and moderate indirect impacts may occur to stream temperature as a result of implementing the proposed actions. Considering all of these impacts collectively, high cumulative impacts to fisheries resources are expected in the Assessment Area.

Lower Gold Creek

Existing Condition

Through implementation of Forestry BMPs and Forestry Administrative Rule, there are no anticipated effects to instream habitat conditions in the form of sediment or channel form in Gold Creek. Potential effects to populations and connectivity were discussed in the previous section. The proposed activities in the action alternative which may affect fisheries habitat in the Lower

Gold Creek watershed is riparian timber harvest adjacent to Warm Springs and Burnt Bridge creeks. In the Lower Gold Creek watershed, approximately 687 acres of riparian habitat are present between the ordinary high water mark and 100 feet. Known historic disturbances in the watershed that have impacted large woody debris, stream shade, and stream temperature include construction of road in the SMZ or RMZ, historic riparian timber harvest, and historic wildfire. While the total amount of road in riparian areas and historic riparian timber harvest levels are unknown, the history of management in the Gold Creek watershed suggests that riparian roads and previous harvest have likely altered large wood loading rates, stream shade, and stream temperature from historical conditions. During the Mineral-Primm and Liberty fires in 2003 and 2017 respectively, approximately 40 percent of the SMZ/RMZ on Classified streams in the watershed were impacted by fire. Stocking rates in the majority of this watershed are unknown, but have likely started to regenerate and provide stream shade. There is an existing high risk of moderate effects of historic riparian disturbance on Bull trout critical habitat in Gold Creek.

Direct, Indirect and Cumulative Effects of the No-Action Alternative
Under the proposed no-action alternative, no additional impacts to riparian condition would occur outside of those described above in the Existing Condition.

Direct, Indirect, and Cumulative Effects of the Action Alternative
Implementation of the proposed action alternative would result in approximately 2.15 acres of RMZ harvest in the Lower Gold Creek watershed. This accounts for 0.3 percent of the total riparian habitat in the Lower Gold Creek watershed, and 1.9 percent of the total RMZ acres in the watershed (Table F6). Harvest of up to 50 percent of the merchantable timber may occur under the proposed action, which may have moderate risk of moderate effects locally on direct and indirect effects to large woody debris recruitment, stream shade, and stream temperature. Due to the irrigation diversions present on both Warm Springs and Burnt Bridge creeks, elevated stream temperature may occur as return flow from surface water irrigation reaches Gold Creek. Given the extremely small magnitude and location of harvest units, as well as the likely elevated temperatures resulting from irrigation withdrawal, there is a very low risk of very low impact to Bull trout critical habitat in the form of elevated stream temperature in Gold Creek. No other direct, indirect, or cumulative effects of the proposed action alternative would be expected to impact fisheries habitat resources in the Assessment Area.

Fisheries Mitigations

Fisheries related resource mitigations that would be implemented with the proposed action alternative include:

- Applying all applicable Forestry BMPs (including the SMZ Law and Rules) and Forest Management Administrative Rules for fisheries, soils, and wetland riparian management zones (ARMs 36.11.425 and 36.11.426)
- Applying all applicable Forestry BMPs and Forest Management Administrative Rules for road construction and maintenance
- Applying HCP mitigations and Administrative Rule for riparian timber harvest.

Wildlife

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Introduction

The following analysis will disclose the anticipated direct, secondary, and cumulative effects to wildlife associated with the no-action and action alternatives.

Issues Addressed

The following issues were formulated from concerns expressed during public scoping and from internal agency review.

- There is concern that proposed timber management and associated road construction and use, could fragment wildlife habitat, and adversely affect corridors and wildlife linkage zones for large free-ranging species, such as elk, deer, grizzly bears, black bears, moose, mountain lions, and wolves.
- There is concern that the abundance of snags and coarse woody debris would be reduced by the proposed activities, which could cause adverse effects to species that depend upon these habitat attributes for feeding sites and shelter.
- There is concern that timber management activities could alter hiding cover, reduce security cover, increase human access, and increase presence of unnatural attractants and bear foods, which could adversely affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.
- There is concern that timber management and associated 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.
- There is concern that timber management and associated activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles.
- 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.
- There is concern that timber management and associated activities could alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, while potentially removing snags needed by flammulated owls for nesting.
- There is concern that timber management and associated activities could disturb peregrine falcons and/or negatively affect peregrine falcon habitats.
- There is concern that timber management and associated activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.
- There is concern that timber management and associated activities could alter northern goshawk habitats and/or displace nesting goshawks from active nests, resulting in

increased goshawk chick mortality.

- There is concern that timber management and associated activities could reduce security habitat and seasonal cover for big game, which could affect big game numbers and/or hunter opportunity and quality of local recreational hunting.
- There is concern that timber management and associated activities could reduce winter thermal cover for moose, elk, white-tailed deer, and mule deer, resulting in reduced numbers and/or their displacement from the area.

Regulatory Framework

The following plans, rules, and practices have guided this project's planning and/or will be implemented during project activities: DNRC Forest Management Rules, DNRC Habitat Conservation Plan, 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 (581 acres), which includes the portion of Section 36, T.14 N., R.17 W. managed by DNRC where activities are being proposed. The second scale is the cumulative effects analysis area, which refers to a broader surrounding landscape useful for assessing cumulative effects to wildlife and habitat. For this proposed project, two distinct cumulative-effects analysis areas were identified. The first cumulative effects analysis area includes the project area and those lands within 1 mile of the project area (5,780 acres). This area includes 1,042 acres (18%) that are managed by DNRC, 1,766 acres (31%) that are privately-owned, 1,701 acres (29%) managed by The Nature Conservancy, 977 acres (17%) that are managed by US Forest Service, 276 acres (5%) that are managed by US Bureau of Land Management, and 18 acres (<1%) that are managed by Montana Dept. Fish, Wildlife, and Parks. The second cumulative effects analysis area is approximately 30,711 acres and is bounded by the Blackfoot River to the south, Woody Mountain and Blue Point to the west, Sheep Mountain and Shoofly Meadows to the north, and Sunflower Mountain and Kinneys Ridge to the east. This area was identified as an appropriate adjacent land area of similar vegetation and topography where potential cumulative impacts would be most likely to be realized and detectable in relation to proposed activities and most of the issues raised pertaining to wildlife and habitat. This area also approximates the home range size of species such as grizzly bears and Canada lynx. This cumulative-effects analysis area contains sizeable areas managed by US Forest Service (10,957 acres, 36%) and the Nature Conservancy (15,131 acres, 49%); other smaller owners in the cumulative effects analysis area include small private ownership (3,599 acres, 12%), DNRC (635 acres, 2%), US Bureau of Land Management (357 acres, 1%), Montana Dept. Fish, Wildlife, and Parks (31 acres, <1%).

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 1/4/21 and 5/11/21), 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.

Habitat Fragmentation, Corridors, and Linkage Zones

Issue

There is concern that proposed timber management combined with associated road construction and use, could fragment wildlife habitat, and adversely affect corridors and wildlife linkage zones for large free-ranging species, such as elk, deer, grizzly bears, black bears, moose, mountain lions, and wolves.

Introduction

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. Forest management considerations to mitigate adverse effects to habitat connectivity include limiting the creation of small habitat islands that may cause localized extinctions of small subpopulations, treating and retaining fewer larger patches rather than many small patches, and reducing edge (boundary between habitats perceived by an organism to be different from one another) to reduce potential for nest parasitism and predation associated with edge habitat.

Linkage zones are defined as "the area between larger blocks of habitat where animals can live at certain seasons and where they can find the security they need to successfully move between these larger habitat blocks" (Servheen et al. 2003). Linkage zones differ from corridors in that the area is not just used for travel. Areas appropriate for linkage zones can occur at different spatial scales, particularly when considering the species of concern. The main factors generally considered to affect the quality of linkage zones are major highways, railroads, road density, human site development, availability of hiding cover, and the presence of riparian areas (Hilty et al. 2006, USFS 2005, Servheen et al. 2003, Craighead et al. 2001). Maintaining linkage zones and connectivity between isolated populations can benefit wildlife species by: (1) allowing immigrant individuals to bolster a resident population in an area that has been affected by catastrophic events or negative environmental conditions; and (2) preserving genetic diversity by reducing negative effects from inbreeding.

Analysis Area

Direct and secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support a variety of wide-ranging terrestrial wildlife species that rely on effective corridors and linkage zones.

Analysis Methods

Direct and secondary 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. Connective forest was defined as pole and sawtimber stands with moderate to closed canopies (40- to 100- percent canopy cover) greater than 300 feet wide (ARM 36.11.403(20)(b)). Stands meeting these requirements were assumed to provide conditions that would facilitate movement of wildlife species in the area. Factors considered within the cumulative effects analysis area included the amounts of mature forest cover with >40% canopy closure, amount of connective forested habitats, amount of riparian habitats, open road density in the area, levels of potential human disturbance, and changes to linkage zone attributes.

Affected Environment

The project area is situated in the lower elevations of the Gold Creek drainage and is dominated by moderately warm and dry forest types interspersed with some cool and moist, moderately cool and moist, and warm and dry forest types. Elevations range from roughly 3,560 to 4,240 feet. Slopes generally range from 0 to 25% with up to 60% on steeper portions in the southeastern corner of the project area. The project area provides forested habitats used by many terrestrial wildlife species, and it could be used to varying degrees by moose, elk, mule deer, white-tailed deer, grizzly bears, black bears, mountain lions and wolves, as well as many other terrestrial species, including marten, bobcats, and a host of forest-birds.

There are 581 acres of forested land in the project area, dominated by Douglas fir/western larch, Douglas-fir, ponderosa pine, and western larch (see ***Forest Cover Types, Age Classes, and Stand Structure*** within the ***Vegetation*** section or Chapter 3). Across the forested habitats, small openings exist including several from past timber management activities but are insufficient to be mapped separately. Fire has historically played an important role in shaping vegetation community types in the Blackfoot 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 frequent fires that reduced understory vegetation but were not lethal, stand replacing fires; as such, park-like stands of ponderosa pine and Douglas-fir were likely found in the lower portions of Gold Creek in the vicinity of the project area.

Dense patches of mature forest are present in the project area and in portions of the cumulative effects analysis area. No old growth stands exist in the project area (see Vegetation section for more detail). Approximately 461 acres of the project area (79%) currently possess greater than 40% overstory canopy cover in mature forest patches, including riparian habitats along Warm Spring Creek and trace amounts along Burnt Bridge Creek. Roughly 524 acres of connective forest patches are present in the project area that are in pole or sawtimber stands with a moderate to closed canopy; past timber management may have slightly reduced the quality of these connective forest patches for those species relying on the densest stands of mature timber. Approximately 8,911 acres (29%) of the 30,711-acre cumulative effects analysis area appears to possess greater than 40% overstory canopy cover in mature forest patches; ongoing activities on USFS/BLM lands could reduce this by another 499 acres, which would drop the amount of the cumulative effects analysis area to 8,412 acres (27%) in mature stands with >40% canopy closure. In the immediate vicinity of the project area, availability of mature forested habitats is somewhat limited due to past management and natural openness of existing habitats, likely limiting the usefulness of existing forests on DNRC-managed lands within the broader landscape perspective. Existing patches of connective forested habitats have variable tree density, comprise a diverse mosaic of habitat conditions, and are distributed across the cumulative effects analysis

area. Existing patch shapes and sizes in the cumulative effects analysis area have been influenced by past logging, roads, and natural disturbances that have likely occurred during the past 150 years. Ongoing tree mortality in the project area as well as the cumulative effects analysis area could continue altering existing mature and connective forest habitats. Connectivity along riparian habitats in the immediate vicinity of the project area is also somewhat limited; upstream of the project area along Warm Springs more forested riparian habitats exist, but downstream of the project area the stream flows through agricultural fields that lack forested cover and vertical structure that may be necessary for several of the species that may follow these riparian courses across a landscape. Collectively, connectivity across the cumulative effects analysis area is moderately intact and likely provides a suitable network of cover capable of facilitating movements of many terrestrial species across the local landscape.

Within the project area there are approximately 0.1 miles of open roads with public motorized access that crosses the northwest corner of the project area; another 0.55 miles of road exists in the project area that DNRC lacks control of and provides access to an adjacent landowner's property. Collectively the open road density is effectively 0.84 miles per square mile (simple linear calculation). Approximately 5.8 miles of low standard, restricted roads used for administrative uses are present in the project area, yielding a total road density of 6.4 miles per square mile. Open road densities are relatively low in the cumulative effects analysis area (at least 41.6 miles, 0.87 mi./sq. mi., simple linear calculation), with highest concentrations of open roads in the southern and eastern portions of the cumulative effects analysis area and larger areas without open roads in the western portions of the cumulative effects analysis area. Considerable amounts of restricted roads (at least 157.9 miles; 3.3 miles/sq. mile) exist in the cumulative effects analysis area that could facilitate non-motorized human access.

The project area lies approximately 14 miles east of Missoula, MT and approximately 0.5 miles off Highway 200, which is a moderately busy roadway connecting Missoula to points north and east of Missoula. In the vicinity, forest lands are reasonably continuous and limited open habitats are present. Numerous residences exist in the vicinity, particularly along the Highway 200 corridor; additional development and residential clearing is ongoing in the cumulative effects analysis area resulting from recent conversions of industrial timber lands to small private ownerships. Stands of mature forest in the project area could be included in linkage zones for numerous species in the vicinity and could facilitate movements of wildlife within the Gold Creek drainage. Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area have likely influenced habitat fragmentation, corridors, and linkage zones. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering habitat fragmentation, corridors, and habitat linkage zones. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands, including activities on roughly 499 acres that appear to be in mature stands with >40% canopy

closure would continue altering stand densities and connectivity of forested stands in the cumulative effects analysis area, while modifying short-term attributes that contribute to potential wildlife linkage zones.

Environmental Effects of Habitat Fragmentation, Corridors, and Linkage Zones

Direct and Indirect Effects of the No-Action Alternative

Under this alternative, no timber management nor associated road construction or use would occur. Thus, there would be no changes in forest cover, patch characteristics, habitat connectivity, or habitat linkage within the 581-acre project area. Over time and in the absence of natural disturbance events, the abundance of dense mature forest would be expected to increase. No adverse direct or secondary effects to large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves would be anticipated under this alternative.

Direct and Indirect Effects of the Action Alternative

Proposed timber management would reduce stand density on roughly 486 acres of connective forested habitats (93% of the project area), including 425 acres (92% of habitat available) of mature stands with greater than 40% overstory canopy cover. These reductions in forested habitats would be expected to reduce connective forested patches in the project area including those species that rely on dense patches of mature timber. Following proposed treatments, roughly 17 acres (3%) of connective forested habitats would exist in the project area and a total of roughly 36 acres (8%) of mature forested habitats would exist. Habitat connectivity associated with riparian areas would not be appreciably altered as limited riparian timber management (6.7 acres) would occur in the project area. These riparian habitats along Warm Springs Creek could provide some cover capable of facilitating movements of terrestrial species across the local landscape. 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.

Proposed activities would not construct any new, open roads, and open road density would continue to be 0.84 miles per square mile (simple linear calculation), which is reasonably low. Proposed activities would construct 0.5 miles of permanent, restricted roads that would be available for administrative purposes and non-motorized public access; total road density would be 6.9 miles per square mile following proposed activities. During timber management activities, and associated road construction, reconstruction, and maintenance, the disturbance could temporarily displace wide-ranging large ungulates and carnivores. Slight increases in the amount of new roads would be anticipated, but public motorized access would remain restricted, thus minimal additional risk of long-term displacement and/or habitat avoidance by wide-ranging large ungulates and carnivores would be anticipated. Overall slight increases in total road density (0.55 mi./sq. mi. increase) would occur, but no increases in open road density would be anticipated; reductions in hiding cover would occur; and slight modifications to riparian habitats could collectively alter linkage zone quality but given there would be no increases in major highways, railroads, human site developments, these effects to potential

linkage zone habitats would be minimal and of relative short duration.

Following proposed timber management activities, large mammal species such as moose, elk, deer, grizzly and black bears, mountain lions, and wolves may alter the way they move through and use habitat and individual forested stands in the project area due to anticipated reductions in mature forest cover; similarly, proposed activities would result in some increases in edge habitats at the expense of mature forested habitats. Overall, proposed timber management would have moderate adverse effects on species that prefer well-connected mature forested habitats, and the wide-ranging large ungulates and carnivore species could all be displaced temporarily during project activities. Tree density in proposed units would be reduced, which would improve habitat conditions for species that prefer open forest conditions, but would reduce habitat quality for species that benefit from large expanses of mature forest cover. Thus, there would be a moderate risk of adverse direct or secondary effects to wildlife habitat fragmentation, connectivity, and linkage zones since: 1) the majority of the forested stands with >40% canopy cover would be removed in the project area; 2) a relatively high percentage (49%) of riparian habitats would remain unaltered; 3) linear road amounts would increase by 0.5 miles on the project area resulting in a total road density increase of 0.55 mi./sq. mi., but no changes in public motorized use would occur which would limit long-term disturbance potential; 4) disturbance could occur on the project area for up to 6 years; and 5) modifications to existing habitats could alter linkage zone habitat quality, but no changes in open road densities, major highways, railroads, human-site developments that would cause long-term effects to the potential for the area to function as a linkage zone would be anticipated.

Cumulative Effects of the No-Action Alternative

No further timber management or associated road construction and use would occur. Ongoing alterations to tree densities and connective forested habitats associated with the BLM/USFS projects in the cumulative effects analysis area would continue to alter tree densities on 854 acres, including activities on roughly 499 acres of mature stands with >40% canopy closure. Of the 30,711-acre cumulative effects analysis area, 8,412 acres (27%) would be expected to be in mature connective forest patches with >40% overstory canopy closure. There would be no further changes in forest cover, patch characteristics, habitat connectivity, or linkage zones within the 30,711-acre cumulative effects analysis area. No changes in open or total road densities would occur. Over time and in the absence of natural disturbance events, the abundance of dense mature forest would be expected to increase in the cumulative effects analysis area. No adverse cumulative effects to large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions and wolves would be anticipated under this alternative.

Cumulative Effects of the Action Alternative

Stand densities would be reduced on 486 acres of connective forested habitats, including 425 acres of mature forested stands in a small portion of the cumulative effects analysis area. Some slight increases in edge habitats would be possible in this same small portion of the cumulative effects analysis area. Habitat connectivity associated with riparian areas would not be

appreciably altered as limited riparian timber management (6.7 acres) would occur in a small portion of the project area. Across the 30,711-acre cumulative effects analysis area, connectivity along riparian features would largely persist and no appreciable change in the ability of these features to facilitate wildlife movements would be anticipated. Of the 30,711-acre cumulative effects analysis area, roughly 7,987 acres (26%) would remain in mature connective forest patches with >40% overstory canopy closure following proposed activities. Collectively, stand densities on approximately 10% of mature forested stands with >40% canopy closure would be reduced, which would reduce availability of these habitats and connectivity of forest stands in the cumulative effects analysis area. Within the cumulative effects analysis area, forest patches would continue to provide a diverse mosaic of habitat conditions following proposed activities. Up to 1,348 acres could be treated across ownerships and converted to younger-aged and more open stands. Within proposed units, individual trees and patchy tree retention would remain, that could provide some low-quality escape cover and visual screening.
Within the cumulative effects analysis area, no changes to open roads or open road density would be anticipated as a result of the proposed activities or the ongoing activities on BLM/USFS-managed lands. Proposed construction of 0.5 miles would slightly increase total road density (0.01 mi./sq. mi. increase) in the cumulative effects analysis area; no road construction would occur in the cumulative effects analysis area associated with activities on USFS/BLM managed lands. During proposed activities, including road construction and use, temporary displacement of wide-ranging large ungulates and carnivores could occur and/or their movement patterns in the vicinity of the project area could be altered. Negligible additional risk of long-term displacement and/or habitat avoidance by wide-ranging large ungulates and carnivores would be anticipated following proposed activities due to the presence of these additional restricted roads.

Following proposed activities, large species such as moose, elk, deer, grizzly and black bears, mountain lions, and wolves may alter the way they move through and use habitats and individual forested stands in the cumulative effects analysis area due to anticipated reductions in mature forest cover. Thus there would be a minor risk of adverse cumulative effects to wildlife habitat fragmentation, connectivity, and linkage zones since: 1) roughly 7,987 acres (26% of cumulative effects analysis area) of mature conifer forest with >40% canopy cover would remain in the cumulative effects analysis area; 2) a mosaic of habitat conditions that would be relatively well connected would remain following proposed activities and cover along riparian areas would generally be retained; 3) open road densities would not change and a minor increase in total road density (0.01 mi./ sq. mi increase) would be anticipated; 4) project-related disturbance could occur for up to 6 years; and 5) modifications to existing habitats could alter linkage zone habitat quality, but no changes in open road densities, major highways, railroads, human-site developments that would cause long-term effects to the potential for the area to function as a linkage zone would be anticipated.

Snags and Coarse Woody Debris

Issue

There is concern that the abundance of snags and coarse woody debris would be reduced by the

proposed activities, which could cause adverse effects to species that depend upon these habitat attributes for feeding sites and shelter.

Introduction

Snags, downed logs, and defective trees (e.g., partially dead, spike top, broken top etc.) are used by a wide variety of terrestrial species for nesting, denning, roosting, feeding, and cover (Bull et al. 1997). The quantity, quality, and distribution of snags affect the presence and population size of several of these wildlife species. Snags provide foraging sites for insectivorous species and sites for many nesting and roosting birds and animals. Primary excavators of nest cavities (i.e., woodpeckers) create holes and nest sites for secondary cavity users, which include many other birds and mammals. Snags and defective trees can also provide nesting sites for cavity-using species where cavities are formed by broken tops and fallen limbs. Without trees and snags that provide for cavities or substrate for cavity excavation, primary and secondary cavity species would not be able to survive and/or reproduce (Bull et al. 1997). Primary risk factors for snags and large defective trees include loss to legal and illegal firewood cutting, prescribed burning, removal for wood fiber, purposeful felling for human safety during timber management operations, and incidental loss during logging due to equipment operation and yarding activities. Given various tree mortality agents, it can take at least 40 years to grow a small tree capable of becoming a small snag, whereas it often takes 100 to several hundred years to grow large trees capable of becoming large snags.

The practice of leaving coarse woody debris was highly variable in the past and was not frequently a consideration during timber management activities, as a clean forest floor was thought to be healthy and more aesthetically desirable. The practice of leaving coarse woody debris after timber management has become more common in the recent past, and coarse woody debris has been identified as being important for maintaining nutrients on logged sites, healthy soil structure, and important habitat attributes for wildlife (Graham et al. 1994). Monitoring on DNRC lands conducted during the last 15 years has indicated that higher densities of coarse woody debris typically exist after logging than prior to logging. However, the quantity of large pieces (greater than 15 inches diameter) that are preferred for wildlife habitat are scarce (DNRC 2016). Coarse woody debris provides structural diversity and promotes biological diversity by providing habitat for many wildlife species (Bull et al. 1997). Many small mammals require coarse woody debris to survive. In turn, these species distribute fungi that are beneficial for seedling establishment and tree growth (Graham et al. 1994). Additionally, coarse woody debris can provide feeding substrates for species such as pileated woodpeckers and black bears, as logs will often host high densities of insects (Aney and McClelland 1985). Forest carnivores such as pine marten and Canada lynx rely on coarse woody debris to provide resting and denning habitat (Patton and Escano 1990, Squires et al. 2008). Loss or removal of coarse woody debris through logging and other forest management activities could reduce habitat quality and availability for species that rely on this important habitat attribute. Blowdown or windthrow of standing trees can contribute to coarse woody debris levels in forested stands; increasingly open stands following timber management can be exposed to more or different wind patterns and could be more susceptible to blowdown events.

Analysis Area

Direct and secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support a variety of wildlife that rely on snags and coarse woody debris.

Analysis Methods

Direct and secondary effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, aerial photograph interpretation, USDA remotely sensed data, a GIS analysis of available habitats, and past DNRC timber sale monitoring. Variability of coarse woody debris volumes in forested habitats is relatively high. Two separate sampling schemes using differing methods were used to collect estimates of coarse woody debris within *Chapter 3 Affected Environment and Environmental Consequences.* The methodologies for observations in the Geology and Soils section differ from the Wildlife section within Chapter 3. Factors considered within the cumulative effects analysis area included snag densities, snag and recruitment tree recruitment potential, levels of coarse woody debris, and changes in open roads that could facilitate legal or illegal removal of snags and/or coarse woody debris.

Affected Environment

Amounts of snags vary considerably across the project area; some large old live trees (5-14 per acre) and some snags (0-3 per acre) greater than 20 inches dbh occur in the project area. Those that exist are primarily ponderosa pine, Douglas-fir, and western larch. Timber management has occurred in the project area numerous times in the last century; snag densities in stands that have been harvested in the last century are lower than in unharvested stands, as the practice of leaving snags and snag recruits (particularly larger ones) was not always a common practice. Coarse woody debris in the project area is highly variable and ranges from about 0 to 19 tons per acre, with an average of 7 tons per acre, and the material is primarily comprised of 3 to 9-inch diameter pieces. Some localized sites have very heavy coarse woody debris concentrations with >40 tons (visual estimation) per acre. Limited blowdown currently exists in the project area. Across the broader landscape, insects, disease, and wildfires have contributed to the abundance of snags in the cumulative effects analysis area. Portions of the cumulative effects analysis area were previously in industrial timber ownership and retention of snags was not necessarily a consideration; conversely areas in USFS ownership have not been managed in many years and likely contain considerably higher numbers of snags. Roughly 4,554 acres have burned in the cumulative effects analysis area in the last 20 years with portions burning at relatively high intensity that created considerable snags and coarse woody debris. Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area have altered densities of snags, snag recruits, and coarse woody debris. Any ongoing timber management and land clearing/residential development, including recent conversions of industrial timberlands to small private ownership that is occurring in the cumulative effects analysis area could continue to alter snags, snag recruitment trees, and coarse woody debris. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower

Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could continue altering snag densities, recruitment tree densities, and coarse woody debris levels, particularly on the 695 acres that could be exposed to prescribed burning treatments to reduce hazard fuels and promote more resilient forest stands.

Environmental Effects of Snags and Coarse Woody Debris

Direct and Indirect Effects of the No-Action Alternative

Under this alternative, no timber management or road construction would occur, and no short-term changes would occur in the abundance or distribution of snags or coarse woody debris in the project area. Thus, no short-term effects would be anticipated. Blowdown or wind throw of existing trees could occur with any given wind event, but such events are sporadic and nearly impossible to predict timing or location. Over time, snags and downed logs would likely increase and be well distributed across the project area as a result of aging forest conditions and the natural attrition of live trees. Such expected increases would improve the availability of these habitat attributes over time for associated wildlife species in the project area that depend on them.

Direct and Indirect Effects of the Action Alternative

Snags and potential snag recruitment trees would be reduced from existing levels on the 494 acres proposed for treatment. Additional snags or recruitment trees may also be lost in the short-term following treatments due to wind throw. Across the project area, at least 2 large snags and 2 large recruitment trees per acre (both >21 inches dbh) would be retained in a well distributed manner, with preference given to the shade-intolerant species, such as western larch and ponderosa pine, as these typically provide habitat for longer periods of time than do the faster-decaying shade-tolerant species. In cases where snags and recruitment trees meeting this minimum size are not present, the largest available snags and trees would be retained. Evaluations of proposed marking guidelines show 0-2.8 existing large snags per acre along with 2.7-6.6 large leave trees per acre would remain following proposed treatments. Available snag habitats would be reduced in the project area, which could reduce habitat quality for wildlife species that require snags for meeting life requisites. Species most likely to be adversely affected would be those species that use, and sometimes prefer, smaller snags for feeding and nesting (e.g., smaller primary and secondary cavity-nesting bird species), as greater amounts of smaller snags would likely be lost or removed across proposed units. Increased openness of the resulting stands could increase the likelihood of blowdown, which could contribute to additional coarse woody debris in the proposed units if left un-salvaged. No additional open roads would be constructed, thus, potential associated snag loss due to legal or illegal firewood cutting would not be expected.

While some changes in the amount and distribution of coarse woody material would occur across the project area, ample amounts would be expected to remain, which would provide for soil structure, habitat structure, and feeding substrate for many species that utilize woody material to meet life requisites (Graham et al. 1994). However, it is likely that amounts following logging would be greater than existing levels (DNRC 2005, DNRC 2011, DNRC 2016), and

contract requirements to retain 5-15 tons per acre of coarse woody material would be in place to ensure material is retained. Post-harvest coarse woody debris levels would range from 5-15 tons per acre and would likely average approximately 7 tons per acre across harvest units (DNRC 2016), which would be similar to existing conditions. Much of the material would likely consist of pieces of existing logs, cull boles, limbs, and tops with relatively few intact large logs retained. Retained material would also be required to be relatively well distributed across proposed units and would simply not be retained in large piles; the retention of larger logs greater than 15 inches diameter in proposed units would be emphasized. Coarse woody debris retained in stands following proposed treatments would provide habitat attributes for native wildlife species. However, habitat quality in proposed units could be reduced for those species that require an abundance of larger logs (DNRC 2011). Some habitats may be removed, or the quality reduced for species that rely on coarse woody debris, but overall low levels of adverse effects would be anticipated to wildlife species in the project area as 5-15 tons per acre of coarse woody debris would be left in proposed units. Retained snags and recruitment trees would further ensure the presence of snags and downed woody material across the project area over time.

Thus, a minor risk of direct or secondary effects to wildlife species closely associated with snags and downed woody material would be expected given that: 1) snag and tree densities would be decreased across 494 from existing levels; 2) large snags and recruitment trees (2 each per acre minimum) would be retained in all proposed units; 3) coarse woody material would be retained in similar to greater amounts within proposed units, and logs greater than 15 inches diameter would be emphasized for retention; and 4) no new open roads would be constructed that could otherwise increase the potential for legal or illegal firewood removal.

Cumulative Effects of the No-Action Alternative

Under this alternative, no further short-term changes would occur in the abundance or distribution of snags or coarse woody debris associated with forest management activities; ongoing activities on BLM/USFS lands in the cumulative effects analysis area could continue altering snags numbers, tree densities, and coarse woody debris levels, particularly in those areas where prescribed burning is planned that would reduce coarse woody debris levels and potentially snags densities. Over time due to aging forest conditions and the natural attrition of live trees, increases in snags and downed logs would occur and be well distributed across the project area. No changes in blow down potential would occur. Such expected increases in snags and downed logs would improve the availability of these habitat attributes over time for wildlife species that depend on them in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative

Under the proposed action, existing numbers of trees and snags would be reduced from existing levels on the 494 acres proposed for treatment in a small portion (2%) of the 30,711-acre cumulative effects analysis area. These reductions would be additive to the ongoing activities on 854 acres of USFS lands in the cumulative effects analysis area; overall approximately 4% of the cumulative effects analysis area would receive treatments that would reduce some snags, snag recruitment trees, and coarse woody debris. Additional recruitment trees and snags may also be

lost in the short-term following treatments due to blowdown. Legal or illegal firewood cutting would not be expected to appreciably reduce snags further, because no changes in motorized public access would occur. Additionally, across the project area, at least 2 large snag and 2 large recruitment tree per acre (both >21 inches dbh where they exist, otherwise next largest size class available) would be retained in proposed DNRC units. If such large trees and snags are absent, the largest available snags and trees would be retained. Available snag habitats would be reduced with reductions in tree densities on all treated acres in the project area, which would be expected to reduce habitat quality and abundance for species that require snags as a life requisite. However, no further changes in snags and future recruitment trees would occur across much of the remainder of the cumulative effects analysis area, which would maintain habitat for fewer individuals of species closely associated with snags. Species most likely to be adversely affected would be those species that use, and sometimes prefer, smaller snags for feeding and nesting (e.g., smaller primary and secondary cavity-nesting bird species), as greater amounts of smaller snags would likely be lost or removed across proposed units.

Effects on the abundance and distribution of coarse woody debris would also be variable on DNRC lands, however, ample amounts have not been difficult to retain in most logging units during the recent past (DNRC 2005, DNRC 2011, DNRC 2016). Areas with currently high concentrations of coarse woody debris would likely have amounts reduced due to operability needs and harvest operations. In balance, the amounts of material in areas where down woody material is relatively sparse would likely increase following proposed activities. Post-treatment coarse woody debris levels would be expected to range from 5-15 tons per acre and would likely average approximately 7 tons per acre across DNRC harvest units (DNRC 2016). These increases on DNRC-managed lands would partially offset losses associated with ongoing activities on USFS lands where prescribed burning could reduce coarse woody debris concentrations on 854 acres. Residual woody material on USFS lands undergoing management would likely be variable, depending upon individual treatment types, sites, fuel loads, and burning conditions at the time of ignitions. While some changes in the amount and distribution of woody material would occur across the DNRC project area, ample amounts would be expected to remain across the cumulative effects analysis area, which would provide for soil structure, habitat structure, and feeding substrate for many species that utilize woody material to meet life requisites (Graham et al. 1994). Retained snags and recruitment trees would further ensure the presence of downed woody material across the project area and cumulative effects analysis area over time. Some increases in potential blow down could occur in a small portion of the cumulative effects analysis area, but given the nature of blow down, limited effects would be anticipated. Given the access management restrictions that would be incorporated with both projects, any changes in potential for illegal firewood harvest that could affect the abundance of snags or coarse woody debris would be expected to be negligible.

Thus, a minor risk of cumulative effects to wildlife species closely associated with snags and downed woody material would be expected given that: 1) snag and snag recruitment densities would likely be decreased on 1,348 acres (4%) in the cumulative effects analysis area due to timber management on DNRC and Federal lands, 2) snags and recruitment trees (2 each per acre

minimum) would be retained in all proposed DNRC units; 3) coarse woody material would be retained in proposed DNRC units, but this would only partially offset activities ongoing on adjoining USFS lands; and 4) no new open roads would be constructed that could increase the potential for illegal firewood removal.

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 (Table WI-1).

Table WI-1 –Anticipated Effects of the Goldielogs on wildlife species

Species/Habitat	**Potential for Impacts and Rationale** [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Threatened and Endangered Species	
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	[Y] Detailed analysis provided below.
Canada lynx (*Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	[Y] Detailed analysis provided below.
Yellow-Billed Cuckoo (*Coccyzus americanus)* Habitat: Deciduous forest stands of 25 acres or more with dense understories and in Montana these areas are generally found in large river bottoms	[N] No suitable deciduous riparian habitats are in the project area. Thus, no direct, secondary, or cumulative effects to yellow-billed cuckoos would be expected to occur as a result of either alternative.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)*	[Y] Detailed analysis provided below.

Habitat: Late-successional forest less than 1 mile from open water	
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 or within 1 mile of the project area. Thus, no direct, secondary, 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. Fringed myotis have been documented along the Blackfoot River. 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. Thus, negligible direct, secondary, or cumulative effects to fringed myotis would be anticipated as a result of either alternative.
Hoary bat (*Lasiurus cinereus*) Habitat: coniferous and deciduous forests and roost on foliage in trees, under bark, in snags, bridges	[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. Some use by hoary bats would be possible, but water sources in the project area that could be suitable foraging habitats are somewhat limited. 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. Hoary bats have been documented in the vicinity along the Blackfoot River. Proposed activities could disturb hoary bats should they be in the area. Loss of potential roosting habitats could occur, but considerable amounts of trees would persist in the project and cumulative effects analysis areas. No changes in foraging habitats would be anticipated. Overall, no appreciable changes to hoary bat use of the project

	area or cumulative effects analysis areas would be anticipated. Thus, negligible direct, secondary, or cumulative effects to Hoary bats would be anticipated as a result of either alternative.
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	[Y] Detailed analysis provided below.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	[Y] Detailed analysis provided below.
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the project area or vicinity. Thus, no direct, secondary, 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 tree line 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 way 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, secondary, or cumulative effects to wolverines would be anticipated.
Other Species Considered	
Northern goshawk *(Accipiter gentilis)* Habitat: Coniferous forests with high canopy closure and relatively open understory	[Y] Detailed analysis provided below.
Big Game Species	
Elk	[Y] Big game winter range exists in the project area. Potential big game security habitat exists in the project area - Detailed analysis provided below.
Moose	
Mule Deer	

White-tailed Deer	

Threatened and Endangered Species

Grizzly Bear

Issue

There is concern that timber management activities could alter hiding cover, reduce security cover, increase human access, and increase presence of unnatural attractants and bear foods, which could adversely affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Introduction

Grizzly bears are native generalist omnivores that use a diversity of habitats in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The search for food drives grizzly bear movements, with bears moving from low elevations in spring to higher elevations through the summer and early fall, as fruits ripen throughout the year. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing human access and disturbance into secure areas by creating roads (Mace et al. 1997). Forest management operations can reduce the ability of vegetation and cover to conceal grizzly bears, which can lower effective bear use of habitat and render bears more vulnerable to human- caused mortality (Servheen et al. 1999). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase the risk of bears being illegally shot. Displacing bears from preferred areas may increase their energetic costs, particularly during the spring period, which may lower their ability to survive and/or reproduce successfully.

Analysis Area

Direct and secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion. This area approximates the home range size of a female grizzly bear.

Analysis Methods

Direct and secondary effects, as well as cumulative effects, were analyzed using a variety of information obtained from field evaluations, SLI data, aerial photograph interpretation, USDA remotely sensed data, and a GIS analysis of available habitats. Factors considered within the cumulative effects analysis area included the level of disturbance, degree of harvesting, the amount of continuous forested habitats, the percentage of the area with an open-road density

greater than 1 mile per square mile, the amount of security habitats present, and the levels of potentially unnatural foods or attractants.

Existing Environment

The project area is 7 miles southeast of the Northern Continental Divide Ecosystem grizzly bear recovery area and 8 miles south of the `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). Grizzly bears have been documented in the vicinity in the past and some use of the project area could occur. Grizzly bears generally use different habitats relative to season, but the combination of habitat attributes (including forested habitats, riparian areas, and big game winter range) in the project area could facilitate the use by grizzly bears during the non-denning period.

Managing human access is a major factor in management for grizzly bear habitat. There is a minor amount of open roads (0.65 miles, including 0.1 miles of open road and another 0.55 miles are used to access adjacent property) in the project area. However, the locations of these roads and the presence of open roads just off the DNRC-managed parcel would be anticipated to have effects to grizzly bears that would be similar to areas with higher levels of motorized access. Extensive non-motorized access to the project area exists given the presence of open roads, the relatively gentle terrain, and the 5.8 miles of restricted roads (6.4 mi./sq. mi.) in the project area. Within the project area approximately 524 acres (90% of project area) of hiding cover with greater than 40% overstory canopy cover currently exists. Connectivity of existing habitats in the project area is moderately intact; past harvesting in the project area likely reduced some hiding cover attributes. Connectivity of habitats along riparian areas in the project area could be suitable for movements of grizzly bears, however downstream from the project area these streams pass through agricultural fields, limiting value as travel corridors of these riparian areas. Areas suitable as denning habitat at high elevations on slopes >45% (Podruzny et al. 2002) do not occur on the project area or within 1 mile of the project area. No grizzly bear security habitats (≥ 0.3 miles from roads receiving motorized use and ≥2,500 acres in size) exist solely within the project area, but habitats in the project area contribute to a block of potential security cover that extends beyond the project area.

Open road densities are relatively low in the cumulative effects analysis area (0.87 mi./sq. mi., simple linear calculation), with highest concentrations of open roads in the southern and eastern portions of the cumulative effects analysis area and larger areas without open roads in the western portions of the cumulative effects analysis area. Some potential for disturbance to grizzly bears in the cumulative effects analysis area is likely given this level of access, but several areas exist that are distant from open roads. Extensive non-motorized access to the project area exists given the presence of the open roads, the relatively gentle terrain, and the 157.9 miles of restricted roads (3.2 mi./sq. mi.) in the cumulative effects analysis area. Grizzly bear hiding cover is likely present on some of the 13,239 acres (44% of non-DNRC lands) of forested stands with a reasonably closed canopy across the cumulative effects analysis area on other ownerships. Within the cumulative effects analysis area, hiding cover is largely absent from the 7,610 acres (25% of non-DNRC lands) of burned habitats, shrubs, herbaceous, and non-

forested habitats and is likely somewhat limited on the other 11,579 acres (38% of non-DNRC lands) of sparsely stocked and young forest habitats in the cumulative effects analysis area. Uplands in the vicinity are generally reasonably connected with ample hiding cover that could facilitate movement of grizzly bears. While no grizzly bear security habitats exist solely in the project area, the project area contributes roughly 463 acres to a 2,555-acres block of potential grizzly bear security habitats in the cumulative effects analysis area. Collectively, there are 3 blocks of potential grizzly bear security habitats in the cumulative effects analysis area that totals 21,168 acres. Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area likely altered grizzly bear habitats and/or human disturbance levels. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering grizzly bear habitats and/or disturbing grizzly bears. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands, including roughly 499 acres that appear to be in mature stands with >40% canopy closure that are likely providing grizzly bear hiding cover, could continue altering potential grizzly bear habitats while introducing potential disturbance to grizzly bears.

Environmental Effects on Grizzly Bears

Direct and Indirect Effects of the No-Action Alternative

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

Direct and Indirect Effects of the Action Alternative

This alternative could affect grizzly bears directly through increased road traffic, noise, and human activity, and secondarily by altering the amount of hiding cover and forage resources in the project area. Activities in grizzly bear habitats could also reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These potential disturbances would only be present during proposed operations; therefore, the season of disturbance is important in addressing effects to grizzly bears. Proposed activities could occur during the denning period or the non-denning period. Any proposed activities conducted in the denning period would not be expected to disturb grizzly bears; some disturbance to grizzly bears would be possible with proposed activities that may occur during the non-denning period. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated, thus a minor potential for disturbance and displacement of grizzly bears would be anticipated. Collectively, the short-term risk of disturbance and displacement of grizzly bears could have minor adverse effects to grizzly bears.

About 0.5 miles of new, restricted roads would be constructed with the proposed activities resulting in a total road density of 6.9 mi./sq. mi. (up from 6.4 mi./sq. mi.) in the project area. Since all newly constructed roads would be behind existing closures, there would be no changes in open road density or motorized public access would be anticipated. Some increases in non-motorized public access could occur on the newly constructed roads, which could facilitate minor increased contact between humans and grizzly bears. Temporary roads would be reclaimed by making them impassible to off road vehicles and motorized passenger vehicles through various means including semi-permanent barrier types, slashing, debris scattering, and road surface obliteration. Minimal long-term measurable effects to grizzly bears would be attributable to the overall increase in restricted road density of 0.55 miles/sq. mi. that would occur following project completion.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at 200 feet, would be reduced on most of the 486 acres (93%) of hiding cover proposed to receive treatment. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees would persist in several of the units, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 10 to 20 years. Reductions in hiding cover could make any grizzly bears using the project area more detectable by humans, which would result in minor added risk for bear mortality. Within the project area, connectivity of suitable habitats would be reduced, but some would persist along riparian features and in unharvested areas. Proposed RMZ management on 6.7 acres would further narrow these corridors along riparian features, but effectiveness of these areas for facilitating movements of bears would not be drastically reduced given the anticipated tree retention, adjacent riparian habitat, and overall levels of anticipated use. In the near term, minor reductions in grizzly bear security habitats would occur with the reductions in hiding cover, but any these reductions would only be expected to persist for 10-20 years and no appreciable changes to security habitats would occur in the long-term given that no changes in open roads would occur in the project area.
Any unnatural bear foods or attractants (such as garbage) would be kept in a bear resistant manner. Compliance with contract terms would frequently be evaluated and would be enforced by a DNRC contract administrator. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal. Thus, a low risk of adverse direct or secondary effects to grizzly bears would be anticipated since: 1) disturbance and displacement would be possible, should bears be present; 2) hiding cover would be reduced on 93% of the project area but would remain in portions of the project area and would be expected to recover in the next 10-20 years; 3) habitats in potential security habitat would be modified, but no changes in the long-term availability of security habitats would occur; 4) no changes to long-term open road density would be anticipated; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Cumulative Effects of the No-action Alternative
No appreciable changes to existing habitats would be anticipated; advances in succession within

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

Cumulative Effects of the Action Alternative

Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present levels. Proposed activities could temporarily increase human disturbance and the potential for disturbance/displacement to grizzly bears for the short term (2-6 years) within a small portion of the cumulative effects analysis area. Some disturbance and displacement potential exists associated with the ongoing BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project adjacent USFS lands and any potential increases associated with this alternative would be additive to existing high levels of motorized and non-motorized public recreational use in the vicinity, human developments, and ongoing timber management in the cumulative effects analysis area. Such disturbance could increase the potential for temporary displacement of grizzly bears sensitive to the increased presence of humans and motorized activities. Should bears be present in the area, they could be displaced into places with lower quality habitat, and/or be pressed into nearby areas possessing greater inherent risk of conflict with humans (e.g., areas with high hunter density, subdivisions, home sites, and agricultural lands).

Proposed activities would reduce stand densities on 494 acres of mature forest, including 486 acres that are likely providing hiding cover, causing bears that may wander into such areas to be more detectable by humans, which would result in minor added risk for bears, particularly in fall during the big game general hunting season. The reductions in hiding cover would be temporary and treated stands would likely take 15 to 30 years to regenerate into a suitable hiding cover comprised of Douglas-fir, western larch, ponderosa pine, and lodgepole pine sapling stands. Reductions in hiding cover would be additive to the reductions from past timber management, recent wildfire activity, ongoing harvesting, as well as more permanent land-cover changes in the cumulative effects analysis area. Thus, the potential for up to 1,348 acres (4%) of vegetation altering activities (with the USFS Lower Blackfoot Corridor Restoration Project) could occur in the cumulative effects analysis area that could alter potential hiding cover in the cumulative effects analysis area. Within treated stands on both the DNRC and USFS projects, some visual screening would be provided by individual trees and patchy tree retention. Across the cumulative effects analysis area, proposed activities would alter 993 acres of mature forested stands with >40% overstory canopy closure, but roughly 12,246 acres (40%) would remain in the cumulative effects analysis area after proposed activities. Although there would be some minor reductions in the acreage of hiding cover following proposed timber management, ample amounts of hiding cover and connected mature forest patches would remain in the cumulative effects analysis area, which would maintain suitable cover conditions for grizzly bears. Early successional stages of vegetation occurring in proposed units could provide additional foraging opportunities for grizzly bears.

The proposed treatments would construct 0.5 miles of temporary roads that would be decommissioned following use and 0.5 miles of new, restricted roads in a small portion of the cumulative effects analysis area. Overall, no changes in open road densities would be anticipated, but total road densities would increase by 0.01 mi./sq. mi. in the cumulative effects analysis area. No new roads would be constructed on adjacent USFS lands, thus no further changes in total road densities would be anticipated. Minimal additional risk of long-term displacement and/or habitat avoidance by grizzly bears would be anticipated with this additional amount of new, restricted roads. Following proposed activities, continued use of habitats within the cumulative effects analysis area during the non-denning season would be expected. Quality of grizzly bear security habitat would be reduced in short-term due to temporary motorized activities and decreased hiding cover but would persist through time.

Any unnatural bear foods or attractants (such as garbage) would be kept in a bear resistant manner. Compliance with contract terms would frequently be evaluated and would be enforced by a DNRC contract administrator. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal. Thus, a low risk of adverse cumulative effects to grizzly bears would be anticipated since: 1) increases in human disturbance levels in the short-term could occur in a small portion of the cumulative effects analysis area; 2) hiding cover would be reduced in the next 10-20 years on roughly 993 acres in the cumulative effects analysis area; 3) no changes in long-term open road density would occur, 4) quality of security habitats would be reduced, but no changes in the long-term availability of security habitats would occur; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Canada Lynx

Issue

There is concern that timber management and associated 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.

Introduction

Canada lynx are medium-size felines that are federally listed as a threatened species. Lynx foraging habitat in western Montana consists of a mosaic of young and mature forested stands of lodgepole pine, Engelmann spruce, and subalpine fir with high levels of canopy cover (Squires et al. 2010, Squires et al. 2013, Holbrook et al. 2017). Canada lynx habitats in western Montana are generally found between 4,000 to 7,000 feet in elevation and lynx home range sizes vary from approximately 16,000 to 25,000 acres (Ruediger et al. 2000). Lynx primarily prey on snowshoe hares, but also consume red squirrels, ruffed grouse, blue grouse, spruce grouse, flying squirrels, weasels, and carrion. Lynx in western Montana preferred mature, multi-storied stands with dense horizontal cover year-round; during the summer lynx also selected earlier successional stands with a high horizontal cover (Squires et al. 2010). For denning sites, the primary component appears to be abundant large woody debris, particularly in the form of downed logs, root wads, slash piles, and live trees (Squires et al. 2008). These conditions are

found in a variety of climax vegetation habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) occurred in continuous dense forests of lodgepole pine, subalpine fir, and Engelmann spruce. These fires created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Analysis Area

Direct and secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion. This area approximates the home range size of a lynx (Ruediger et al. 2000).

Analysis Methods

To assess potential Canada lynx habitat on the project area, SLI data were used to identify stands in potential lynx habitats (ARM 36.11.403(44)). Potential lynx habitats were subdivided into the following lynx habitat classes: 1) winter foraging, 2) summer foraging, 3) forested travel/other suitable, and 4) temporary non-habitat (USFWS and DNRC 2010). Additionally, habitats on other ownerships in the cumulative effects analysis areas were evaluated using aerial photographs and USDA remotely sensed data. Direct and secondary 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 the analysis include: the level of harvesting, the availability of suitable lynx habitat classes, potential risk of displacement, and landscape connectivity.

Existing Environment

Canada lynx are listed as a threatened species by the USFWS, and federally designated Critical Habitat was described for the Northern Rockies in Unit 3 (USFWS 2014). The project area occurs outside of the Critical Habitat boundary and no federal funding or permitting would be required for the proposed project. Thus, federal measures required under the Critical Habitat designation would not be applicable to this project.

The project area ranges from approximately 3,560 to 4,240 feet in elevation and is dominated by mature stands containing predominantly Douglas-fir, Douglas-fir/western larch, ponderosa pine, and western larch. Roughly 403 acres (69%) of the project area is in unsuitable lynx types, while 178 acres (31% of the project area) of potential lynx habitat occur in the project area (Table WI-2). Much of this habitat is other suitable (129 acres; 22% of the project area) habitats, which are largely forested lands that provide cover to facilitate lynx movements, with smaller amounts (50 acres; 9% of the project area) of winter foraging habitats. Many of the other suitable habitats were harvested in the last decade (roughly 109 acres, 84% of the other suitable habitats) and generally do not contain high horizontal cover that would facilitate extensive use by snowshoe hares and lynx (Squires et al. 2010). Existing habitats are largely located on northerly-facing slopes in the south-central portion of the project area and are not associated with existing

riparian features; existing habitats are located near a ridgeline and small saddle, but both contain non-suitable lynx habitats and are not likely providing quality connectivity and travel habitats for lynx. Existing habitats are largely disconnected from other suitable lynx habitats and exist in a matrix of unsuitable habitats of dry Douglas-fir and ponderosa pine. Connectivity of forested habitats in the project area is fairly high, but many of those forested habitats are generally unsuitable, drier ponderosa pine and Douglas-fir types. Overall, despite some potentially suitable lynx habitats existing in the project area, appreciable use by Canada lynx would not be anticipated.

No other DNRC-managed lands exist in the cumulative effects analysis area. On other ownerships in the cumulative effects analysis area, there are roughly 5,038 acres (18% of non-DNRC lands) of forested stands with a reasonably closed canopy that are dominated by Douglas-fir, subalpine fir, lodgepole pine, Engelman spruce, western larch, and mixed conifer stands that likely include some winter foraging habitats and other suitable habitats. Additionally, there are roughly 4,082 acres (14% of non-DNRC lands) of young seedling, sapling, and pole timber stands dominated by Douglas-fir, subalpine fir, lodgepole pine, Engelman spruce, western larch, and mixed conifer on other ownerships, which likely includes some summer foraging habitats in addition to some other suitable habitats. Additionally there are 4,501 acres of poorly stocked seedling/sapling, pole timber and saw timber stands dominated by Douglas-fir, subalpine fir, lodgepole pine, Engelman spruce, western larch, and mixed conifer that may be considered other suitable habitats or temporary non-suitable habitats; no lynx habitats likely exist on the 14,918 acres (52% of non-DNRC lands) of burned habitats, shrubs, herbaceous, non-forested types, and forested stands dominated by ponderosa pine on other ownerships in the cumulative effects analysis area. Thus, up to 5,088 acres (17%) of winter foraging habitats, 4,082 acres (14%) of summer foraging habitats, plus up to 4,180 (14%) of other suitable habitats may be available in the cumulative effects analysis area. Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area likely altered Canada lynx habitats and/or human disturbance levels. Connectivity of lynx habitats within the cumulative effects analysis area is somewhat limited due to ownership, past timber management, human developments, agricultural fields, recent wildfires, and the natural openness of certain habitats in the cumulative effects analysis area. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering Canada lynx habitats and/or disturbing Canada lynx. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands would not affect Canada lynx or their habitats. Roughly 85.7% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas are in suitable lynx habitat categories.

Environmental Effects on Canada Lynx

Direct and Indirect Effects of the No-Action Alternative

Under this alternative none of the proposed forest management activities would occur and no alterations of forest vegetation or lynx habitats would occur. Continued regeneration in existing stands classified as other suitable habitats that were harvested in the recent past could improve habitat quality by adding horizontal cover near the forest floor that is currently limited in those areas. Existing landscape connectivity would not be altered. Thus, a negligible risk of adverse direct and secondary effects to Canada lynx would be expected since: 1) habitats found in the project area are marginally suitable for lynx use as travel or matrix habitats; 2) winter foraging habitats would persist; 3) summer foraging habitats would continue to be absent from the project area; 4) the amount of temporary non-suitable habitats in the project area would not change; 5) no further risk of displacement due to motorized activities would be anticipated; and 6) no further to alterations in landscape connectivity would occur.

Direct and Indirect Effects of the Action Alternative

Roughly 320 acres (65%) of the proposed activities under this alternative would not occur in mapped lynx habitats and would not be expected to appreciably affect lynx; approximately 175 acres of lynx habitats (98% of lynx habitats in the project area) would be altered with this alternative (Table WI-2). Proposed treatments would be expected to reduce habitats in the "other suitable" habitat category by 126 acres and winter foraging habitats by 49 acres while increasing temporary non-suitable habitats by 175 acres. Those areas of unaltered habitats (3 acres of other suitable and 1 acre of winter foraging habitats) remaining following proposed treatments would be too small for lynx use, thus even though they would meet structural requirements for lynx, they would be considered temporary non-suitable until surrounding stands regrow sufficient cover to be considered lynx habitats. Thus, 100% of the lynx habitats in the project area would be temporarily unsuitable for lynx following proposed treatments. These treated acres would be sparsely forested following proposed activities and would likely take 15 to 30 years to regenerate into a suitable habitat condition comprised of Douglas-fir/western larch, Douglas-fir, and western larch sapling stands. Generally, lynx have relatively low use of silvicultural-treated areas for 10-40 years depending on the intensity of the treatments (Holbrook et al 2018). The retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine fir and Engelmann spruce in foraging habitats, could break-up sight distances, provide horizontal cover, and provide some forest structural attributes preferred by snowshoe hares and lynx. Coarse woody debris would be retained (emphasizing retention of some logs 15 inches dbh and larger) to provide some horizontal cover and security structure for lynx. Proposed activities would reduce forested connectivity in the project area. In the short-term, any use of the project area by lynx would be expected to decline due to the openness in the resultant stands in the project area. 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 2 to 6 years). Risk of any displacement attributable to motorized project activities beyond 6 years would not be expected. Thus, a minor risk of adverse direct and secondary effects to Canada lynx would be expected since: 1) habitats found in the project area are marginally suitable for lynx use as travel

or matrix habitats and appreciable use by lynx is unlikely; 2) winter foraging habitats would be reduced in the project area; 3) summer foraging habitats could develop in the future in the project area; 4) a relatively large 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 6 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 –Acres of Canada lynx habitats in the project area and anticipated changes to existing lynx habitats under both alternatives of the Goldielogs Project

Lynx Habitat Element	Existing Condition	No-Action Alternative	Action Alternative
Winter Foraging	50 (28%)	50 (28%)	0 (0%)
Summer Foraging	0 (0%)	0 (0%)	0 (0%)
Other Suitable	129 (72%)	129 (72%)	0 (0%)
Temporary Non-Suitable	0 (0%)	0 (0%)	178 (100%) *
Total Lynx Habitats	178	178	178
Non-Lynx Habitats	403	403	403

*- Includes 3 acres of Other Suitable and 1 acre of Winter Foraging habitats that would not be altered, but due to their size would be unsuitable for lynx use alone in a matrix of temporary unsuitable habitats.

Cumulative Effects of the No-Action Alternative

No appreciable change in lynx habitats in the cumulative effects analysis area would occur. No appreciable changes to landscape connectivity would be anticipated. Roughly 85.7% 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 as travel or matrix 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.

Cumulative Effects of the Action Alternative

Should any individual lynx be present in the cumulative effects analysis area at the time of proposed timber management activities in the project area or on adjacent USFS lands, 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 6 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 6 years would not be expected. Disturbance associated with motorized and non- motorized human activities conducted in conjunction with both projects would be in addition to existing levels of human disturbance.

Approximately 126 acres of other suitable and 49 acres of winter foraging habitats would be altered with proposed activities, 3 additional acres of other suitable habitats and 1 acre of winter foraging habitats would remain, but would be expected to be unsuitable for lynx until the surrounding stands achieve sufficient vegetation to be considered lynx habitats. Collectively all the lynx habitats would likely be too open to be considered suitable lynx habitats with most being converted into temporary non-suitable habitats. This habitat would likely take 15 to 30 years to regenerate into suitable habitat conditions of western larch, Douglas-fir, and lodgepole pine sapling stands. Anticipated reductions in lynx habitats would be additive to past losses from timber management and recent wildfires as well as any ongoing modifications in the cumulative-effects analysis area. Following proposed treatments, up to 5,039 acres (16%) of forested stands with a reasonably closed canopy stands that are dominated by Douglas-fir, subalpine fir, lodgepole pine, Engelman spruce, western larch, and mixed conifers would persist in the cumulative effects analysis area, which likely include some winter foraging habitats. Similarly, up to 4,054 acres (13%) of reasonably poorly stocked (largely 25-40% canopy closure) stands that are dominated by Douglas-fir, subalpine fir, lodgepole pine, Engelman spruce, western larch, and mixed conifers would persist that would likely include some other suitable habitats useful for travel and connectivity of suitable habitats. In the near term, no appreciable changes to available summer foraging habitats in the cumulative effects analysis area would be anticipated, however through time, as stands develop, existing summer foraging habitats would no longer be suitable, but replacement stands would develop following the various disturbance vectors that have occurred in the cumulative effects analysis area recently.

Given the proposed treatment types and relatively small size and location of the patches of lynx habitats affected, habitat connectivity would not be appreciably altered in the project area. Although forest connectivity would be altered in the project area, these reductions in connectivity would not appreciably alter connectivity in the cumulative effects analysis area given the matrix of habitats present in the project area and larger cumulative effects analysis area. Connectivity of suitable lynx habitats along RMZs could facilitate potential movements through the project area following proposed activities. Roughly 85.3% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories 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 use as travel or matrix habitats; 2) winter foraging habitats would be reduced by 1%, but ample 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 6 years; and 6) minor alterations in landscape connectivity would not prevent lynx movements.

Sensitive Species

Bald Eagle

Issue

There is concern that timber management and associated 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 secondary effects were analyzed for activities conducted in the project area within 2.5 miles of nest associated with the Rainbow Bend bald eagle territory. Cumulative effects were analyzed on the Rainbow Bend bald eagle territory home range. This cumulative effects analysis area includes the likely nesting home range area used by the pair of eagles, considering the size of such areas typically used by eagles breeding in western Montana.

Analysis Methods

Direct and secondary 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

The project area is completely within the home range associated with the Rainbow Bend bald eagle territory on the Blackfoot River. The pair using this territory has used nested in the same area for nearly 20 years and the nest is near Highway 200 and a popular fishing/river access point. The aquatic habitats associated with this territory include the Blackfoot River and numerous smaller streams, ponds, and wetlands. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitats included in the territory are a

coniferous/deciduous mixture along the riparian areas, with coniferous forests and grasslands in the upland areas. Within the home range, black cottonwood is the deciduous tree of primary importance to bald eagles, while large emergent conifers also provide important nesting, roosting, and perching habitats. The project area does not contain any suitable aquatic habitats preferred by bald eagles and appreciable use by the bald eagle pair is unlikely. Human disturbance, including timber management, agricultural activities, Highway 200, several residential homes, and recreational activities along the river are potential sources of disturbance to the nesting territory however past successful breeding seasons indicate this pair is habituated to moderate-high levels of motorized activities. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands would occur in the home range associated with the Rainbow Bend territory, but would not be expected to alter bald eagle habitats nor introduce potential disturbance to the nesting pair. Numerous large emergent trees are available across portions of the home range, but logging and other human developments in the last 100 years has likely reduced some of these attributes while others have experienced mortality and are declining in quality.

Environmental Effects on Bald Eagles

Direct and Indirect Effects of the No-Action Alternative

No direct or secondary 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.

Direct and Indirect Effects of the Action Alternative

No activities would occur in the nest area or primary use area associated with the Rainbow Bend bald eagle territory. Proposed activities on 494 acres (100% of proposed units) would occur in the home range area associated with the bald eagle territory. Proposed activities could occur when soils are dry, frozen, or snow covered. Thus, the proposed activities could occur during the bald eagle nesting season (February 1- August 15), or the non-nesting (August 16-February 1) season. Given the proximity to Highway 200, numerous residences, recreational use of the river, topography between the nest site and project area, and ongoing timber management in the vicinity, 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. No changes in human access to the home range would occur, thereby limiting potential for introducing additional human disturbance to the territory. Thus, a minor risk of direct and secondary 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.

Cumulative Effects of the No-Action Alternative
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.

Cumulative Effects of the Action Alternative
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. Given the proximity to Highway 200, numerous residences, recreational use of the river, topography between the nest site and project area, and ongoing timber management in the vicinity, any potential disturbance from proposed activities would be expected to have negligible effects to nesting eagles. 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 negligible risk of cumulative effects to bald eagles would be anticipated since: 1) disturbance would 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 secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 30,711-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 secondary 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 394 acres (68%) of potential upland fisher habitats in the project area and 2 acres (<1%) of riparian habitats associated with the class 1 Warm Springs Creek. This riparian area is not highly suitable for fisher given there are sizable quantities of drier ponderosa pine and Douglas-fir in the riparian areas, there is little horizontal cover or structure in the riparian area, and connectivity along the riparian area is poor since immediately downstream of the project area the stream goes through an agricultural field and upstream of the project area considerable concentrations of drier ponderosa pine dominate the riparian areas, which are neither highly suitable fisher types. 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. Motorized human access to the project area that could expose fisher to potential trapping pressure is rather limited; nonmotorized access exists on the network of restricted roads.

Within the cumulative effects analysis area, there are roughly 28,786 acres that would be classified as upland (more than 100 ft from Class 1 and more than 50 feet from Class 2 streams) and 1,926 acres that would be classified as riparian that are associated with the 122 miles of Class 1 and 2 streams in the cumulative effects analysis area. On DNRC-managed lands, 100% of the potential riparian fisher habitats in the cumulative effects analysis area are providing structural habitat attributes that could facilitate use by fisher. In the cumulative effects analysis area, existing habitats are partially connected throughout the cumulative effects analysis area, particularly along riparian features. Suitable fisher habitats appear to exist more in the central portion of the cumulative effects analysis area where elevation and aspect allow greater concentrations of western larch/Douglas-fir and mixed conifer stands to dominate; lower elevations in the cumulative effects analysis area are dominated by drier ponderosa pine and Douglas-fir types which are not highly suitable for fisher, and the upper portions of the cumulative effects analysis area are dominated by lodgepole pine and subalpine fir, which are also not highly suitable for fisher. Potential fisher habitats may exist on roughly 3,032 acres (12%) of reasonably closed canopied stands of Douglas-fir, western larch, and mixed conifers in

the cumulative effects analysis area, including roughly 408 acres that are near streams. Another 5,527 acres (21%) within the cumulative effects analysis area are in preferred covertypes (mixed conifers, Douglas-fir/western larch), but lack sufficient structure and cover to be used by fishers, including roughly 221 acres that are near streams. Also, fisher habitats are largely absent from the 17,245 acres (67%) of shrubs, herbaceous, recently burned, non-forested habitats, and non-suitable forested types dominated by ponderosa pine, sub-alpine fir, or lodgepole pine stands in the cumulative effects analysis area. Extensive timber management in the past has occurred across the cumulative effects analysis area and many of the stands that are in suitable covertypes likely lack structural attributes that would make them usable by fisher. Generally, habitats in the cumulative effects analysis area are somewhat disconnected and interspersed with some drier and/or more open habitats than generally used by fisher, thus extensive use of the cumulative effects analysis area would not be anticipated, however, some use by fisher could occur. 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 2021, Krohner et al. 2022). Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area likely altered fisher habitats. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering potential fisher habitats. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands would not affect fishers or their habitats.

Environmental Effects on Fisher

Direct and Indirect Effects of the No-Action Alternative

No direct and secondary 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.

Direct and Indirect Effects of the Action Alternative

Roughly 0.78 acres of low-quality riparian habitats associated with Warm Springs creek 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 387 of the 394 acres (98%) of upland fisher habitats in the project area would receive treatments that would reduce canopy closure and would likely be too open to be used by fisher. No changes in open roads would be anticipated. 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. Thus, a moderate risk of adverse direct and secondary effects to fisher would be

anticipated since: 1) appreciable use of the project area by fishers is unlikely; 2) 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 large percentage of existing upland fisher habitats; 3) reductions in connectivity would occur, but those areas associated with riparian areas would largely remain unaffected; 4) 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.

Cumulative Effects of the No-Action Alternative

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.

Cumulative Effects of the Action Alternative

Minor amounts of riparian habitats associated with the class 1 Warm Springs creek 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. Reductions in upland habitats on DNRC-managed lands (387 acres) would further reduce the amount of suitable upland fisher habitats in the cumulative effects analysis area. These reductions would be additive to the losses associated with past timber management in the cumulative-effects analysis area as well as any ongoing harvesting. Activities would 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 roughly 11% of upland fisher habitats, but 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 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

There is concern that timber management and associated activities could 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 secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 5,780-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 secondary 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

There are approximately 381 acres (66% of the project area) of potential flammulated owl habitats in dry Douglas-fir, Douglas-fir/western larch, and ponderosa pine stands across the project area. There are an additional 452 acres of potential flammulated owl habitats on dry Douglas-fir, Douglas-fir/western larch, and ponderosa pine stands on DNRC-managed lands within the cumulative effects analysis area. Some suitable habitats likely exist on a portion of the 3,698 acres (78% of non-DNRC-managed lands) of open and closed forested habitats on other ownerships in the cumulative effects analysis area; however, portions of these forested areas are not likely preferred flammulated owl habitat types. Elsewhere in the cumulative effects analysis area, some forested habitats have been harvested in the recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a portion of the Douglas-fir encroachment while opening stands of ponderosa pine; however, retention of large ponderosa pine and/or Douglas-fir was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Modern fire suppression has allowed

Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls. Timber management and human developments that have occurred in the cumulative effects analysis area likely altered flammulated owl habitats and/or human disturbance levels. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering flammulated owl habitats and/or disturbing flammulated owls. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could disturb flammulated owls and open up flammulated owl habitats.

Environmental Effects on Flammulated Owl

Direct and Indirect Effects of the No-Action Alternative

No changes to existing flammulated owl habitats in the project area would occur. Thus, a negligible risk of adverse direct and secondary effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting or foraging habitats would be anticipated.

Direct and Indirect Effects of the Action Alternative

Flammulated owls can be tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur when flammulated owls are present. Proposed activities could overlap the nestling and fledgling periods. Since some snags and large trees would be retained, loss of potential nest trees would be expected to be minimal. Proposed activities on 312 acres of potential flammulated owl habitats (69% of the habitats in the project area) would open the canopy while favoring western larch, ponderosa pine, and Douglas-fir. The proposed treatments would reduce canopy closure, which would allow more sunlight to reach the forest floor, which could stimulate grass and shrub growth, providing habitat for moths and other flying insects that provide food for flammulated owls. 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 more open stand conditions, the retention of fire adapted tree species, and the maintenance of limited existing snags would move the project area toward historical conditions, which is suitable flammulated owl habitat. Thus, a minor risk of adverse direct and secondary effects would be expected to flammulated owls since: 1) the potential exists to disturb flammulated owls; and 2) proposed timber management 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.

Cumulative Effects of the No-Action Alternative

No further changes to flammulated owl habitats or disturbance levels would occur. Thus, a

negligible risk of adverse cumulative effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting or foraging habitats would be anticipated.

Cumulative Effects of the Action Alternative
Disturbance in flammulated owl habitats would occur on a small portion (7%) of the cumulative effects analysis area and could be additive to ongoing activities in the area. Proposed activities would increase the amount of the cumulative effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of losing snags and large trees important for nesting. Overall, no change in the amount of potential flammulated owl habitats would occur 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) proposed activities 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) proposed activities 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.

Peregrine Falcon

Issue
There is concern that timber management and associated activities could disturb peregrine falcons and/or negatively affect peregrine falcon habitats.

Introduction
Peregrine falcons occupy more open habitats and will typically nest and perch on ledges and cliff faces. Additionally, a water source (e.g., river or lake) is usually close to the nest site, which is important for providing a localized and adequate prey base (Johnsgard 1990). Prey for peregrine falcons include shorebirds, ducks, grebes, gulls, pigeons, and songbirds including jays, thrushes, longspurs, buntings, larks, waxwings, and starlings. Additionally, peregrine falcons will also occasionally consume small mammals, insects, and fish. Typically, peregrine falcons hunt by flying very high, then dive to strike prey out of the air.

Analysis Area
Direct and secondary effects were analyzed for activities conducted in the project area within 0.5 miles of the eyrie. Cumulative effects were analyzed on the 0.5-mile area around the Johnsrud peregrine falcon eyrie. This cumulative effects analysis area includes the likely home range area used by the nesting pair of peregrine falcons.

Analysis Methods
Direct and secondary 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 level of potential disturbance at the eyrie, alterations to potential habitats such as riparian areas and cliff faces/ledges, and potential changes to prey availability.

Existing Environment

The project area is roughly 0.4 miles north of the Johnsrud peregrine falcon eyrie (Montana Natural Heritage Program, June 2021). This eyrie has been routinely used for roughly 15 years by a pair of peregrine falcons; in 2021 this eyrie was again active and had 4 nestlings (J. Sumner, Montana Peregrine Institute, pers. comm. 6/29/21). The eyrie is located above the Blackfoot River which provides a diversity of prey for the nesting pair. The eyrie is within 0.5 miles of Highway 200 and across the river from a popular fishing/river access point. Human disturbance, including timber management, agricultural activities, Highway 200, several residential homes, and recreational activities on the river are potential sources of disturbance to the eyrie. Collectively human disturbance within 0.5 mile of the eyrie is relatively high and this territorial pair appears more resilient to disturbance. The project area could provide upland forested foraging habitats for peregrine falcons; but given their typical nature of diving down on prey, little use of the project area for foraging would be anticipated given the existing stand densities and habitats present. No riparian areas that produce typical prey species or cliff faces or ledges that may be used for nesting exist in the project area. Timber management and human developments that have occurred in the cumulative effects analysis area likely altered peregrine falcon habitats and/or human disturbance levels. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering peregrine falcon habitats and/or disturbing peregrine falcons. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could alter upland forested habitats for some peregrine falcon prey species, though no activities would be near cliff faces, ledges, or riparian areas that could alter peregrine falcon use of the area.

Environmental Effects on Peregrine Falcon

Direct and Indirect Effects of the No-Action Alternative

No changes to potential foraging or nesting habitats would be anticipated. No potential disturbance to the eyrie during the nesting season would occur. Thus, no further risk of adverse direct and secondary effects to peregrine falcons would be anticipated since: 1) no disturbance to the peregrine falcon eyrie would be anticipated; 2) habitats near nesting habitats and riparian areas would not be altered; and 3) no changes to habitats for peregrine falcon prey species could occur.

Direct and Indirect Effects of the Action Alternative

Little or no disturbance to peregrine falcons from proposed activities would be anticipated given

the distance from the eyrie, tolerance of the nesting pair to existing human activities, and the topography and aspect of the proposed units in relation to the eyrie. The proposed activities would not alter habitats near potential nesting habitats or riparian areas where peregrines frequently forage. Proposed activities could modify upland forested habitats which could alter habitats for some peregrine falcon prey species, but no appreciable changes to prey availability would be anticipated. Thus, a minor risk of adverse direct and secondary effects to peregrine falcons would be anticipated since: 1) little or no disturbance to the peregrine falcon eyrie would be anticipated; 2) habitats near nesting habitats and riparian areas would not be altered; and 3) minor alterations to habitats for peregrine falcon prey species could occur.

Cumulative Effects of the No-Action Alternative
No changes to potential foraging or nesting habitats would be anticipated. No potential disturbance to the eyrie during the nesting season would occur. Thus, no further risk of adverse direct and secondary effects to peregrine falcons would be anticipated since: 1) no disturbance to the peregrine falcon eyrie would be anticipated; 2) habitats near nesting habitats and riparian areas would not be altered; and 3) no changes to habitats for peregrine falcon prey species could occur.

Cumulative Effects of the Action Alternative
Minor levels of potential disturbance to the eyrie could be possible. These would be additive to ongoing activities and other forms of disturbance that may be affecting the eyrie. Collectively, little or no additional disturbance effects to peregrine falcons would be anticipated. No further alterations to specific habitats such as riparian areas, cliff faces, or ledges would occur. Proposed activities in upland forested habitats could alter habitats for some peregrine falcon prey species and would be additive to ongoing activities in the vicinity. No appreciable changes in peregrine falcon prey availability would be anticipated. Thus, a minor risk of adverse cumulative effects to peregrine falcons would be anticipated since: 1) little or no disturbance to the peregrine falcon eyrie would be anticipated; 2) habitats near nesting habitats and riparian areas would not be altered; and 3) minor alterations to habitats for peregrine falcon prey species could occur.

Pileated Woodpeckers

Issue
There is concern that timber management and associated 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 secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 5,780-acre cumulative effects analysis area described above in the Analysis Areas portion. This area 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 secondary 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 461 acres (79% of the project area). These habitats are dominated by Douglas-fir/western larch, Douglas-fir, ponderosa pine, and western larch stands. Additionally, 120 acres (21% of the project area) of sawtimber stands, dominated by Douglas-fir/western larch, ponderosa pine, Douglas-fir, and western larch exist in the project area, which may be potentially suitable foraging habitats. In the cumulative effects analysis area, an additional 66 acres (14%) of pileated woodpecker nesting habitats exist on DNRC-managed lands dominated by Douglas-fir, and western larch. Also, on DNRC managed lands within the cumulative effects analysis area, an additional 386 acres (84%) of sawtimber stands exist that may be potential foraging habitats. Some suitable habitats likely exist on a portion of the 2,139 acres (45% of non-DNRC lands) of forested habitats on other ownerships in the cumulative effects analysis area. Total potential pileated woodpecker habitat within the cumulative effects analysis area is 2,666 acres (46% of all

lands). Much of the 2,594 acres (55%) of shrubs, herbaceous areas, poorly stocked forested stands, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful to pileated woodpeckers. Across the cumulative effects analysis area, ongoing tree mortality is reducing forested cover while increasing the amount of dead wood resources available for pileated woodpeckers. Timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area likely altered pileated woodpecker habitats and/or human disturbance levels. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering pileated woodpecker habitats and/or disturbing pileated woodpeckers. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could disturb pileated woodpeckers and alter up to 550 acres of potential pileated woodpecker habitats, although only 236 of those acres would receive treatments that would likely remove forest attributes used by pileated woodpeckers.

Environmental Effects on Pileated Woodpecker

Direct and Indirect Effects of the No-Action Alternative

A negligible risk of adverse direct and secondary effects to pileated woodpeckers would be expected since: 1) no timber management would occur; 2) no further 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.

Direct and Indirect Effects of the Action Alternative

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 timber management on 494 acres would reduce continuously forested habitats for pileated woodpeckers in the project area. Roughly 425 acres (92%) of the potential nesting habitats along with 70 acres (58%) of potential foraging habitats would be treated. Most or all of the 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 30-100 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags greater than 21 inches dbh per acre), coarse woody debris (5-15 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 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 494 acres (94%). This could result in the temporary loss of 1-3 breeding pileated woodpecker territories. These silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir while

promoting the growth and/or regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, a high risk of adverse direct and secondary effects to pileated woodpeckers would be anticipated since: 1) proposed activities would reduce the amount of continuously-forested habitats available by 94%; 2) potential nesting habitats (92%) and foraging habitats (58%) would be removed; 3) some snags and snag recruits would be removed; however, mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre would be included; and 4) proposed treatments would promote seral species in the project area.

Cumulative Effects of the No-Action Alternative

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.

Cumulative Effects of the Action Alternative

Reductions in pileated woodpecker habitat quality and the amount of continuously forested habitats available for pileated woodpeckers would occur. Proposed timber management on 494 acres (19% of potentially suitable habitat) would reduce habitat for pileated woodpeckers in the cumulative effects analysis area by removing some live trees and snags. On DNRC-managed lands in the cumulative effects analysis area, roughly 102 acres (19%) of pileated woodpecker nesting and 436 acres (86%) of foraging habitats would not be altered. Potential habitats that exist on the portions of the 2,139 acres of closed-canopy forest on non-DNRC-managed lands in the cumulative effects analysis area would be expected to persist; potential habitat reductions on 236 of these acres associated with the BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project would continue. Approximately 2,005 acres (35%) of potentially suitable nesting habitats would persist in the cumulative effects analysis area following proposed activities. Any other ongoing timber management activities in the cumulative effects analysis area on other ownerships could continue altering potential pileated woodpecker habitats in the vicinity. Snags (a minimum of 2 snags greater than 21 inches dbh per acre), coarse woody debris (5-15 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 units 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. Many of these altered stands in both the DNRC-managed portions and those on USFS-managed lands would be expected to fill in with a high proportion of Douglas-fir, ponderosa pine, and western larch, which could provide nesting and feeding structural components in 30 to 100 years, thereby improving pileated woodpecker habitats. Modifications to pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting and human

development; continued use of the cumulative effects analysis area would be anticipated, but likely at a reduced level. Continued maturation of stands across the cumulative-effects analysis area would provide future pileated woodpecker habitats. 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 by 494 acres; 2) potential nesting and foraging habitats would be modified, but habitats would persist in some parts of the cumulative-effects analysis area; 3) snags and snag recruits in the cumulative effects analysis area would 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 minimum of 2 snags per acre and 2 snag recruits per acre would be included; and 4) proposed treatments would promote seral species in a portion of the cumulative effects analysis area.

Northern Goshawk

Issue

There is concern that timber management and associated activities could alter northern goshawk habitats and/or displace nesting goshawks from active nests, resulting in increased goshawk chick mortality.

Introduction

Northern goshawks (hereafter goshawk) are forest generalists with specific nesting habitat requirements (Reynolds et al. 1992, Squires and Reynolds 1997, McGrath et al. 2003, Squires and Kennedy 2006). Goshawks forage on various species, with the predominant prey being snowshoe hares, Columbian ground squirrels, red squirrels, blue grouse, ruffed grouse, northern flickers, American robins, gray jays, and Clark's nutcrackers (Reynolds et al. 1992, Boal and Mannan 1996, Watson et al. 1998, Squires 2000, Clough 2000). While acquiring this wide range of prey species, goshawks forage in a diversity of habitats. Beier and Drennan (1997), however, observed that goshawks tend to forage in areas based more on habitat attributes rather than prey abundance. Beier and Drennan (1997) also found that goshawks tend to forage relatively selectively in forests with greater abundance of large trees, canopy cover, and basal area, but had relatively open understories. Reynolds et al. (1992) identified 3 increasingly large spatial scales at which northern goshawks appear to utilize their nesting home range, including: 1) nest area; 2) post-fledging family area; and 3) foraging area. Goshawks will nest in ponderosa pine, Douglas-fir, and aspen stands on north-facing slopes that are typically in the stem exclusion (pole) or understory reinitiation (mature) stages of stand development, with higher canopy closure (> 50%) and basal area than available in the surrounding landscape (Reynolds et al. 1992, Squires and Reynolds 1997, Clough 2000, Finn et al. 2002, McGrath et al. 2003). McGrath et al. (2003) found that nests are typically surrounded by stands in the stem exclusion and understory reinitiation stages of successional development (Oliver and Larson 1996), which possess canopy closure > 50% in an area of about 74-acres. While goshawks appear to select denser stands with higher canopy closure for nesting areas, areas in post-fledging family areas and foraging areas are more heterogeneous and typically contain more stand structure diversity. Goshawk post-fledging family areas are generally 300-600 acres and provide sufficient prey to

allow young hawks to develop hunting skills while affording the young cover from predators. Foraging areas must provide adults an area to capture sufficient prey to support themselves and their young. Prey availability, intraspecific competition (competition with other goshawks) and forest type can influence home range size of goshawks, which vary from about 1,200 to 12,000 acres (Squires and Reynolds 1997). Reich et al. (2004) observed that in some locations, the availability of locations with high potential for nests may not limit local population density as much as territorial competition between nesting pairs. They also noted that the number of territories may have more to do with the size of the nesting population than the availability of suitable nesting habitat.

Analysis Area

Direct and secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support several pairs of northern goshawks (Squires and Reynolds 1997).

Analysis Methods

To assess potential northern goshawk habitat in the project area, SLI data were used to identify stands in mature forested habitats possessing >40% overstory canopy cover. Direct and secondary 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 amount of continuously forested habitats, amount of the area in the stand initiation stage of development, and the availability of potential prey species.

Existing Environment

An active goshawk nest was detected in the project area during field reconnaissance. Re-use of old nests by goshawks occurs relatively infrequently, but fidelity to the nest area (territory) is fairly high (Woodbridge and Deitrich 1994, Patla 1997). Thus, use of the project area in the future could occur. In the project area, roughly 449 acres (77%) of potential nesting habitat (cover >60%, pole or mature forest) exist. The remaining habitats in the project area could be suitable foraging habitats.

Within the cumulative effects analysis area, approximately 3,409 acres (11%) of potential nesting habitat (crown cover >60%, pole or mature forest) dominated by Douglas-fir, western larch/Douglas-fir, lodgepole pine, and mixed conifers exist. Additionally, within the cumulative effects analysis area, another 9,830 acres (32%) of more open forest, 11,579 acres (38%) of stand initiation or young forest, and 5,313 acres (17%) of more open, herbaceous, or shrub types exist that likely provide a diversity of prey species for northern goshawks. Across the cumulative effects analysis area, a variety of successional stages of coniferous forested habitats exist that could support a variety of potential prey species for northern goshawks. Past timber management in the cumulative effects analysis area has altered northern goshawk habitats; ongoing harvesting within the cumulative effects analysis area could continue altering goshawk

habitats. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could disturb northern goshawks and alter potential northern goshawk habitats and/or habitats for their prey.

Environmental Effects on Northern Goshawk

Direct and Indirect Effects of the No-Action Alternative

Negligible direct or secondary adverse effects to northern goshawks in the project area would be anticipated since: 1) no further changes in the amount of continuously forested habitats would occur; 2) no further changes in the amount of the project area in the stand-initiation (seedling/sapling) stage of stand development would occur; and 3) no further changes in goshawk prey availability would occur.

Direct and Indirect Effects of the Action Alternative Some disturbance to goshawks could be possible should proposed activities occur during the nesting season and goshawks are in the vicinity. A seasonal restriction (April 1 – August 1) on activities within ¼ mile of the nest would be implemented, which would minimize potential for disturbance to the pair. All trees within 200 feet of the nest tree would be retained, which would reduce the potential effects to the existing nest site. Across the project area, approximately 413 acres (92%) of the potential nesting habitats and another 82 acres (14%) of more open mature forest would be altered with the proposed activities. The proposed treatments would reduce canopy closure and basal area to a point where they would likely not be suitable for nesting following proposed activities; it could take 30-50 years following proposed treatments to develop sufficiently dense stands to again facilitate goshawk nesting. The resultant stands would be more open, contain fewer large trees, fewer snags, more coarse woody debris, fewer areas of dense mid-aged forest, and have variable tree density. However, the mosaic of habitat conditions, the more open stands, and the presence of some small openings would support a variety of prey species. Collectively the prescriptions would yield more seedling development that would resemble the stand initiation stage more than the existing conditions, which is less suitable for northern goshawk nesting, but may support different prey species. Overall, a slight reduction in use of the project area would be anticipated but use by goshawks for foraging could persist. An increase in potential nest predation would be possible with the increasingly openness in the canopy following proposed treatments, but mitigations to retain cover near the nest would offset some of this potential. Thus, moderate adverse direct and secondary effects to northern goshawks in the project area would be anticipated since: 1) reductions in the amount of continuously forested habitats and potentially suitable nesting habitats would be anticipated with the majority of the project area no longer being suitable for nesting; 2) increased openness in the project area and subsequent seedling/sapling growth could reduce nesting habitat suitability for goshawks but use of the territory by foraging goshawks would likely persist; 3) goshawk prey availability would be altered with the proposed habitat modifications, including reducing habitats for those prey relying on mature trees, large snags, small patches of dense mid-aged stands, and closed canopied stands, while increasing potential habitat for those prey species relying on small

openings and coarse woody debris; and 4) mitigations would be in place that would restrict activities within ¼ mile of the nest from April 1 to August 1, and additional tree retention around the nest site would be required.

Cumulative Effects of the No-Action Alternative

No further adverse cumulative effects to northern goshawks would occur in the cumulative effects analysis area since: 1) no further changes in the amount of continuously forested habitats would occur; 2) no further timber management would occur that would increase the amount of the cumulative effects analysis area in the stand-initiation (seedling/sapling) stage of stand development; and 3) no further changes in goshawk prey availability would occur.

Cumulative Effects of the Action Alternative

Some disturbance to goshawks could be possible should proposed activities occur during the nesting season and goshawks are in the vicinity; seasonal restrictions near the nest would limit the potential disturbance to nesting goshawks. Any potential disturbance could occur for up to 6 years and would be additive to any potential disturbance associated with ongoing forest management activities as well as other potential disturbances in the area from agricultural operations, existing roads, human developments, as well as various forms of motorized and non-motorized human recreation. The proposed activities would reduce canopy closure and basal area to a point where they would not likely be suitable nesting habitats (413 acres) or foraging habitats (82 acres) following proposed activities in this small portion of the cumulative effects analysis area. It could take 30-50 years following proposed treatments to develop sufficiently dense stands to again facilitate goshawk nesting; some continued use of the retained buffer associated with the existing nest could occur, although success could be reduced due to predation. Across the 30,711-acre cumulative effects analysis area, roughly 2,996 acres (10%) of dense patches of mature forest cover would be present, which could provide a network of nesting and foraging habitats. Following proposed activities, a slight increase in stands with a variable tree density would be anticipated that would provide differing foraging opportunities for goshawks. Across the cumulative effects analysis area, potential foraging habitats across a diversity of forest structure and age classes would persist, and through time, would continue maturing towards older age classes; no appreciable changes in foraging habitat availability would be anticipated. Although there would be a 12% reduction in the acreage of suitable nesting habitats and a slight reduction (<1%) to foraging habitats following proposed timber management, ample amounts would remain in the cumulative effects analysis area, which would maintain suitable habitat conditions for goshawks, albeit at slightly reduced quality at the scale of the 30,711-acre cumulative effects analysis area. Any reductions in nesting habitats would be additive to ongoing harvesting and residential development in the vicinity that may have reduced goshawk nesting habitats while altering foraging habitats. Ongoing harvesting would continue to alter potential goshawk habitats while reducing the amount of the cumulative-effects analysis area in mature, forested covertypes and increasing the amount in the stand-initiation stage of stand development. Overall, modifications to nesting and foraging habitats under this alternative would be additive to habitat losses associated with past harvesting and any ongoing harvesting. Thus, minor adverse cumulative effects to northern

goshawks would be anticipated since: 1) a minor reduction in the amount of continuously forested habitats and potentially suitable nesting habitats would be anticipated in the cumulative effects analysis area; 2) proposed activities would increase the amount of the cumulative effects analysis area that are in more open and subsequent seedling/sapling growth could reduce nesting habitat suitability for goshawks in a small portion of the cumulative effects analysis area; 3) goshawk prey availability would be altered with the proposed habitat modifications, including reducing habitats for those prey relying on mature trees, large snags, small patches of dense mid-aged stands, and closed canopied stands, while increasing potential habitat for those prey species relying on small openings and coarse woody debris; and 4) continued use of the cumulative effects analysis area by goshawks would be anticipated.

Big Game

Big game species that may inhabit the vicinity of the project area during part or all the year could include moose, elk, mule deer, white-tailed deer, mountain lions, gray wolves, and black bears. These can be divided into 2 groups: 1) herbivorous ungulates (deer, elk, and moose), and 2) carnivorous/omnivorous species (black bears, mountain lions, and gray wolves) that rely partially or solely on the herbivorous big game species. By considering important habitat attributes for the herbivorous big game species, it is assumed that needs of those carnivorous/omnivorous big game species are also being met. Additionally, several of the considerations, habitat attributes, and effects for grizzly bears (Grizzly Bear section of this analysis) would be similar for black bears. Furthermore, large-scale habitat attributes for several of these species were also covered in the Habitat Fragmentation, Corridors, and Linkage Zone portion of this analysis.

Big Game Security Habitat

Issue

There is concern that timber management and associated activities could reduce security habitat and seasonal cover for big game, which could affect big game numbers and/or hunter opportunity and quality of local recreational hunting.

Introduction

Timber management can increase vulnerability of big game animals by changing the size, structure, juxtaposition, and accessibility of areas that provide security during the 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. Since 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 can 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. Similarly, providing larger blocks of habitats that are relatively free of human disturbance would provide for the needs of several of the carnivorous/herbivorous big game species such as gray wolves, black bears, and mountain lions that prey upon these ungulates.

Analysis Area

Direct and secondary effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion. This cumulative effects analysis area should provide enough area for an elk herd to avoid hunting pressure during the general hunting season and approximates the size of an elk herd's fall home range.

Analysis Methods

Given that areas within 0.5 mile of an open road do not provide elk security habitat (Hillis et al. 1991), open roads were buffered 0.5 mile and identified as areas not meeting the criteria for elk security habitat. Areas that were extensively harvested or burned in the last 20 years were not expected to provide security habitat and were removed from potential security cover. Additionally, elk security habitat patches need to be somewhat larger forested blocks (greater than 250 acres) with adequate cover to afford elk security during the general big game hunting season, so areas failing to meet these criteria were also removed, leaving patches that were distant enough from open roads, were large enough to meet the minimum criteria, and had adequate cover to provide elk security habitat (Hillis et al. 1991). Cumulative effects were evaluated using 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

The project area is in the central parts of DFWP hunting district 283. Deer, elk, and moose are common in the district and some use by big horn sheep from the Lower Blackfoot herd likely occurs. This hunting district has a steady-to-increasing population of elk over the last 30 years (S. Eggeman, DFWP R-2 Biologist pers. comm. 6/2/21). During that same period, both the numbers of hunters recreating in the district and the number of successful hunters in the district has been declining (S. Eggeman, DFWP R-2 Biologist pers. comm. 6/2/21), which may partially be the result of reductions in open road access stemming from the ongoing transition of large tracts of lands in the district formerly owned by corporate timber companies to small landowners and/or public land management agencies.

In the project area, hiding cover is reasonably abundant (524 acres; 90%). There are

approximately 0.1 miles of open roads with public motorized access that crosses the northwest corner of the project area and another 0.55 miles of road exists (0.84 mi./sq. mi.) in the project area that facilitates motorized access to an adjacent landowners property. Considerable non-motorized access to the project area exists given the presence of the open road, the relatively gentle terrain, and the 5.8 miles of restricted roads (6.4 mi./sq. mi) in the project area. A portion of the project area lacks big game security habitat due to the proximity to the open road. Much of the 256 acres (44% of project area) that are distant enough from open roads contain sufficient cover to be able to contribute to larger blocks of potential security habitat that extend beyond the project area; past timber management in the project area on roughly 118 acres within the potential big game security habitat block partially reduced hiding cover and overall effectiveness of that portion of the block in 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 17,248 acres (56%) 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 7,610 acres (25%) 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 (5,843 acres) 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 41.6 miles, 0.87 miles/sq. mile) that facilitate access and numerous restricted roads (at least 157.9 miles; 3.3 miles/sq. mile) that could be used for non-motorized access. In the cumulative effects analysis area, a total of 10,153 acres in 4 patches meet the distance, cover, and size requirements of elk security habitats (Hillis et al. 1991). This amount of security habitat (33.1 percent of the cumulative effects analysis area) exceeds 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 vicinity. 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. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to small private ownerships in the cumulative effects analysis area could continue altering big game security habitats and/or disturbing big game species. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could disturb big game, reduce tree densities on 854 acres, and alter cover on 408 acres of potential security habitats, while potentially improving foraging habitats on 854 acres.

Environmental Effects on Big Game Security Habitat

Direct and Indirect Effects of the Action Alternative

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 secondary 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.

Direct and Indirect Effects of the Action Alternative

During proposed activities, disturbance from motorized equipment could disturb or displace big game animals in the area for up to 6 years, and habitats in the vicinity may temporarily be unusable due to the level of noise and human activity. 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. Proposed construction of 0.5 miles of new, restricted roads and 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. Minimal long-term effects to big game would be attributable to the overall increase in restricted road density of 0.55 mi./sq. mi. and nonmotorized public use that could occur following proposed activities.

Proposed activities would reduce tree densities on 494 acres. Roughly 486 acres (93% of available habitat) of big game hiding cover would be altered which would reduce quality for 10 to 20 years as Douglas-fir, ponderosa pine, and western larch seedlings and shrubs fill in and provide adequate cover for big game; however, some cover (7%) for big game would persist that could benefit big game during the hunting season in the project area. These reductions in hiding cover would include alterations on 219 acres (85% of security habitat in project area) of hiding cover in blocks that may contribute to potential big game security habitats. 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. Continued use of the project area by the suite of big game species currently found in the project area would be likely. Collectively, moderate 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) minor increases in nonmotorized access could increase human access on 0.5 miles of new, restricted roads; 3) much of the big game hiding cover (93%) and big game security habitat (85%) in the project area would be altered; 4) disturbance could occur on the project area for up to 6 years, and 5) slight decreases in big game survival could potentially occur with increased

access and visibility.

Cumulative Effects of the No-Action Alternative
Approximately 33.9 percent of the cumulative effects analysis area would continue providing big game security habitat, which would exceed the 30-percent minimum threshold recommended by Hillis et al. (1991). Continued maturation in previously harvested stands on all ownerships in the cumulative effects analysis area would improve hiding cover in those older units. 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.

Cumulative Effects of the Action Alternative
Any short-term disturbance (up to 6 years of potential disturbance) associated with proposed forest management activities would be additive to disturbance from existing high levels of motorized and non-motorized public recreational use, as well as ongoing activities on USFS lands within the cumulative effects analysis area. Such disturbance 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 from normal home range areas into places with lower quality habitat, and/or be pressed into nearby areas potentially possessing greater inherent risk of human or predator-caused mortality. 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. Proposed road construction (0.5 miles) and improvements to permanent, restricted roads could facilitate an increase in nonmotorized traffic to a small portion of the cumulative effects analysis area.

Approximately 486 acres of hiding cover and 219 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 clearing and development, 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 the 219 acres (2%) of big game security habitats proposed for treatment not be suitable for big game species there would still be a minimum of 31.0 percent of the cumulative effects analysis area in big game security habitat following proposed treatment, which would exceed the 30-percent minimum threshold recommended by Hillis et al. (1991). Continued maturation in previously harvested stands across the cumulative effects analysis area would improve hiding cover in those older units and may partially offset proposed losses; ample 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 494 acres in a small part (2%) 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) changes to nonmotorized access would be minor; 3) 494 acres (3% of hiding cover in the cumulative effects analysis area) of 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 6 years, and 5) negligible changes in big game survival in the cumulative effects analysis are would be anticipated.

Big Game Winter Range/Thermal Cover

Issue

There is concern that timber management and associated activities could reduce winter thermal cover for moose, elk, white-tailed deer, and mule deer, resulting in reduced numbers and/or their displacement from the area.

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 concentrated 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 secondary effects were analyzed for activities conducted in the 581-acre project area. Cumulative effects were analyzed on the combined deer and elk winter ranges in the 30,711-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale provides enough winter habitat to support several hundred wintering white-tailed deer, mule deer, and elk.

Analysis Methods

Direct and secondary, 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 (565 acres, 97%), mule deer (397 acres, 68%), and elk (581 acres, 100%) winter ranges in the project area. These winter ranges are part of larger winter ranges in the area. Mature Douglas-fir, Douglas-fir/western larch, and ponderosa pine stands in the project area are providing attributes facilitating use by wintering big game. Approximately 524 acres of the project area (90%) appear to have sufficient canopy closure (>40%) 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.

Roughly 16,248 acres of composite deer and elk winter range (53% of the cumulative effects analysis area) exist in the cumulative effects analysis area; roughly 13,034 acres (42%) of the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game, including approximately 8,911 acres (29%) that currently appears to possess greater than 40% overstory canopy cover in mature forest patches. Portions of the cumulative effects analysis area in shrubs, herbaceous areas, poorly stocked forested stands, burned areas, and recently harvested stands would not be expected to provide thermal cover or snow intercept in the near future. Human disturbance within the winter range is associated with residential development, commercial timber management, and several roads but is largely concentrated along the southern portions of the cumulative effects analysis area. Past timber management, recent wildfires, and human developments that have occurred in the cumulative effects analysis area likely altered big game winter range and thermal cover habitats and/or human disturbance levels. Any ongoing timber management and land clearing/residential development resulting from recent conversions of industrial timber lands to

small private ownerships in the cumulative effects analysis area could continue altering big game thermal cover and winter range habitats and/or disturbing wintering big game. Ongoing timber management (commercial harvest, pre-commercial thinning, and prescribed burning) in the cumulative effects analysis area associated with collaborative BLM/USFS Lower Blackfoot Corridor Ecosystem Maintenance, Forest Restoration, and Fuels Reduction project on 854 acres of USFS lands could disturb big game, reduce tree densities and potentially improve foraging habitats. These include activities on roughly 672 acres of white-tailed deer winter range, 782 acres of mule deer winter range, and 830 acres of elk winter range.

Environmental Effects on Big Game Winter Range/Thermal Cover

Direct and Indirect Effects of the No-Action Alternative

No further direct or secondary 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.

Direct and Indirect Effects of the Action Alternative

Proposed activities could occur in the winter or non-winter periods. Disturbance created by mechanized logging equipment and trucks could temporarily displace wintering big game animals during periods of operation for up to 6 years; no disturbance or displacement of wintering big game on winter ranges 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. No public motorized access would be allowed in the project area while proposed activities would be underway, thus no added risk of displacement due to this cause 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 activities would occur on roughly 480 acres (85%) of white-tailed deer winter range, 326 acres (82%) of mule deer winter range, and 494 acres (85%) of elk winter range. Proposed activities would reduce canopy closure and potential winter use by big game on roughly 486 acres (93%) 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. Thus, a high risk of adverse direct or secondary 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 93% of the stands that are providing thermal cover and snow intercept habitats for big game species; and 3) portions of winter ranges for several species of big game would be altered.

Cumulative Effects of the No-Action Alternative

Continued big game 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.

Cumulative Effects of the Action Alternative

Proposed activities could occur in the winter or non-winter periods. Disturbance created by mechanized logging equipment and trucks in a small part of the cumulative effects analysis area could temporarily displace wintering big game animals during periods of operation for up to 6 years; no disturbance or displacement of wintering big game on winter ranges 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 activities would occur on roughly 480 acres (4% of the winter range in the cumulative effects analysis area) of white-tailed deer winter range, 326 acres (4% of the winter range in the cumulative effects analysis area) of mule deer winter range, and 494 acres (9% of the winter range in the cumulative effects analysis area) of elk winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 486 acres (93%) of thermal cover facilitating considerable winter use by big game. Collectively, 1,152 acres (9% of the winter range in the cumulative effects analysis area) of white-tailed deer winter range, 1,108 acres (15% of the winter range in the cumulative effects analysis area) of mule deer winter range, and 1,324 acres (23% of the winter range in the cumulative effects analysis area) of elk winter range would be altered between this alternative and the BLM/USFS project; approximately 7,987 acres (26% of the cumulative effects analysis area) would remain in mature forest cover with >40% overstory canopy closure that could serve as big game thermal cover following proposed activities. Some localized reductions in the connectivity of these mature stands would occur, which could alter the way big game would be able to use these patches of thermal cover in a small portion of the cumulative effects analysis area in the vicinity of the project area.

Modifications to thermal cover and snow intercept in the project area would further reduce the amount of the larger winter range providing these attributes for big game by approximately 4%. 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 roughly 4% of the larger winter range would be removed; 3) relatively small amounts of winter ranges for several species of big game would be altered.

Wildlife Mitigations

- A DNRC biologist would be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.443) are needed.
- Motorized public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs would be used during active periods and a physical closure (gate, barriers, equipment, etc.) would be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris would be managed according to ARM 36.11.411 through 36.11.413, particularly favoring western larch and ponderosa pine. Retain at least 2 large snags and 2 large recruitment trees per acre (both >21 inches dbh, or largest available). Given operability and human safety constraints, retain all existing non-merchantable snags where possible. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Retain large woody debris within ranges recommended by Graham et al. (1994). For this project the appropriate range is approximately 5-15 tons per acre. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Where opportunities exist, retain leave trees, sub-merchantable trees, and retention areas in a clumped fashion to emulate natural disturbance patterns and reduce sight distances for wildlife.
- Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants would be stored in a bear-resistant manner.
- Should a raptor nest be identified in or near project activities, activities would cease and a DNRC biologist would be contacted. Site-specific measures would be developed and implemented to protect the nest and birds prior to re-starting activities.
- Retention of patches of advanced regeneration of shade-tolerant trees would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.

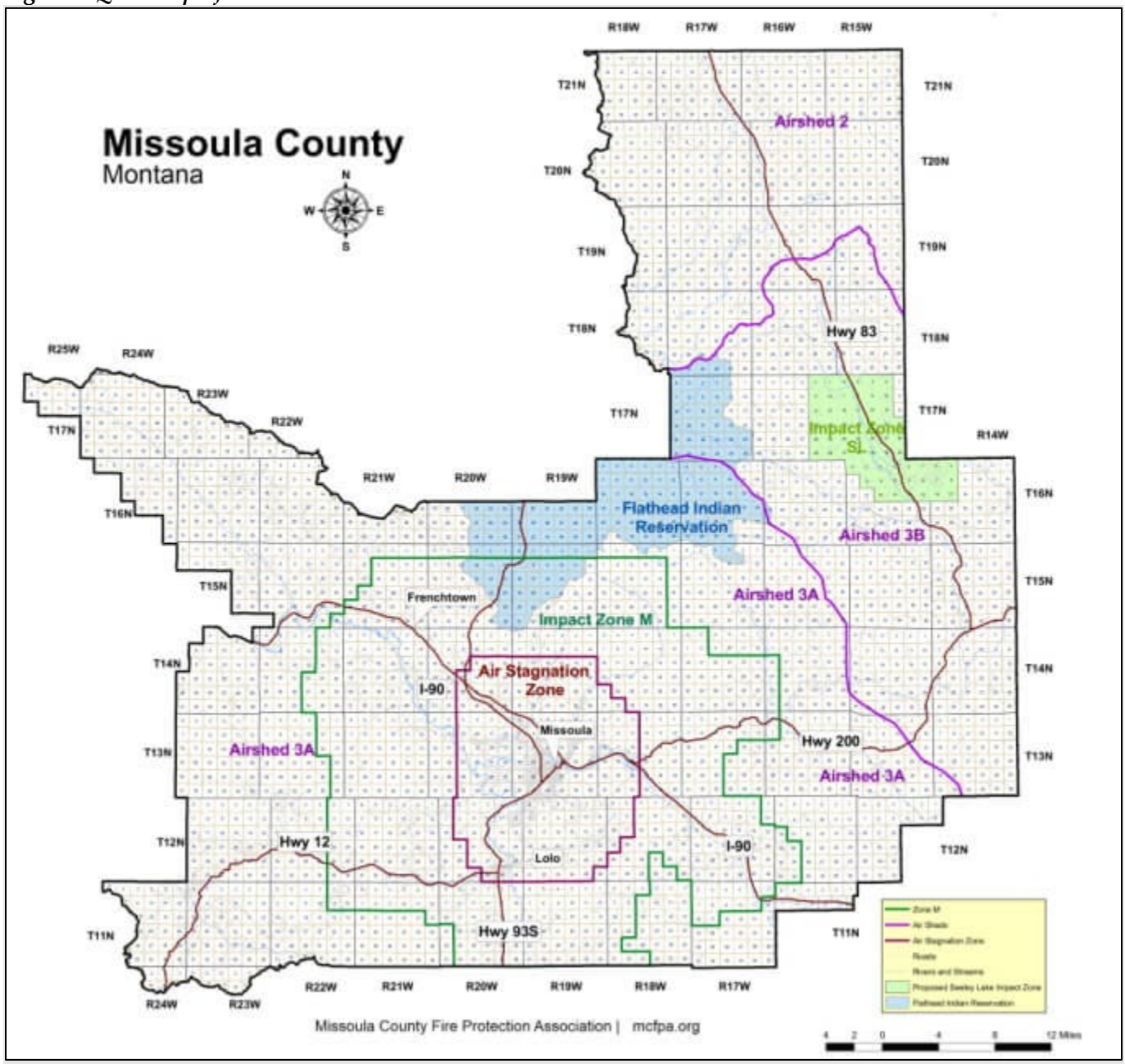
- Retain all trees within 200 feet of any active goshawk nest. In any year when the nest is active, restrict harvesting and hauling on restricted roads within 0.25 mile of the nest to the non-nesting period (August 1 – April 1) to minimize potential for disturbing the nesting pair.
- Provide connectivity 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.

Air Quality

Analysis Areas

The analysis area used to determine direct, indirect, and cumulative environmental effects to air quality includes the airshed the Goldielogs project area is located within Air Shed 3A located within Missoula County (Figure AQ-1).

Figure AQ-1: Map of Missoula Airsheds.



Methods

The methodologies used to determine the environmental effects of the proposed action on air quality within the project and cumulative-effects analysis area include estimating the amount, location, timing, and duration of smoke and dust generated by activities associated with the proposed action. Cumulative effects include consideration of other actions indicated in Chapter 2 – Relevant Past, Present, and Related Future Actions.

Issues Addressed

No issues related to air quality arose from the public scoping period, however, the following issues were developed internally:

- Smoke produced from logging slash piles and broadcast burning associated with this project may adversely affect local air quality.
- Dust produced from harvest activities such as road building, road maintenance, and hauling may adversely affect local air quality.

Measurement Criteria

Quantitative and qualitative changes to the following measurement criteria are intended to 'measure' the extent of the potential direct, indirect, and cumulative environmental effects the proposed action may have on existing air quality in the area.

- Amount (piles, acres), timing (week, month, season), and duration (weeks, months, years) of prescribed burning (slash pile).
- Amount, timing (week, month, season), and duration (weeks, months, years) of road construction, road maintenance, and harvest-related traffic.

Relevant Agreements, Laws, Plans, Permits, Licenses, and Other Authorizations

Clean Air Act

Congress passed the Clean Air Act in 1963. The purpose of the act is to protect and enhance air quality while ensuring the protection of public health and welfare. MCA 75-2-101 through 429 is known as the Clean Air Act of Montana and requires the State of Montana to provide for a coordinated statewide program to prevent, abate, and control air pollution while balancing the interest of the public.

Montana / Idaho Airshed Group

The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2010). As a member, DNRC must submit a list of planned burns to the Smoke Monitoring Unit describing the type of burn to be conducted, the size of the burn in acres, the estimated fuel loading in tons/acre, and the location and elevation of each burn site. The Smoke Monitoring Unit provides timely restriction messages by airshed. DNRC is required to abide by those restrictions and burn only when conditions are conducive to

good smoke dispersion.

Air Quality Major Open Burning Permit

The DEQ issues permits to entities that are classified as major open burners (ARM 17.8.610). DNRC is permitted to conduct prescribed wildland open burning activities in Montana that are either deliberately or naturally ignited. Planned prescribed burn descriptions must be submitted to DEQ and the Smoke Monitoring Unit of the Montana/Idaho Airshed Group. All burns must be conducted in accordance with the major open burning permit.

Affected Environment

The analysis area is within the central part of Montana Airshed 3A. Local winds in the area tend to blow out of the west. Weather occurrences such as cold fronts may cause shifts in local wind patterns.

Existing sources of emissions include road dust and smoke from logging slash disposal and prescribed burns. Main Gold Creek Road is a recreation corridor, access for residences, as well as used for forest management by other agencies.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative

Under the no-action alternative, no proposed project -related harvest activities, traffic, road construction, or road maintenance would occur. Current levels of traffic within the project area would continue. Therefore, direct and indirect effects to air quality as a result of the no-action alternative would not be expected.

Direct and Indirect Effects of the Action Alternative

Prescribed Burning-Slash Piles

Slash piles consisting of tree limbs and tops and other vegetative debris would be created throughout the project area during harvesting. DNRC would conduct prescribed burning following harvest activities in order to remove residual logging waste.

Timing

Burning would start approximately one year after a harvest unit has been completed. Due to airshed restrictions limiting available burning days, burning could be expected to occur from one to 3 years following the completion of a harvest unit.

Duration

Burning would most likely occur from September-December. Actual burning days would be controlled and monitored by DEQ and the smoke monitoring unit of the Montana/Idaho Airshed Group and would meet EPA standards, which would further minimize the direct and indirect effects of burning activities.

Effects

Burning within the project area would be short in duration and would only 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 in order

to meet current air quality standards. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. Thus, direct and indirect effects to air quality due to slash pile burning associated with the proposed action would be minimal.

Road Construction, Maintenance and Log Hauling

Road construction, maintenance and log hauling activities would create localized dust on roads affected by the proposed action alternative.

Amount

The amount of dust generated would vary by season and by activity. Haul roads within the project area are dirt/gravel roads that have potential to generate dust. However, Main Gold Creek Road is a recreation corridor, access for residences, as well as used for forest management by other agencies. Therefore, effects to air quality throughout the analysis area as a result of harvest-related traffic are expected to be minor.

Timing

Road construction and maintenance would take place within the first three to five years of the proposed project implementation. Log hauling would take place whenever road conditions are such that rutting or other road surface damage would not occur. This may occur not only in summer and fall but also early spring and during the winter when the ground is frozen and/or snow packed.

During this period dust production in the dry summer and fall months would likely be higher than during the late fall, winter, and early spring months when frozen ground conditions and/or higher levels of moisture are expected to abate particulate production. Dust mitigations may be incorporated into contracts to reduce dust production during the summer and fall.

Duration

Road construction and road maintenance activities would be short in duration and may only take 8-12 weeks to complete. However, depending on the activity, these may take place at different periods for the life of the project, which may be 3-5 years. Log hauling would take place throughout implementation of the project. This has the potential to occur off and on (depending on soil and/or road conditions) for 3-5 years.

Effects

Direct and indirect effects to air quality as a result of road construction, maintenance and log hauling are expected to be localized to the roadways and areas directly adjacent to the roadways. Dust abatement mitigations, such as dust abatement applications or speed restrictions if excessive amounts of dust are created or expected to be created during hauling operations, are expected to greatly limit the dispersion of particulate matter beyond these areas. Direct and indirect effects to air quality throughout the analysis area as a result of road construction and log hauling are expected to be minor.

Cumulative Effects of the No-Action Alternative

Cumulative effects to air quality as a result of this alternative would not be expected.

Cumulative Effects of the Action Alternative

Cumulative effects of burning, road construction, road maintenance, and log hauling associated

with ongoing and foreseeable actions on DNRC, federal, and private, lands would produce particulate matter. Existing emission sources from occasional construction equipment, vehicles, road dust, residential wood burning, wood fires, and smoke from logging slash disposal would continue. All burning activities by major burners would continue to comply with emission levels authorized by the DEQ, Montana/Idaho Airshed Group, and the EPA.

All above mentioned emissions in conjunction with expected particulate production from the proposed action would occur at higher levels than currently experienced. Providing that speed restrictions/dust abatement for log trucks would be placed in contracts, portions of the project would occur in the winter, construction activities would be short in duration, and emissions produced from burning would be appropriately controlled and monitored, the cumulative effects to air quality are not expected to exceed EPA and DEQ standards.

Air Quality Mitigations

- Burning within the project area would be short in duration and would be conducted when conditions favored good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality, Missoula County, and the Montana/Idaho Airshed Group.
- The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.
- Contract clauses may provide for the use of dust abatement or require trucks to reduce speed if necessary to reduce dust near any affected residences.

Historical and Archeological Sites

No Montana Tribal Nations 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 that no cultural or paleontological resources have been identified in the APE. Because of the overall steep terrain (from an archaeological perspective), a lack of springs, the lack of geology that would suggest caves, rock shelters, or sources of tool stone, and because the area has been logged previously, no additional archaeological investigative work will be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work would cease until a professional assessment of such resources can be made.

Recreation

Introduction

A variety of recreational activities currently occur within the project area, which largely includes: big game hunting, cross-country skiing, hiking, dog walking, horse riding, and camping. The DNRC values the use of State Trust lands for educational, research, and recreational purposes, however one of the primary objectives of management on forested State Trust Lands is to generate revenue for trust beneficiaries and contribute to the sustainable yield as mandated by state statute 77-5-223. ARMs 36.11.421 (1), (9) and (10) as well as the SFLMP's Road Management Standards state that the DNRC may restrict, reclaim or abandon roads that are deemed non-essential to near-term management plans. Reclamation or abandonment of a road through revegetation and/or slash obstruction may occur to minimize future road maintenance costs and erosion.

Issues Addressed

The following issues were developed from concerns brought up during the scoping period.

- The proposed action will negatively impact recreation and educational opportunities.
- Slash placed on reconstructed roads and trails will impact hiking and skiing opportunities.

Environmental Effects on Recreation

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

No harvest activities would occur, and thus recreational opportunities would likely not change. However, potential effects to the forested area from Douglas-fir beetle and/or wildland fire disturbance may occur in the future and may affect recreational opportunities.

Direct, Indirect, and Cumulative Effects of the Action Alternative

Following the completion of the proposed timber harvest, this state land may continue to be used by the public for recreational and other purposes. It is expected that the logging activities would create easier non-motorized access to parts of the section for increased hunting, hiking, horse riding and cross-country skiing opportunities. The harvest would emulate a natural disturbance, which would create a more open stand with greater opportunities for snow accumulation.

Recreation Mitigations

- When re-constructing skids trails and roads, the arrangement, amount, size and configuration of course woody debris (in the form of slash, logs, etc.) would be designed to meet resource protection objectives. However, when appropriate, slash would be placed with a secondary objective of not impeding non-motorized recreational traffic.

Economics

Issues Addressed

The following project-level issue related to economics were developed during public scoping and internally:

- The proposed project will not provide positive economic return to the trust.

Effects on Economics

The proposed action has a projected harvest estimated volume of 3 MMBF or a volume between 2.5 and 3.5 MMBF. This volume is worth approximately $435/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 $1,305,000. 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 $195,750 and $456,750. Additional Forest Improvement fees of $21.75/MBF would be collected from the purchaser for all sawlog loads.

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. 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 3,000 MBF of timber towards the annual sustained yield target thus helping sustain current mill capacity.

Visual Quality

Introduction

This analysis describes the existing visual quality throughout the area and discloses the potential environmental effects on those attributes.

Issues Addressed

The following issues was formulated from concerns brought up during the scoping period.

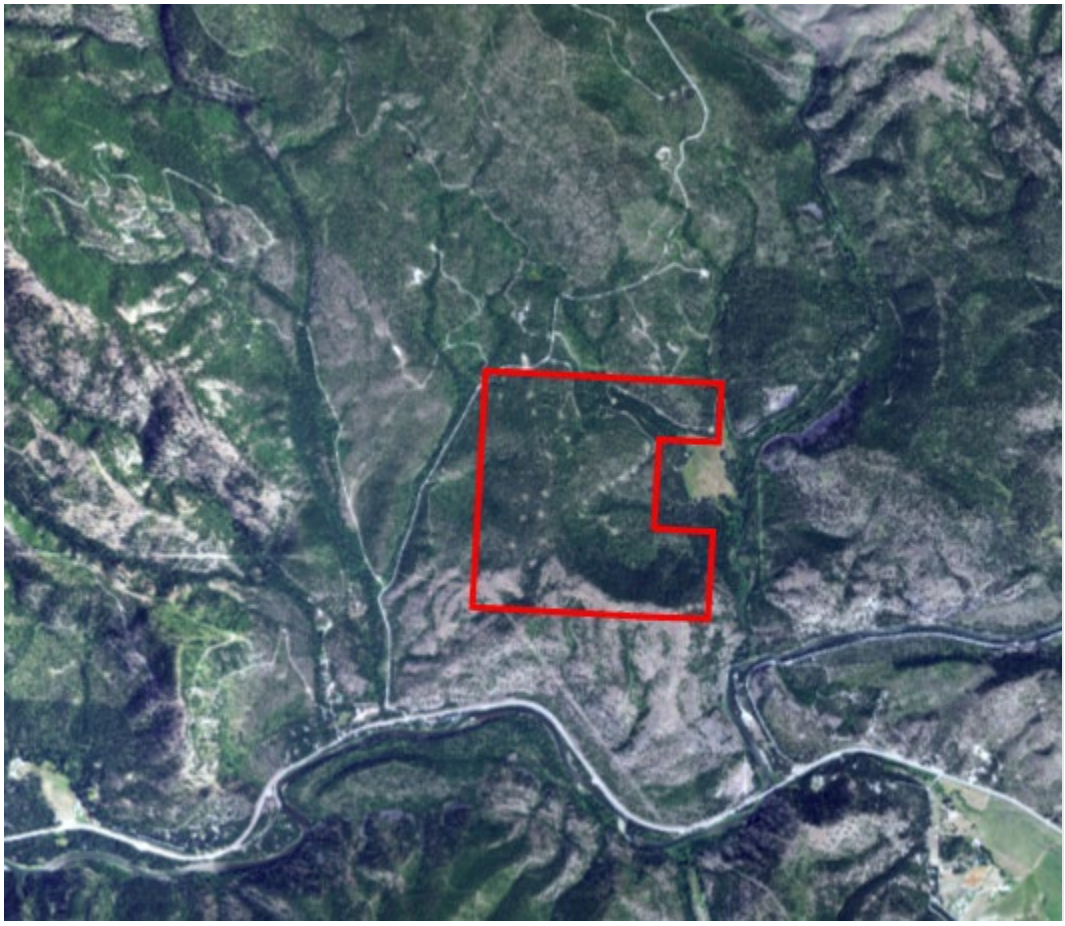
- Harvest activities may adversely affect the visual quality of the landscape.

Analysis Area

The analysis area used to determine the direct and indirect effects of the proposed action on the visual quality will be the project area. Changes to the scenery in the project area could be visible from both Main Gold Creek Road, as well as a small portion from Hwy 200.

The analysis area used to determine cumulative environmental effects of the proposed action on the visual quality will include state, private, and federal lands adjacent to the project area (Figure VQ-1).

Figure VQ-1: Project Area and Surrounding Air Photo



Analysis Methods

The methodologies used to portray the existing environment and determine the environmental effects of the proposed action on the visual quality in the project area and cumulative effects analysis area include using visual interpretation of stand conditions and attributes of non-DNRC lands as well as aerial photo interpretation (Figure VQ-1).

Existing Conditions

Forest management activities on the state trust lands in the Goldielogs project area began as early as 1892 and are described in Chapter 1. It can be assumed that most past harvests resulted in a visible change in the viewshed by altering continuous forest canopy cover. The most recent harvest entry, McNamara Landing Timber Sale (2012), is still visible today from Main Gold Creek Road. Similarly, the surrounding area has been heavily managed for timber production (Champion and Plum Creek most notably).

Harvest-related effects to visual quality, both in the project and cumulative effects analysis areas, are the most noticeable during and just after the harvest, when the disturbance is at greatest contrast with the surrounding environment. As the land starts to re-vegetate and foreststands

regenerate, the colors and textures return to a more natural state reducing the contrast to the adjacent environment.

Direct, Indirect, and Cumulative Effects of the No-Action Alternative

No harvest activities would occur and thus no changes to the viewshed would occur from harvest-related activities. However, the viewshed may change following the effects of potential future Douglas-fir beetle and/or wildland fire disturbance.

Direct and Indirect, and Cumulative Effects of the Action Alternative

Implementation of the action alternative would result in a visible harvest entry but would become more moderate a few years post-harvest. Any change to the scenery in the area due to the implementation of the action alternative would be in addition to past timber harvests, road building, and vegetation management (grazing, pre-commercial thinning, etc.) Immediately following the harvest, the visual effect would be the most noticeable, especially in the harvest units near the road edges. Viewshed changes may also be visible from Hwy 200.

Viewshed Mitigations

Silvicultural treatments would attempt to emulate natural disturbances, many of the largest trees would be left, and a random, natural spacing would be preferred, which would decrease contrast in form, line, color, and texture between past management activities and ownerships.

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Attachment A - Maps

Figure A-1: Goldielogs Timber Sale Vicinity Map

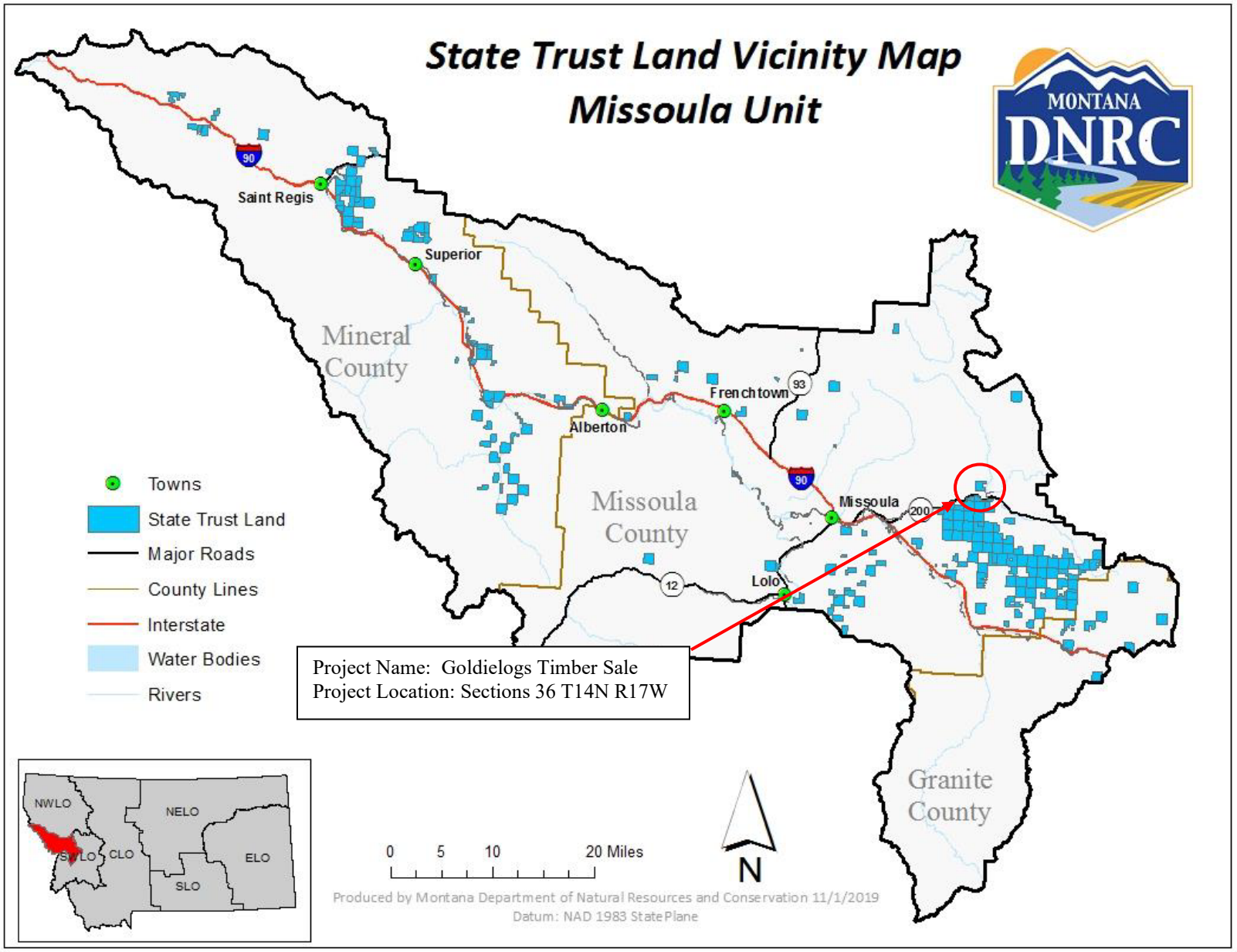


Figure A-2: Goldielogs Timber Sale Project Area Map

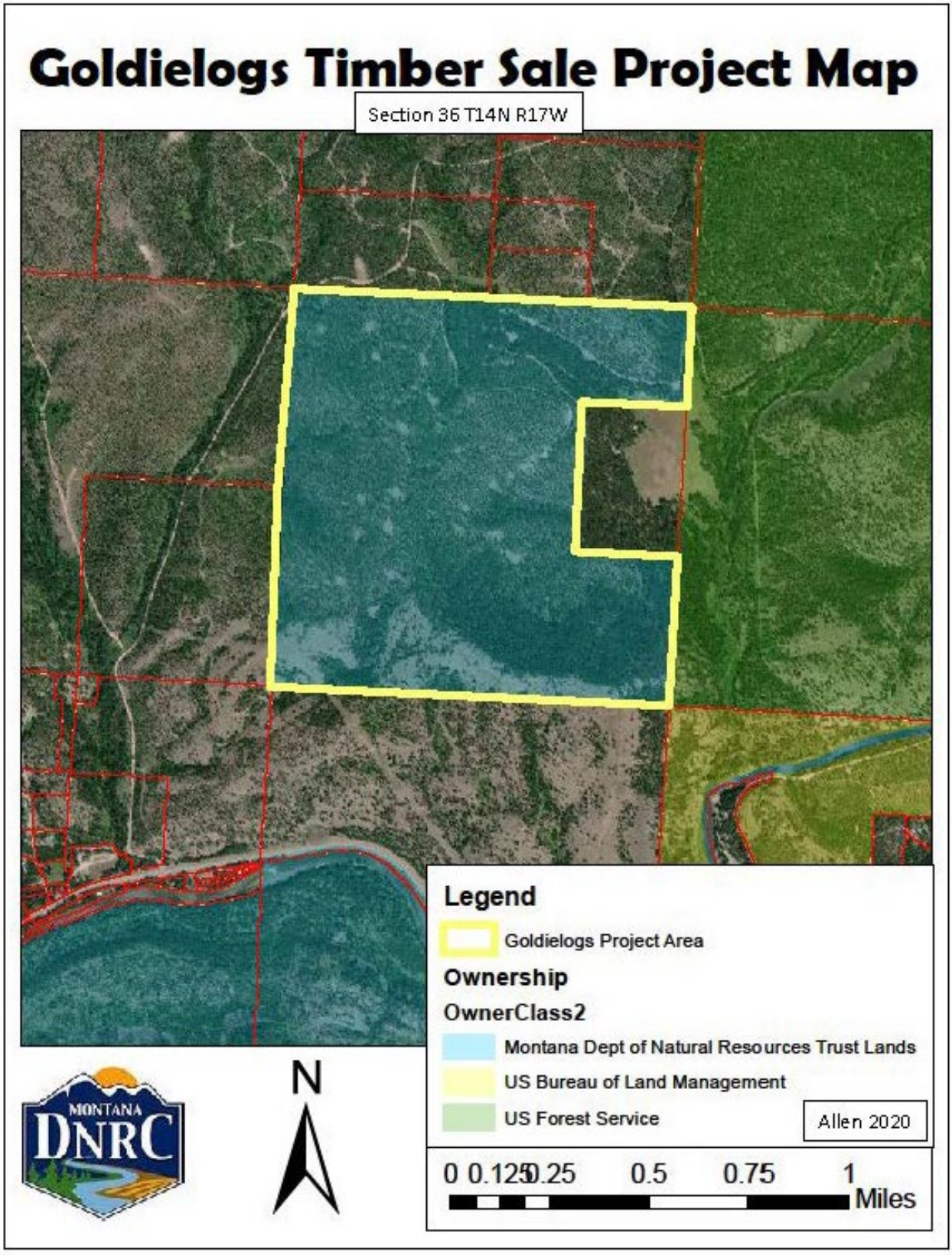
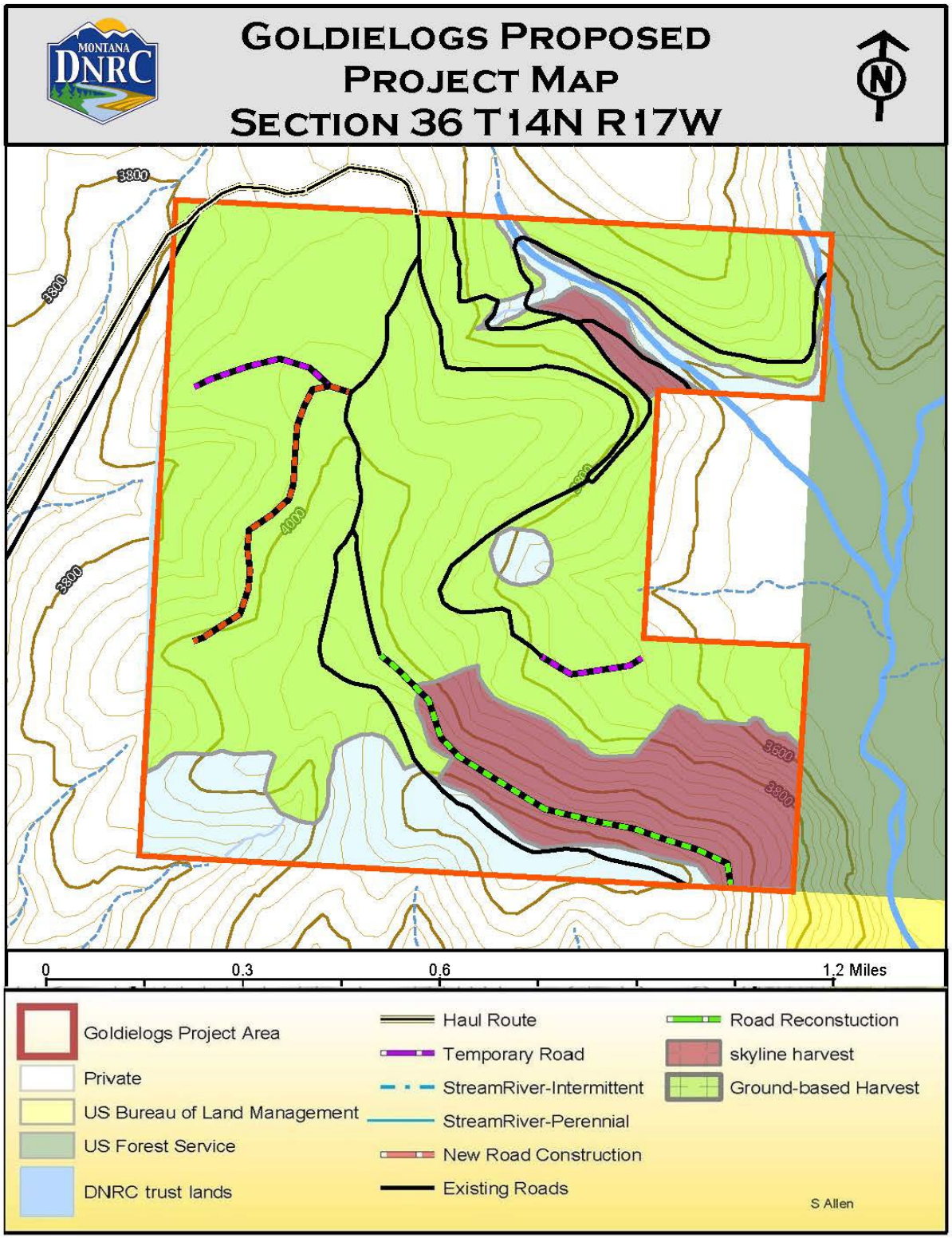


Figure A-3: Goldielogs Timber Sale Proposed Project Activities



Attachment B – Public Comment and Response

Introduction

This section contains public comment letters received from parties interested in the Goldielogs Timber Sale during the project's scoping period. The contents of each comment are displayed in the left column of the following table and DNRC responses to those comments in the right column. The specific question or comment is presented in bold font in the left column and the DNRC's responses are presented in italic font in the right column. Portions of public comments that were either an opinion or statement and do not require a response from the DNRC are not portrayed in bold font. DNRC responses include direct responses to the specific questions or comments.

All comments were carefully reviewed and considered in the Environmental Assessment. The DNRC appreciate both the time and thought that was involved in producing these comments. The decisionmaker has carefully considered each comment received to aid in deciding on a course of action for this project.

Table B-1: Public comments and DNRC responses.

Comment #	Tarn Ream 12/23/2020 Via e-mail	DNRC Response 1/4/2021 Via e-mail
1.1	Hi Scott, Thank you for sending this! Sorry it took so long for me to respond, my schedule has been chaotic! **I am interested in having more information about markings on the trees. What is the coding for different colors and basal marks? Also, I would like to know the specifics about which species and dbh are being used for revenue, as well as which are targeted for stand improvement. Are unmarked trees leave trees? Do you plan to leave snags in this sale?** I appreciate any information you can provide! Happy Holidays! all best, Tarn Ream	*Tarn,* *Thank you for your interest in the proposed Goldielogs Timber Sale. Responses to your specific questions from the first email are below. I have also received your comments/questions from the attached GCRPA letter Goldie Logs pdf from the second email. They will be incorporated into the Goldielogs analysis.* ***I am interested in having more information about markings on the trees. What is the coding for the different colors and basal marks?*** *The following is how I plan to mark the proposed sale. The marked portion I believe you are referring to, is also marked using these specifications. I use this to help me visualize harvest prescriptions for my environmental analysis. Because this is simply a tool used for visualization, there may be "holes" or unfinished portions within the small marked area.* *The marking specs would be as follows:* • *Red three stripe with flagging – section line boundary* • *Orange two dot with flagging – SMZ (streamside management zone) boundary* • *Orange stripe at breast height within the SMZ – cut/harvest tree* • *Blue three stripe with flagging – harvest unit boundary*

		CUT/LEAVE by species *<u>Western larch and ponderosa pine– Marked to cut</u>* • *Orange stripe at breast height – cut/harvest tree* • *No mark on tree – leave tree* *<u>All other species >8" diameter at breast height (DBH) Douglas-fir, Engelmann spruce, lodgepole pine, subalpine fir, and may include others</u>* • *Blue stripe at breast height – leave tree* • *No mark on tree – cut/harvest tree* ***Also, I would like to know the specifics about which species and dbh are being used for revenue, as well as which are targeted for stand improvement.*** *All cut trees of marketable size would be used for revenue (this includes "other" products such as pulp wood and firewood). Tree selection would be based primarily on an individual tree selection prescription (ITS). Leave tree selection would be based on the phenotypical attributes of the tree, as well as the known proximity to insects and disease. For example, a Douglas-fir exhibiting a healthy looking top may be designated for harvest if it is in close proximity to a tree infested with Douglas-fir bark beetles. Early seral species that were historically dependent on fire for disturbance and regeneration such as western larch and ponderosa pine would be preferred for leave trees, however some healthy uninfected Douglas-fir would also be left to maintain some diversity. The DBH of leave trees would be representative of the current stand conditions, with more emphasis on the health and vigor of the individual tree than the DBH. Leave trees would be spaced at distances somewhat relative to their inverse DBH class and canopy size. Meaning: Larger trees spaced at further distances than smaller trees, this is to promote natural regeneration of shade intolerant, early seral species.* ***Do you plan to leave snags in this sale?*** *Yes, we would adhere to snag requirements outlined in the Montana Department of Natural Resources and Conservation Administrative Rules for Forest Management:* *36.11.411 BIODIVERSITY - SNAGS AND SNAG RECRUITS* *(1) The department shall retain snags and snag recruits in all harvest units involving live timber, including seed tree removals, fire, and other salvage operations as follows:*

		(a) in all timber harvest units post-harvest, the department shall retain an average of approximately two snags and two snag recruits over 21 inches DBH, per acre.; *(b) in all cases, if snags or recruits over 21 inches DBH are not present, the next largest size snag or recruit shall be retained.;* *(c) retained snags and recruits may be evenly distributed or clumped.;* *(d) if there is an absence of sufficient snags or recruits, some substitution between the two may occur.;* *(e) Cull trees shall qualify as recruits provided they do not contribute to:* *(i) insect and disease problems;* *(ii) pose a human safety issue; or* *(iii) present concerns over dysgenic practices.*
1.2	Tarn Ream 1/12/2021 Via e-mail Hello Scott, **Will you please send a map that will allow us to find the areas, including any SMZs, where you are marking trees for the Goldie Logs proposed sale? We are confused by what we are seeing on the ground. There are some trees with red paint on what may be a boundary, but they seem to be marked for harvest, and not as a boundary with 3 stripes and flagging. In the area that seems to be inside the boundary, there are trees that are marked with a sort of lavender (pink or purplish) paint -- both D. fir and larch -- that appear to be marked for harvest (with stump mark). Would it be possible to meet on site to help us understand the markings?** Folks wanted me to share this article with you. I am sure you are aware of this article and the land transfers, and the significance of past management in the area surrounding Section 36. There is an opportunity with this State Land section to preserve mature trees, wildlife habitat, and hydrologic integrity as a showplace and outdoor classroom close to Missoula in the Gold Creek drainage. [Link here] We look forward to hearing from you. All best, Tarn Ream (and Cathy Ream)	DNRC Response 1/19/2021 Via e-mail *Tarn,* *I would like to emphasize that the proposed Goldielogs Timber Sale project is in the development stage. I cannot furnish a map, because unit boundaries, prescriptions, etc. are not defined at this time. As stated earlier, there is a small (5 acre) portion that I sample marked to use as an aid while interacting with my ID team during project development. The marked portion is only being used to aid in the analysis at this time. As to the confusion of the purple paint; I generally mark using blue to leave, however since there are remnants of blue marked trees within the proposed project area, I chose to mark using purple in the sample marking area. I mistakenly told you blue, sorry about the confusion. Red is section line boundary (this would include blaze marks made by surveyors, as well as 3 red stripes); All marked trees, regardless whether they would be marked for harvest or retention, may have a stump mark of the same color painted on the downhill side of the stump. I would like to reiterate, the small area of marked trees that you are referring to is just a tool for use in the development of the proposed project. We anticipate having an Environmental Assessment completed around June. I hope this has cleared the confusion; If not, let me know and I would be happy to schedule a time to meet at the proposed project site.* *Regards,* *Scott Allen-Management Forester* *DNRC-Missoula Unit*

		3206 Maverick Lane *Missoula, MT 59804* *Sallen@mt.gov*
2.1	Gold Creek Resource Protection Association 12/28/2020 Via e-mail Department of Natural Resources and Conservation, Missoula Unit Attn: Scott Allen 3206 Maverick Lane Missoula, MT 59804 Dear Mr. Allen, Thank you for sending us the scoping notice for Goldie Logs Timber Sale proposal in the Gold Creek drainage. Please keep us informed as the process moves forward. We would like to submit a few preliminary comments and questions on behalf of the Gold Creek Resource Protection Association. The plans for management of Section 36 of T14N, R17W in the Gold Creek drainage should address cumulative effects of past and potential future logging plans in the drainage. This section is one of the last remaining low elevation, intact forests in the Missoula area—literally an island in a sea of clearcuts and roads. Our position remains that this section has unique values as it is—it is an important core area for many wildlife and plant populations and has fantastic recreational and educational opportunities. We request that DNRC prepare a full Environmental Impact Statement (EIS) for the proposed Goldie Logs Timber Sale. Concerns we would like to see addressed include (please see attached pages for more detail): - **cumulative effect of road densities and habitat fragmentation in the Gold Creek drainage on resident mammal, bird, fish, and plant populations**	DNRC Response *Detailed information on the existing condition and potential for effects associated with either alternative on road densities and habitat fragmentation are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).* *Information on the existing condition and the sediment delivery risk from road systems to fish habitat is disclosed and assessed in the Fisheries Resources assessment of this EA (Chapter 3 Affected Environment and Environmental Consequences – Fisheries Resources).* *Information on the existing condition and potentials risks from road systems to plant populations is disclosed and assessed in this EA (Chapter 3 Affected Environment and Environmental Consequences – Vegetation).*
2.2	- **general impact of the road system, particularly newly constructed and improved roads**	*Information on the existing condition of project roads is discussed and used to inform risk assessments in the Water Resources and Fisheries Resources assessments. Additionally, the impacts of existing and proposed roads are assessed in the Soil Resources assessment of this EA (Chapter 3 Affected Environment and Environmental Consequences – Fisheries Resources, Aquatic Resources & Geology and Soils).*
2.3	- **identification of core habitat security areas in the Gold Creek drainage and connecting zones among these areas for elk, wolves,**	*Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation,*

	deer, grizzly bear, pine marten, pileated woodpeckers, Williamson's sapsuckers, great grey owls, barred owls, goshawk, interior forest songbirds, among others	*corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. Furthermore, potential effects to big game security habitats are covered in the Big Game Analysis. Additionally, several of the identified species are covered by the coarse filter approach, including pine marten, Williamson' sapsuckers, great grey owls, barred owls, interior forest songbirds. Information on the existing condition and potential effects to northern goshawks is in the Northern Goshawk analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).*
2.4	- **management plans to maintain snags (especially large size and broken tops) and other woody debris**	*The action alternative would adhere to snag requirements outlined in the Montana Department of Natural Resources and Conservation Administrative Rules for Forest Management: (Chapter 3 Affected Environment and Environmental Consequences – Wildlife); See the Administrative rule below as well as attached unit harvest prescriptions in Attachment C.* *36.11.411 BIODIVERSITY - SNAGS AND SNAG RECRUITS* *(1) The department shall retain snags and snag recruits in all harvest units involving live timber, including seed tree removals, fire, and other salvage operations as follows:* *(a) in all timber harvest units post-harvest, the department shall retain an average of approximately two snags and two snag recruits over 21 inches DBH, per acre.;* *(b) in all cases, if snags or recruits over 21 inches DBH are not present, the next largest size snag or recruit shall be retained.;* *(c) retained snags and recruits may be evenly distributed or clumped.;* *(d) if there is an absence of sufficient snags or recruits, some substitution between the two may occur.;* *(e) Cull trees shall qualify as recruits provided they do not contribute to:* *(i) insect and disease problems;* *(ii) pose a human safety issue; or* *(iii) present concerns over dysgenic practices.* *Detailed information on the existing condition and potential for effects to wildlife that use snags and coarse woody debris is in the Snags and Coarse*

		Woody Debris analysis. Furthermore, effects associated with any changes in snags and coarse woody debris are included in the Bald Eagle, Fisher, Flammulated Owl, Pileated Woodpecker, and Northern Goshawk analyses. The potential effects to wildlife species tied to blowdown or windthrown trees is also covered in the Snags and Coarse woody debris analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife). *Several administrative rules and our State Forest Land Management Plan (SFLMP) require mitigation for loss of coarse woody debris (CWD) concentrations because of our timber harvest program. Specifically, ARM 36.11.414 requires adequate coarse woody debris 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. To meet these requirements and to reduce the risk of detrimental loss of CWD concentrations within the project area, the sale contract would include a retention requirement of 5 to 15 tons/acre of coarse and fine woody debris. Further discussion of the existing condition of CWD concentrations within the project area is included in the Soils and Geology analysis. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils)*
2.5	- **management plans to minimize exotic plant invasions**	*Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds).*
2.6	- **impact to recreational and educational opportunities** The value of this land in its undisturbed condition for education, research, recreation, and wildlife habitat far exceeds the fiscal returns that could be accrued from timber harvest—and the value will increase every year as places with old trees become less available. The proximity to Missoula provides opportunities for people to appreciate being in the presence of large trees in a natural setting. Encountering the intrinsic values of this place is special because it is an uncommon experience. We feel this experience far outweighs the monetary value to be achieved from logging and producing yet another section of cutover land that is commonplace in	*Information on the current condition, potential future impacts and mitigations to recreation can be found in this EA (Chapter 3 Affect Environment and Environmental Consequences – Recreation).* *The purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).* *Economics of the action alternative were evaluated in this EA. (Chapter 3 Affected Environment and Environmental Consequences -Economics)*

	the Rocky Mountain west. If our input could be of help to you, we would be happy to participate. We look forward to receiving further communication from DNRC regarding this proposed sale. Thank you for the opportunity to comment. Sincerely, Cathy Ream, PhD 15506 Kendall Creek Rd Clinton, MT 59825 (406) 825-6200 Tarn Ream 1250 Harrison Missoula, MT 59802 Tarn.ream@umontana.edu 406-549-7933	
2.7	<u>Wildlife</u> - **What conservation strategies will DNRC implement to ensure that biological diversity is maintained?** - **How will DNRC meet habitat needs for pileated woodpeckers, sapsuckers, pine marten, grizzly bears, wolves, ungulates, and other wildlife? Are core areas large enough to protect from edge effects and provide security?** - **Are they fragmented by roads? How much down woody debris is in them? How will DNRC quantify current habitat availability for local wildlife populations, and assess current population health in this landscape—is the current habitat enough? Is there justification for removing more habitat?** - **Wildlife require corridors to move from one area to another for foraging, denning, nesting and seasonal habitats. The planning documents for the proposed Goldie Logs Timber Sale should include information on wildlife corridors in the Gold Creek drainage, as well as the habitat quality and size of the corridors.** - **DNRC must disclose whether there have been sightings, nests and/or dens of sensitive, threatened and endangered species in the project area and what is being done to protect them.** - **The EIS for the proposed Goldie Logs Timber Sale must evaluate the impacts of blowdown on forest structure and edge effects.** - **How will this project affect thermal and security cover for elk, mule deer and whitetail deer? How will this project affect moose? Guidelines for elk security are a minimum of 250 acres for providing security under favorable conditions; under less favorable conditions the minimum must be >250 acres. Given the fragmented nature of the Gold**	*DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust 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 similar to those with which Montana wildlife evolved, the full complement of species would persist, and biodiversity would 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 (Lozensky 1997). 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 considers the status for each listed species that may be affected. In the SFLMP, DNRC acknowledged that localized adverse impacts would be expected and accepted within the context of an overall strategy that supports habitat capability for these species. DNRC also recognized that their role in conserving such species was supportive, but subsidiary to the principal role played by Federal agencies with larger land holdings (SFLMP, ROD:31, 1996). Additionally, DNRC manages habitats for threatened and endangered species under the Montana DNRC Forested Trust Lands HCP and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in 2012. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout,*

	Creek drainage, this section of state land has potential for grazing and security for elk, and has been used by a large herd. The 2012 McNamara Landing Timber Sale removed security cover for elk and deer, and it appears that the Goldie Logs Timber Sale may continue this pattern. - **-What is the current total and open road density? How will roads be mitigated? How will roads for the proposed Goldie Logs Timber Sale impact elk, wolves, and grizzly bears? (Also, see 'Roads and Soils' and 'Weeds' section below).** **How will this project contribute to viability of sensitive species? What monitoring will be done for wildlife, birds, and sensitive plants?**	*and Columbia redband trout.* *For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the proposed no-action alternative and each action alternative to determine the foreseeable effects to associated wildlife habitats. If suitable habitat conditions for a particular species exist within any defined DNRC project area, that species is considered as present, thus, local population monitoring is typically not conducted. DNRC reports nests and sightings of sensitive, threatened, and endangered species to MNHP. Information regarding key high use areas or denning sites for threatened and endangered species is sensitive and is typically not published.* *Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).* *Several of the identified species are covered by the coarse filter approach, including pine marten, Williamson' sapsuckers, great grey owls, barred owls, interior forest songbirds. Information on the existing condition and potential effects to northern goshawks is in the Northern Goshawk analysis. Additionally gray wolves, black bears, elk, and deer are covered in the Habitat Fragmentation, Corridors, and Linkage Zone analysis identified earlier as well as the big game section. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).* *Detailed information on the existing condition and potential for effects to wildlife that use snags and coarse woody debris is in the Snags and Coarse Woody Debris analysis. Furthermore, effects associated with any changes in snags and coarse woody debris are included in the Bald Eagle, Fisher, Flammulated Owl, Pileated Woodpecker, and Northern Goshawk analyses. The potential effects to wildlife species tied to blowdown or windthrown trees is also covered in the Snags and*

		Coarse woody debris analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife). *Potential effects to thermal cover and snow intercept for big game species as well as potential effects to big game security habitats are covered in the Big Game Analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).*
2.8	Habitat Fragmentation Habitat fragmentation is considered to be one of the single most important factors leading to loss of native species, particularly in forested landscapes, and the Gold Creek drainage could be the poster child for one of the worst case examples of humans breaking up a continuous habitat into smaller, or non-existent, isolated patches through logging and roadbuilding activities**. Loss of mature forests, simplification of forest structure, decreasing size of forest patches, increasing isolation of patches, disruption of natural fire regimes, and increased road building, have all had negative effects on native biodiversity in the Gold Creek drainage, and we expect DNRC to address these issues as part of the EIS for the proposed Goldie Logs Timber Sale.**	*Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
2.9	Roads and Soils We were and continue to be deeply disturbed by the roadbuilding and 'improvement/maintenance' activities during and after the 2012 McNamara Landing Timber Sale in this state land section. The roads are still a sloppy mess of puddles, mud, soil damage, weeds, and unstable surfaces prone to silty run-off. **How will soils be impacted by the proposed Goldie Logs project? Opening stands will dry them out. How will the proposed sale impact mycorrhizal fungi and other soil organisms? Compaction decreases soil productivity and increases run-off. Will the EIS address these issues? The existing road network in this section is already extensive and unmitigated. Road building increases access. What is the need for 0.5mi of permanent new road construction? Will any roads be decommissioned? Loss of topsoil and its benefits to the forest cannot be recovered. How will soil erosion, and increased sedimentation from road-building activities be mitigated?**	*Impacts to area soils (including physical disturbance, changes in productivity, soil organisms, and local moisture conditions) are expected with the action alternative. The existing conditions of the project area, and mitigations to avoid and minimize these soil risks and effects are described in the Soils and Geology analysis of this EA. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils)* *The risk of impacts to water quality and water yield are described in the Water Resources portion of this EA, and include mitigations found to be effective in avoiding or minimizing water quality impacts. (Chapter 3 Affected Environment and Environmental Consequences – Aquatic Resources).* *The project area does include a network of existing roads and proposed new road construction, temporary road construction, and reconstruction of an existing road. The existing condition and proposed use and maintenance of these roads are described in the Aquatic Resources analysis. The proposed action alternative includes improvement and maintenance of road drainage on existing roads. All roads within the DNRC-owned parcel are*

		gated to public use except for 0.1 miles located in the northwestern corner (see figure in soils analysis) (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils). *The proposed road is construction would reduce skidding distances (and more distributed soil impacts from equipment tracking) during the proposed harvest and anticipated future forest management in the area. The road densities in the project area are not outside what is typical for ground managed for forest management. The roads managed by the DNRC in this parcel are not co-located with streams except for at necessary crossing locations. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils & Aquatic Resources)* *Puddles have been observed after precipitation and snowmelt within drainage structures including at the bottom of rolling dips and water bars and inside ditches. The proposed action would include maintenance and improvement of these drainage structures to boost their effectiveness and design life. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils & Aquatic Resources)* *No roads would be decommissioned with the proposed action, except for the 0.5 miles of new temporary road that would be reclaimed at the end of the project. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils & Aquatic Resources)*
2.10	Cumulative Effects **The EIS must evaluate the cumulative effects of past, present and foreseeable future logging plans in this area on wildlife, and water and habitat quality.**	*Past and ongoing activities on all ownerships, as well as planned future agency actions, have been considered in each cumulative-effects analysis for each wildlife resource topic. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)* *Cumulative effects based on past, present and foreseeable logging are found in the EA under each resource section. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils) (Chapter 3 Affected Environment and Environmental Consequences – Aquatic Resources)*
2.11	Economically Unsuitable Lands In the past, the failure to complete an adequate economic analysis for this section of state land has created an inflated view of the value of logging over	*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. Revenue*

	other positive assets. **The EIS should include an economic analysis that addresses the whole picture, as well as future economic potential.**	*and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. Economics of the action alternative were evaluated in this EA. (Chapter 3 Affected Environment and Environmental Consequences - Economics)*
2.12	<u>Climate Change</u> Climate change is affecting annual average temperatures, length of growing season, and weather patterns, in turn affecting plant growth, stream flows, and forest ecosystems. **The Montana Climate Assessment (MCA) [Found at http://montanaclimate.org/] is an effort to synthesize, evaluate, and share credible and relevant scientific information about climate change in Montana. Moving forward, this information on climate change is a critical piece to developing any plans for future logging activity, and should be addressed in the EIS for the proposed Goldie Logs Timber Sale.**	*Evidence of widespread climate change has been well documented and reported and is an important consideration today (Intergovernmental Panel on Climate Change (IPCC) 2014, 2021, and 2022). In Montana, effects of climate change will be related to changes in temperature and moisture availability, and the response of individual tree species, forests and habitats will be complex and variable, depending local site and stand conditions. Changes in temperature and moisture availability may affect the ability of some tree species to establish and regenerate on some sites. Forest productivity may increase in some areas due to longer growing seasons associated with increased temperature where moisture is not limited but may decrease in other areas where increasing temperature results in decreased water availability (Wade et al. 2017). Drought severity is expected to increase, leading to increases in forest and tree mortality. Changing climate may also lead to changes in the range of some species, resulting in changes in forest composition and distribution (Wade et al. 2017). Given possible changes in the amounts and types of trees and other plants observed in forests, unique vegetation community associations and new climax community types may also begin to appear in the future (Fox 2007). Changing climate is also expected to alter natural disturbance regimes, such as fire and insects, with the resulting effects expected to have greater impact on Montana's forests than changes in temperature and moisture availability that directly affect individual trees and species (Wade et al. 2017). Understanding changes in tree species composition in forests, and the ability of various tree species to thrive under changing climate conditions, may take decades. Predicting possible effects of climate change in forests at local levels is also difficult due to large-scale variables at play, such as possible increases in global evaporation rates, and possible changes in global ocean currents and jet stream. Such outcomes could influence locally observed precipitation amounts and possible influences on natural disturbance regimes (such as changing the average intensity, frequency, and scale of fire events). Normal year to year variation in weather*

		also confounds the ability to identify, understand, predict, and respond to influences of climate change. Given the many variables and difficulty in understanding the ramifications of changing climate, detailed assessment of possible direct, indirect, or cumulative effects of climate change in association with project activities described in this EA is beyond the scope of this analysis. In the face of current uncertainty associated with climate change, DNRC is continuing to manage for biodiversity as guided under the SFLMP. Under the management philosophy of the SFLMP, DNRC will continue to manage for biodiversity using a coarse filter approach that favors an appropriate mix of stand structures and compositions on state lands as described by ARM 36.11.404, while also working to understand relevant ecosystem changes as research findings and changes in climate evolve.
2.13	Weeds Controlling weeds and preventing their spread will be an important issue for the proposed Goldie Logs Timber Sale. Extensive weed infestations from the 2012 McNamara Landing Timber Sale persist and were not controlled. DNRC has done nothing to stop the spread of weeds on roads, cutting units, landings, and burn piles in this section of state land. **What is the weed plan for this proposed project?**	*Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds)*
2.14	Costs **DNRC must track the costs expended to plan and implement this timber sale, as well as to mitigate post logging insult to the ecosystem (such as weeds, slash, roads, etc.).** Without this information it cannot accurately determine whether revenue is being generated for the school trust.	*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. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. Economics of the action alternative were evaluated in this EA. (Chapter 3 Affected Environment and Environmental Consequences - Economics)*
3.1	Vicki Watson 12/29/2020 Via e-mail MT Department of Natural Resources and Conservation, Missoula Unit Attention: Scott Allen Dear Mr. Allen: I was concerned to learn from the Gold Creek Resource Protection Association that a timber sale is being	DNRC Response *Detailed information on the existing condition and potential for effects associated to Threatened, Endangered, and Sensitive Plants can be referenced in (Chapter 3 Affected Environment and Environmental Consequences – Vegetation – Threatened, Endangered, and Sensitive Plants).* *DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of*

	considered in an area in the Gold Creek drainage that contains some of the last remaining, little disturbed low elevation forest in that area**. Clearly such an area is important wildlife habitat – and may include rare plants.** The area also has tremendous educational value since it is near Missoula. I have led field trips for University of Montana classes to that area in the past. The area in question is in Section 36 of T14N, R17W -- and I believe that the proposed timber sale is referred to as the GoldieLogs Timber Sale.	*stand structures and compositions on state trust lands (ARM 36.11.404). Within this framework, detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis. Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)* *Detailed information on the existing condition and potential for effects to wildlife that use snags and coarse woody debris is in the Snags and Coarse Woody Debris analysis. Furthermore, effects associated with any changes in snags and coarse woody debris are included in the Bald Eagle, Fisher, Flammulated Owl, Pileated Woodpecker, and Northern Goshawk analyses. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
3.2	**Given the value of this area for wildlife habitat, research & education, a change as drastic as a timber sale should necessitate the preparation of an Environmental Impact Statement. The EIS could consider a meaningful range of alternatives and the potential impacts of roads, habitat fragmentation, introduction of weeds, loss of snags, etc on the diverse populations of birds, small & large mammals and rare plants in the area. Mitigation of those impacts should also be discussed.** Thank you for considering the comments, and I hope to hear that a full EIS is going to be prepared on this proposed sale. Vicki Watson, 509 Daly, Missoula, MT	*The purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).* *DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Within this framework, detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis). Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)* *Detailed information on the existing condition and potential for effects associated to Threatened, Endangered, and Sensitive Plants can be referenced in (Chapter 3 Affected Environment and Environmental Consequences – Vegetation – Threatened, Endangered, and Sensitive Plants).* *According to the Guide to the Montana Environmental Policy Act, the level of environmental review conducted for a project is*

		based on the significance of the potential impacts of the agencies actions. Additionally, DNRC's Administrative Rules for MEPA (ARM 36.2.524) state that the agency is required to consider a list of criteria in determining the significance of impacts and to develop an EIS when issues related to the project are likely to involve significant impacts to the human environment. Through extensive field work and careful consideration of public comments and of the significance criteria, the ID Team recommended that an Environmental Assessment (EA) would provide adequate analysis for this project because it is expected that impacts would be below the level of significance once resource mitigation measures are applied. *Ultimately, the Decision Maker determines if a higher level of environmental review, such as an EIS, is necessary based on the recommendation of the ID team and whether the issues related to the proposed action would likely involve any significant impacts to the human environment.*
4.1	Cindy Miller 12/29/2020 Via e-mail Hello Scott Allen, I just found out about the timber sale on state trust land in the Gold Creek drainage of the Blackfoot River outside Missoula. **I would like to receive more information about the sale as I have recreated on this land and would like to keep apprised of the situation. I am very concerned about the effect the sale would have on the wildlife, habitat and ecosystem.**	DNRC Response *Informational updates about the project as well as this EA were sent to Cindy Miller, as requested in her letter.* *A detailed description of the proposed action alternative can be found (Chapter 2 Alternatives - Description of the Action Alternative)* *Detailed information on the existing condition and potential for effects associated with either alternative to forest structure and composition and associated generalized effects on wildlife habitats can be found in the coarse filter section Existing conditions and potential effects to any of the Threatened, Endangered, or sensitive species that could reasonably occur in the project area are contained in the Fine Filter Section. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
4.2	**I am aware that weeds from the 2012 logging project still persist and am concerned about the further spread of noxious weeds.** Roads that they created were not closed as planned and more timber was taken than what was marked to be harvested. I strongly believe that the value of the land in its undisturbed condition far exceeds the fiscal returns that could be accrued from the timber harvest. Thank you in advance for your consideration. Cindy Miller	*Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds)*

5.1	Catriona Simms 12/30/2020 Via e-mail Dear Mr. Allen, I have just learned about this proposed timber sale on state trust land in the Gold Creek drainage on the Big Blackfoot River, just outside of Missoula, Montana. **Since like many others, I have hiked and birdwatched and really loved this unspoiled forested land for a number of years, this plan concerns me greatly and I would like to be kept appraised about whatever is going on.**	DNRC Response *Informational updates about the project as well as this EA were sent to Catriona Simms, as requested in her letter.* *A detailed description of the proposed action alternative can be found (Chapter 2 Alternatives - Description of the Action Alternative)*
5.2	**This area provides a large, unbroken stand of mature forest and thus has extremely high wildlife values as it creates breeding habitat for elk, whitetail and mule deer, grizzly bear, wolves and numerous bird species.**	*DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Within this framework, detailed information on the existing condition and potential for effects associated with either alternative on habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)* *Detailed information on the existing condition and potential effects to grizzly bears is covered in the Grizzly Bear analysis. Furthermore, the Habitat Fragmentation, Corridors, and Linkage Zone analysis also covers large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Additionally, the Big Game analysis covers big game thermal cover and snow intercept, winter range capacity, and security habitats. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
5.3	**I am also concerned that this new project will result in further spread of noxious weeds, as has happened since the 2012 logging project.** The value of this land in it's undisturbed condition for education, research, recreation in addition to wildlife habitat far outweighs the fiscal returns that could be gained from timber harvest. Please consider these reasons to preserve the land in its present state and keep me posted about any plans for future logging. Sincerely, Catriona Simms	*Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds)*

	910 Ronald Ave. Missoula, MT 59801 (406)370-0702	
6.1	David Atkins 1/2/2021 Via e-mail Hi Scott, The following comments are being submitted for consideration to be addressed in your Environmental Assessment Report. For context I have proximate interest in this project. My wife and I own a quarter section one mile to the west of this sale. We have thinned and piled and burned ~75 acres and we have another 23 acres we will be thinning this next field season. We are working with grant funds from the Blackfoot Challenge and have broadcast burned 6 acres and plan for another ~45 acres this spring or fall depending on the weather burn windows. Wildlife habitat and wildfire risk reduction are some of our primary objectives with these treatments. 1. Your proposal indicates a shelterwood harvest and Individual Tree Selection. **I think a shelterwood with a prescribed burn under it would be very desirable to help regenerate larch, which are abundant in the overstory on many parts of this section. I really encourage you to implement a prescribed underburn after the harvest to achieve the best hazardous fuel reduction possible AND to favor larch regeneration.** Our land was previously corporate ownership and they implemented a larch shelterwood but failed to underburn or create adequate site preparation and therefore the larch regeneration is scarce even though it is the dominant overstory seed trees. Thus I strongly encourage the underburn to achieve the desired site preparation. It will also clean up the fine fuels that feed wildfire spread.	DNRC Response *The objectives identified in Chapter 1 Purpose and Need for Action coincide with the issues identified; Reducing fuel loading and the likelihood of a stand replacing fire: as well as the identified need; Both natural and human caused disturbance encourages regeneration of early successional or seral tree species. The stands within the project area lack the seral species regeneration of western larch (Larix occidentalis and Ponderosa pine (Pinus ponderosa) that is necessary to maintain and promote the DNRC defined desired future condition (DFC). The purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).*
6.2	2. **I encourage the marking of leave trees to vary in density from seed tree, light shelterwood to heavy shelterwood across the units to mimic wildfire behavior. I also hope you plan to retain the overstory trees throughout most or all of the next rotation as these trees are important seed sources that will be much more likely to survive a wildfire in the next 50-100 years.** They will also provide important wildlife habitat, serving vertical structural diversity and they will provide future high value wood product logs.	*The action alternative silvicultural prescriptions can be referenced in Attachment C. According to ARM (Administrative Rules for Montana) 36.11.408 BIODEVERSITY _ SELECTION OF SILVICULTURAL SYSTEMS (1) Selection of silvicultural systems shall typically be based on natural disturbance regimes. The three predominant regimes are: (a) stand-replacement fire (b) mixed severity fire; and (c) non-lethal fire. The attached silvicultural prescriptions for the action alternative can be referenced in Attachment C. Large, dominant PP and WL would be preferred*

		for leave trees, to aid in the recruitment of old growth in the future. (see full unit prescriptions)
6.3	**3.** The harvest and burn would be a good emulation of a mixed severity wildfire which the wildlife species have evolved with. We have elk, deer, bear, bobcats, and an abundance of birds throughout the property including in the recently treated areas. **It is important to retain as many snags as safety will allow and large (>6" diameter on the small end) woody debris which helps support small rodents, insects and the food chain that relies on them. Leaving scattered green trees with broken tops/forks or signs of fungus will be good for future snag retention and coarse woody debris recruitment.**	*The action alternative silvicultural prescriptions can be referenced in Attachment C. The action alternative would adhere to snag requirements outlined in the Montana Department of Natural Resources and Conservation Administrative Rules for Forest Management:* *36.11.411 BIODIVERSITY - SNAGS AND SNAG RECRUITS* *(1) The department shall retain snags and snag recruits in all harvest units involving live timber, including seed tree removals, fire, and other salvage operations as follows:* *(a) in all timber harvest units post-harvest, the department shall retain an average of approximately two snags and two snag recruits over 21 inches DBH, per acre.;* *(b) in all cases, if snags or recruits over 21 inches DBH are not present, the next largest size snag or recruit shall be retained.;* *(c) retained snags and recruits may be evenly distributed or clumped.;* *(d) if there is an absence of sufficient snags or recruits, some substitution between the two may occur.;* *(e) Cull trees shall qualify as recruits provided they do not contribute to:* *(i) insect and disease problems;* *(ii) pose a human safety issue; or* *(iii) present concerns over dysgenic practices.*
6.4	**4.** I have been working with TNC, other neighbors, the BLM and USFS to create a series of treatments across this landscape that will use the results of Mark Finney and others research that shows treatments of 200-400 acres in patches across the landscape representing 25-35% of the landscape can significantly reduce the risk of large high severity wildfire effects and provide anchors for wildfire suppression managers to conduct burnout operations and have crews work in a safer environment. This proposal would be another good piece of treatment to fit into this landscape scale pattern. The combination of harvest with prescribed burning has been shown to be very effective in modifying wildfire behavior. We are submitting a proposal to the current RFP to implement the Forest Action Plan. **This sale would be an important contributor to this set of treatments across multiple ownership boundaries.**	*Thanks for your support, the purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).*
6.5	**5.** Generating revenue for the school trust is an important goal and that was what the lands were allocated to the state to achieve. There is no reason why this sale can't generate good revenues while also meeting wildfire and wildlife habitat goals. **The**	*Thanks for your support, the purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).*

	recent Forest Action Plan Strategy talks specifically to these goals and this sale can contribute to the landscape scale objectives discussed in the plan.	
6.6	**6. I encourage the state to do some prophylactic weed treatments before the harvest and burning to reduce those activities from spreading the weeds further.** I have been doing a combination of prophylactic and post-harvest treatment of weeds on my property as well as my neighbors. This is another situation where we need cross boundary collaboration to achieve greater effectiveness. Don't hesitate to call me with any questions or clarifications of intent from these comments. Thank you for your hard work to integrate multiple values across state lands. -- Dave Atkins Forester/Forest Ecologist 406-396-7779 cell mt4stree@gmail.com	*Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds)*
7.1	Nancy Braun 1/3/2021 Via e-mail I am a resident of Missoula and I have spent many happy times skiing, hiking, mountain biking, birdwatching, searching for animal tracks and simply enjoying the Gold Creek area. I have recently become aware of a possible timber sale- the Goldie Logs project. I am very concerned about the detrimental effects this sale would have on this area. This area has already been so horribly degraded, I hate to see more. We need to keep what is left of our mature forests. **I am always dismayed to see the amount of weeds on the previously logged areas, and would worry about the spread of more invasive plants.**	DNRC Response *Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds)*
7.2	**I worry that the elk, deer, bear, birds and the huge variety of other wildlife populations will suffer and their habitats become more fragmented.**	*DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Within this framework, detailed information on the existing condition and potential for effects associated with either alternative to forest structure and composition and associated generalized effects on wildlife habitats can be found in the coarse filter section. Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage*

		Zone analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife) *Detailed information on the existing condition and potential effects to grizzly bears is covered in the Grizzly Bear analysis. Furthermore, the Habitat Fragmentation, Corridors, and Linkage Zone analysis also covers large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Additionally, the Big Game analysis (page XYZ) covers big game thermal cover and snow intercept, winter range capacity, and security habitats. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
7.3	**Will an EIS be prepared?** **I would like to request more information about this proposed sale.** I am looking forward to knowing more, and then submitting additional comments. Thank you! Nancy Braun 682 North Ave. West Missoula, Montana 59801 406-728-6846	*According to the Guide to the Montana Environmental Policy Act, the level of environmental review conducted for a project is based on the significance of the potential impacts of the agencies actions. Additionally DNRC's Administrative Rules for MEPA (ARM 36.2.524) state that the agency is required consider a list of criteria in determining the significance of impacts and to develop an EIS when issues related to the project are likely to involve significant impacts to the human environment. Through extensive field work and careful consideration of public comments and of the significance criteria, the ID Team recommended that an Environmental Assessment (EA) would provide adequate analysis for this project because it is expected that impacts would be below the level of significance once resource mitigation measures are applied.* *Ultimately, the Decision Maker determines if a higher level of environmental review, such as an EIS, is necessary based on the recommendation of the ID team and whether the issues related to the proposed action would likely involve any significant impacts to the human environment.*
8	Spencer Bradford 1/4/2021 Via e-mail I am emailing to voice a public comment against the Goldilogs Project in Gold Creek. **Gold Creek needs restoration efforts from DNRC, not more logging.** Plum Creek did a disservice the landscape and watershed back there. Please leave one of the only sections that hasn't been industrially harvested in the last 30 years intact.	DNRC Response *The purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).*
9	Matt Arno 1/4/2021 Via e-mail	DNRC Response 1/5/2021 Via e-mail

	Hi Scott, Thank you for the opportunity to comment on your proposed Gold Creek project. Your scoping letter did not provide a silvicultural prescription. **In the upper portion of the previous logged unit it looks like there is a sample area marked with orange paint on PP and larch and purple paint on DF. If orange is cut and purple is leave the majority of the larger healthiest PP and larch will be left and you will be cutting the majority of the overstory DF. If that is the prescription, I support your proposed project. If I am misinterpreting your prescription please notify me. The previous project resulted in untreated weed infestations along some of the roads and in most of the landings. Efforts to keep these weeds from spreading throughout the forest should be implemented in your proposed project.** Thank you, Matt Arno 7790 Gold Creek Rd. 244-6265	*Matt,* *Thank you for your comments, they will be incorporated into the analysis.* *The DNRC plans to analyze for the impacts of noxious weeds.* *You are correct about the 2-color paint scheme in the sample area. Note: "marked to leave" species are only marked if they are of sawlog size. Sub-merch leave trees are not marked. The project is still in the development phase, and this sample area will be used as a tool during the analysis.* *The following is how I plan to mark the proposed sale. The marked portion I believe you are referring to, is also marked using these specifications. I use this to help me visualize harvest prescriptions for my environmental analysis. Because this is simply a tool used for visualization, there may be "holes" or unfinished portions within the small marked area.* *The marking specs would be as follows:* - *Red three stripe with flagging – section line boundary* - *Orange two dot with flagging – SMZ (streamside management zone) boundary* - *Orange stripe at breast height within the SMZ – cut/harvest tree* - *Blue three stripe with flagging – harvest unit boundary* *CUT/LEAVE by species* *<u>Western larch and ponderosa pine– Marked to cut</u>* - *Orange stripe at breast height – cut/harvest tree* - *No mark on tree – leave tree* *<u>All other species >8" diameter at breast height (DBH)</u>* *<u>Douglas-fir, Engelmann spruce, lodgepole pine, subalpine fir, and may include others</u>* - *Blue stripe at breast height – leave tree* - *No mark on tree – cut/harvest tree* *Tree selection would be based primarily on an individual tree selection prescription (ITS). Leave tree selection would be based on the phenotypical attributes of the tree, as well as the known proximity to insects and disease. For example, a Douglas-fir exhibiting a healthy looking top may be designated for harvest if it is in close proximity to a tree infested with Douglas-fir bark beetles. Early seral species that were historically dependent on fire for*

		disturbance and regeneration such as western larch and ponderosa pine would be preferred for leave trees, however some healthy uninfected Douglas-fir wouldl also be left to maintain some diversity. The DBH of leave trees would be representative of the current stand conditions, with more emphasis on the health and vigor of the individual tree than the DBH. Leave trees would be spaced at distances somewhat relative to their inverse DBH class and canopy size. Meaning: Larger trees spaced at further distances than smaller trees, this is to promote natural regeneration of shade intolerant, early seral species. *Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Weeds)*
10	Weyerhauser 1/4/2021 Via e-mail Scott Allen DNRC-Missoula Unit 3206 Maverick Lane Missoula, MT 59804 Dear Mr. Allen, This letter is in support of the Goldielogs Timber Sale proposal. The project description outlined in your Initial Proposal letter describes the need for the project to salvage bark beetle infestation and root rot infection, the need to improve stand diversity and the methods to achieve the desired future condition. Fuels reduction, forest health improvement, timber salvage and the sale of forest products are critical for school trust lands. Weyerhaeuser operates three manufacturing facilities located in Northwest Montana and employs approximately 600 people. Logs from Department of Natural Resource and Conservation projects are an important source of raw materials for our operations. Specifically, the opportunity to purchase logs produced from the Goldielogs Timber Sale is important to our fiber supply to help sustain our manufacturing businesses. Weyerhaeuser hopes that any decision made regarding the implementation of this project will	DNRC Response 1/4/2021 Via e-mail *Thank you for your comments, they will be incorporated into the analysis.* *Scott Allen-Management Forester* *DNRC-Missoula Unit* *3206 Maverick Lane* *Missoula, MT 59804* *Sallen@mt.gov*

	consider its importance to our employees and their respective communities. Thank you for your consideration. Sincerely, Jared Richardson, CF Montana Raw Material Manager	
11.1	Friends of the Wild Swan 1/4/2021 Via e-mail Department of Natural Resources and Conservation, Missoula Unit Attn: Scott Allen 3206 Maverick Lane Missoula, MT 59804 Via e-mail to: SAllen@mt.gov Mr. Allen, Please accept the following comments on the proposed Goldielogs Timber Sale on behalf of Friends of the Wild Swan. The Environmental Impact Statement for this project must address the following issues: • **Identify and map old-growth forest habitat in the project area (preferably with an aerial photograph map). Where does old growth currently exist on the forest? How is it connected? How will connectivity be maintained or improved?** These were recommendations of the Technical Review Committee of scientists that were hired by DNRC. (Pfister et al 2000) Realizing that existing old-growth stands do not last forever, there must be a provision for putting stands on longer rotations so that habitat is connected. Existing old-growth stands must be put on longer rotations so that this component of the forest is retained. Other stands should be put on long rotations so that they develop old-growth characteristics and are able to replace existing old growth. These are not “reserves” but long rotations.	DNRC Response *Old growth forest that meets the definition of Green et al. (1992) are not present in the project area. As such, the issue was dismissed from further analysis (Chapter 3 Affected Environment and Environmental Consequences - Vegetation).*
11.2	**The EIS must analyze what the effects of logging will be on existing and recruitment old growth forest habitat, riparian areas, wetlands and other habitats both in terms of blowdown and other effects on the forest itself as well as on old-growth dependent wildlife**.	*Old growth forest that meets the definition of Green et al. (1992) are not present in the project area. As such, the issue was dismissed from further analysis (Chapter 3 Affected Environment and Environmental Consequences - Vegetation).* *Detailed information on the existing condition and potential for effects associated with either alternative on wildlife species that rely on old*

		growth and riparian areas are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis. Additionally, the existing condition and potential for effects associated with either alternative on wildlife species that rely on blowdown are covered in the Snags and Coarse Woody Debris section. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)
11.3	**Are there sufficient snags and down woody material? If not, what can be done to restore these attributes?** The project must demonstrate compliance with ARM 36.11.407 so that the amount and distribution of old growth forest habitat is within the historic range, not just at the low threshold.	*Detailed information on the existing condition and potential for effects associated with either alternative on snags can be found (*Chapter 3 Affected Environment and Environmental Consequences – Wildlife) *Detailed information on the existing condition and potential for effects associated with either alternative on course woody debris can be found (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils)*
11.4	• Wildlife require corridors to move for foraging, denning, nesting and seasonal habitats. **The EIS must disclose: Where are these corridors? What is the habitat quality in them? What size are they? Are they wide enough to protect from edge effects and provide security? Are they fragmented by roads or past logging units? How much canopy cover, thermal cover or hiding cover is in them? How much down woody debris is in them? What type of habitat is considered suitable?**	*Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Additionally, the Big Game analysis covers big game thermal cover and snow intercept, winter range capacity, and security habitats. The existing condition and potential for effects associated with either alternative on wildlife species that rely on blowdown are covered in the Snags and Coarse Woody Debris section. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
11.5	Once these questions have been answered then the project must ensure that adequate habitat linkages are delineated and protected. This is especially important in the project area due to the fragmented habitat. Corridors of interior forest habitat between old growth habitat have been recommended by the old growth Technical Review Team, and they recommend a minimum width of >100 meters**. Do you have any actual width criteria you are using at present to define corridors in the project area? DNRC needs to map all corridor habitat in the project area, and define both current and long term objectives for maintaining these corridors over time.**	*DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which Montana wildlife evolved, the full complement of species would persist, and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that*

	DNRC must disclose whether there have been sightings, nests and/or dens of sensitive, threatened and endangered species in the project area and what is being done to protect them.	*approximate historic conditions across the landscape (Lozensky 1997). DNRC cannot assure that the coarse-filter approach would 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 considers the status for each listed species that may be affected. In the SFLMP, DNRC acknowledged that localized adverse impacts would be expected and accepted within the context of an overall strategy that supports habitat capability for these species. DNRC also recognized that their role in conserving such species was supportive, but subsidiary to the principal role played by Federal agencies with larger land holdings (SFLMP, ROD:31, 1996).* *For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the proposed no-action alternative and each action alternative to determine the foreseeable effects to associated wildlife habitats. If suitable habitat conditions for a particular species exist within any defined DNRC project area, that species is considered as present, thus, local population monitoring is typically not conducted. DNRC reports nests and sightings of sensitive, threatened, and endangered species to MNHP. Information regarding key high use areas or denning sites for threatened and endangered species is sensitive and is typically not published.* *Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
11.6	**The EIS must evaluate the impacts of blowdown on forest structure and edge effects.**	*According to the Guide to the Montana Environmental Policy Act, the level of environmental review conducted for a project is based on the significance of the potential impacts of the agencies actions. Additionally DNRC's Administrative Rules for MEPA (ARM 36.2.524) state that the agency is required consider a list of criteria in determining the significance of impacts and to develop an EIS when issues related to the project are likely to involve significant impacts to the human environment. Through extensive field work*

		and careful consideration of public comments and of the significance criteria, the ID Team recommended that an Environmental Assessment (EA) would provide adequate analysis for this project because it is expected that impacts would be below the level of significance once resource mitigation measures are applied. *Ultimately, the Decision Maker determines if a higher level of environmental review, such as an EIS, is necessary based on the recommendation of the ID team and whether the issues related to the proposed action would likely involve any significant impacts to the human environment.* *Detailed information on the current condition and potential effects on forest structure can be found in the EA (Chapter 3 Affected Environment and Environmental Consequences – Vegetation & Wildlife).*
11.7	**Has DNRC defined how much deer and elk winter range needs to be maintained over time on this landscape to maintain stable big game populations? What are your management goals for big game summer and winter range? Do you have any limitations on the amount of big game winter or summer range that you can remove over a given period of time?**	*Detailed information on the existing condition and potential for effects associated with either alternative on big game thermal cover and snow intercept, winter range capacity, and security habitats are covered in the Big Game Analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
11.8	**Where is the current lynx foraging and denning habitat located? How will it be maintained, how will it be improved, how is it connected? How will it be impacted by this project? What are the effects to critical habitat for lynx? Will it be adversely modified? Lynx avoid clearcuts, will this project expand clearcuts and negatively impact lynx? Winter foraging habitat is limited – how much is there? Where is it?**	*Detailed information on the existing condition and potential for effects associated with either alternative on Canada lynx are covered in the Canada lynx analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
11.9	**What is the current total and open road density? Will new roads be built? Will roads be decommissioned? How will the current and future road densities impact wildlife?**	*A detailed description of the proposed action alternative can be found (Chapter 2 Alternatives - Description of the Action Alternative)* *Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. (Chapter 3 Affected Environment and*

		Environmental Consequences - Wildlife)
11.10	**How will this project contribute to viability of sensitive species?**	*DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which Montana wildlife evolved, the full complement of species would persist, and biodiversity would 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 (Lozensky 1997). 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 considers the status for each listed species that may be affected. In the SFLMP, DNRC acknowledged that localized adverse impacts would be expected and accepted within the context of an overall strategy that supports habitat capability for these species. DNRC also recognized that their role in conserving such species was supportive, but subsidiary to the principal role played by Federal agencies with larger land holdings (SFLMP, ROD:31, 1996).* *For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the proposed no-action alternative and each action alternative to determine the foreseeable effects to associated wildlife habitats. If suitable habitat conditions for a particular species exist within any defined DNRC project area, that species is considered as present, thus, local population monitoring is typically not conducted.* *Generally, within the fine filter section, sensitive species which could potentially be found in the area and/or have potential habitat in the area are addressed. Detailed information on the existing condition and potential for effects associated with either alternative on bald eagles, fisher, flammulated owls, peregrine falcons, pileated woodpeckers, and northern goshawks are included in the analysis. (Chapter 3 Affected Environment and Environmental Consequences -*

		Wildlife)
11.11	**What monitoring will be done for wildlife? fish? old-growth dependent wildlife? sensitive plants? other? What past monitoring has been done to determine whether the proposed treatments actually achieve the desired results?**	*For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the proposed no-action alternative and each action alternative to determine the foreseeable effects to associated wildlife habitats. If suitable habitat conditions for a particular species exist within any defined DNRC project area, that species is considered as present, thus, local population monitoring is typically not conducted. DNRC reports nests and sightings of sensitive, threatened, and endangered species to MNHP. Information regarding key high use areas or denning sites for threatened and endangered species is sensitive and is typically not published.*
11.12	Habitat fragmentation is generally defined as the process of subdividing a continuous habitat type into smaller patches, which results in the loss of original habitat, reduction in patch size, and increasing isolation of patches. (Heilman et al. 2002) **This project must reduce fragmentation and edge effects and increase patch size and core areas. Past management through even-aged silvicultural prescriptions have contributed to the fragmentation of forest habitat to the detriment of many bird and wildlife species.** Large and small openings should be allowed to be created through natural processes rather than clearcut logging.	*The action alternative silvicultural prescriptions can be referenced in Attachment C.* *Detailed information on the existing condition and potential for effects associated with either alternative on habitat fragmentation is covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
11.13	**How will soils be impacted by this project? Opening up stands will dry them out, how will this impact mychorizal fungi and other soil organisms? How much soil damage is there? Does DNRC have a standard for soil disturbance?** No new roads should be built, not even temporary roads. Roads fragment habitat and increase mortality for wildlife such as elk, grizzly bear and lynx. Roads degrade stream habitat for fish. Roads take acres out of the timber-growing base.	*Impacts to area soils (including physical disturbance, changes in productivity, soil organisms, and local moisture conditions) are expected with the action alternative. The existing conditions of the project area, and mitigations to avoid and minimize these soil risks and effects are described in the Soils and Geology analysis of this EA. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils)* *DNRC standards for soil disturbance are found in DNRC's State Forest Land Management Plan (DNRC, 1996)*
11.14	**Roads, even temporary roads, have negative impacts on wildlife and fish habitat including:** **a. The greatest surface erosion from roads occurs during the construction phase and first year after.** **b. Soil erosion and compaction (as always occurs with roads) causes long-term loss of soil productivity.** **c. The loss of topsoil and attendant loss of soil productivity is permanent.**	*When planning transportation systems, DNRC is instructed to plan for the minimum number of road miles (ARM 36.11.421[1]). DNRC occasionally needs to construct additional roads in order to access timber stands for management. As described in ARM 36.11.422, DNRC shall implement all applicable BMPs on existing roads proposed for use and on all new road construction, including temporary roads. A historical road that is*

	d. Road obliteration does not immediately stop severely elevated soil erosion from roads. **e. Even "temporary" roads have enduring impacts on aquatic resources.** **f. Roads and increased sedimentation cause long-term negative impacts on a variety of aquatic species.**	*causing resource damage is prioritized for corrective actions to lessen or eliminate its negative impacts. The action alternative attempts to minimize the miles of proposed road construction needed to meet project goals. The temporary roads proposed under the action alternative would be reclaimed upon completion of use for this project. (Chapter 3 Affected Environment and Environmental Consequences – Geology and Soils)*
11.15	**The Environmental Impact Statement must evaluate the cumulative effects of past, present and foreseeable future logging plans in this area. There have been numerous timber sales in the project area over the past years. This EIS must include the cumulative effects of those projects on wildlife, fish, and water quality**.	*According to the Guide to the Montana Environmental Policy Act, the level of environmental review conducted for a project is based on the significance of the potential impacts of the agencies actions. Additionally DNRC's Administrative Rules for MEPA (ARM 36.2.524) state that the agency is required consider a list of criteria in determining the significance of impacts and to develop an EIS when issues related to the project are likely to involve significant impacts to the human environment. Through extensive field work and careful consideration of public comments and of the significance criteria, the ID Team recommended that an Environmental Assessment (EA) would provide adequate analysis for this project because it is expected that impacts would be below the level of significance once resource mitigation measures are applied.* *Ultimately, the Decision Maker determines if a higher level of environmental review, such as an EIS, is necessary based on the recommendation of the ID team and whether the issues related to the proposed action would likely involve any significant impacts to the human environment.* *Past and ongoing activities on all ownerships, as well as planned future agency actions, have been considered in each cumulative-effects analysis for each wildlife resource topic. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)* *The water resources portion of this analysis evaluates the existing condition and the anticipated effect of the proposed action. The conditions that exist within the project area and analysis watersheds are assumed to be ongoing for the foreseeable future. For example the DNRC Trust Lands will continue to be managed primarily for sustained forestry production. (Chapter 3 Affected Environment and Environmental Consequences – Aquatic Resources)* *The fisheries resources portion of this analysis assess the existing condition and the proposed effects of the action on fisheries resources.*

		(Chapter 3 Affected Environment and Environmental Consequences – Fisheries Resources)
11.16	• Climate change is happening, it is affecting plant growth, stream flows, forests and weather patterns and it will intensify. Neither DNRC's Administrative Rules for Forest Management and Streamside Management nor the Habitat Conservation Plan for listed species fully considers the impacts of climate change. Past conditions will not predict the future in the wake of climate change. **The Montana Climate Assessment (MCA) [Found at http://montanaclimate.org/] is an effort to synthesize, evaluate, and share credible and relevant scientific information about climate change in Montana. It must be considered in development of this project.** Following are key messages and conclusions: KEY MESSAGES * Annual average temperatures, including daily minimums, maximums, and averages, have risen across the state between 1950 and 2015. The increases range between 2.0-3.0°F (1.1-1.7°C) during this period. [high agreement, robust evidence] * Winter and spring in Montana have experienced the most warming. Average temperatures during these seasons have risen by 3.9°F (2.2°C) between 1950 and 2015. [high agreement, robust evidence] * Montana's growing season length is increasing due to the earlier onset of spring and more extended summers; we are also experiencing more warm days and fewer cool nights. From 1951-2010, the growing season increased by 12 days. In addition, the annual number of warm days has increased by 2.0% and the annual number of cool nights has decreased by 4.6% over this period. [high agreement, robust evidence] * Despite no historical changes in average annual precipitation between 1950 and 2015, there have been changes in average seasonal precipitation over the same period. Average winter precipitation has decreased by 0.9 inches (2.3 cm), which can mostly be attributed to natural variability and an increase in El Niño events, especially in the western and central parts of the state. A significant increase in spring precipitation (1.3-2.0 inches [3.3-5.1 cm]) has also occurred during this period for the eastern portion of the state. [moderate agreement, robust evidence] * The state of Montana is projected to continue to warm in all geographic locations, seasons, and under all emission scenarios throughout the 21st century. By mid	*Evidence of widespread climate change has been well documented and reported and is an important consideration today (Intergovernmental Panel on Climate Change (IPCC) 2014, 2021 and 2022). In Montana, effects of climate change will be related to changes in temperature and moisture availability, and the response of individual tree species, forests and habitats will be complex and variable, depending local site and stand conditions. Changes in temperature and moisture availability may affect the ability of some tree species to establish and regenerate on some sites. Forest productivity may increase in some areas due to longer growing seasons associated with increased temperature where moisture is not limited but may decrease in other areas where increasing temperature results in decreased water availability (Wade et al. 2017). Drought severity is expected to increase, leading to increases in forest and tree mortality. Changing climate may also lead to changes in the range of some species, resulting in changes in forest composition and distribution (Wade et al. 2017). Given possible changes in the amounts and types of trees and other plants observed in forests, unique vegetation community associations and new climax community types may also begin to appear in the future (Fox 2007). Changing climate is also expected to alter natural disturbance regimes, such as fire and insects, with the resulting effects expected to have greater impact on Montana's forests than changes in temperature and moisture availability that directly affect individual trees and species (Wade et al. 2017). Understanding changes in tree species composition in forests, and the ability of various tree species to thrive under changing climate conditions, may take decades. Predicting possible effects of climate change in forests at local levels is also difficult due to large-scale variables at play, such as possible increases in global evaporation rates, and possible changes in global ocean currents and jet stream. Such outcomes could influence locally observed precipitation amounts and possible influences on natural disturbance regimes (such as changing the average intensity, frequency, and scale of fire events). Normal year to year variation in weather also confounds the ability to identify, understand, predict, and respond to influences of climate change. Given the many variables and difficulty in understanding the ramifications of changing climate, detailed assessment of possible direct, indirect, or cumulative effects of climate change in*

	century, Montana temperatures are projected to increase by approximately 4.5-6.0°F (2.5-3.3°C) depending on the emission scenario. By the end-of-century, Montana temperatures are projected to increase 5.6-9.8°F (3.1-5.4°C) depending on the emission scenario. These state-level changes are larger than the average changes projected globally and nationally. [high agreement, robust evidence] * The number of days in a year when daily temperature exceeds 90°F (32°C) and the number of frost-free days are expected to increase across the state and in both emission scenarios studied. Increases in the number of days above 90°F (32°C) are expected to be greatest in the eastern part of the state. Increases in the number of frost-free days are expected to be greatest in the western part of the state. [high agreement, robust evidence] * Across the state, precipitation is projected to increase in winter, spring, and fall; precipitation is projected to decrease in summer. The largest increases are expected to occur during spring in the southern part of the state. The largest decreases are expected to occur during summer in the central and southern parts of the state. [moderate agreement, moderate evidence]	*association with project activities described in this EA is beyond the scope of this analysis. In the face of current uncertainty associated with climate change, DNRC is continuing to manage for biodiversity as guided under the SFLMP. Under the management philosophy of the SFLMP, DNRC will continue to manage for biodiversity using a coarse filter approach that favors an appropriate mix of stand structures and compositions on state lands as described by ARM 36.11.404, while also working to understand relevant ecosystem changes as research findings and changes in climate evolve.*
11.17	**This EIS must fully evaluate whether logged areas will regenerate and how changes in precipitation patterns affect streams.**	*According to the Guide to the Montana Environmental Policy Act, the level of environmental review conducted for a project is based on the significance of the potential impacts of the agencies actions. Additionally DNRC's Administrative Rules for MEPA (ARM 36.2.524) state that the agency is required consider a list of criteria in determining the significance of impacts and to develop an EIS when issues related to the project are likely to involve significant impacts to the human environment. Through extensive field work and careful consideration of public comments and of the significance criteria, the ID Team recommended that an Environmental Assessment (EA) would provide adequate analysis for this project because it is expected that impacts would be below the level of significance once resource mitigation measures are applied.* *Ultimately, the Decision Maker determines if a higher level of environmental review, such as an EIS, is necessary based on the recommendation of the ID team and whether the issues related to the proposed action alternative would likely involve any significant impacts to the human environment.* *Detailed information on current conditions and potential effects to water resources can be found in the EA (Chapter 3 Affected Environment and*

		Environmental Consequences – Aquatic Resources).
11.18	**• DNRC must track the costs expended to plan and implement this timber sale. Without this information it cannot accurately determine whether revenue is being generated for the school trust.** We expect our comments to be fully considered in the EIS. Please keep us informed as this project develops. /s/Arlene Montgomery Program Director	*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. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. Economics of the action alternative were evaluated in this EA. (Chapter 3 Affected Environment and Environmental Consequences-Other Appropriate Social and Economic Circumstances-Economics)*
12.1	Davis Plummer 1/4/2021 Via letter Mr. Allen, I was interested last fall to see that vehicles had been into Sec. 36, T 14N, RI 7W up the Gold Creek road and that fresh paint had appeared. Having been a regular year-round visitor to this ground for over 30 years the area is well known to me. The most recent harvest in 2012 provided hope that the leave trees would have greater access to sun, nutrients and moisture, while providing some revenue from this section of State land. Unfortunately the way that sale finished left some sore spots. **An initial one was the intentional repeated blockage of the historic roads with logging debris. Those roads did not have any existing vehicular traffic, but did have pedestrian and skier traffic which was impacted by the road blockage.** This indicated a lack of knowledge of the use by the public, and an application of a generic post harvest treatment of the ground that was not applicable to this area.	DNRC Response *Information on the current condition, potential future impacts and mitigations to recreation can be found in this EA (Chapter 3 Affect Environment and Environmental Consequences – Recreation).*
12.2	**As well, since then it may have been apparent to some of your field staff that certain weeds have been regularly pulled by the public in this state section, especially along the roads used in the recent harvest.** Although many of these weed species have been increasing throughout western Montana, it has been disappointing to see them increase in an area that should have had mitigation efforts as a part of recent timber sale activities.	*Administrative Rule ARM 36.11.445, the SFLMP, HCP, and BMP commitments require weed management Detailed information on the existing condition and potential for effects associated with either alternative on weeds can be found (Chapter 3 Affected Environment and Environmental Consequences – Vegetation-Weeds)*
12.3	**As regards the new proposed cut, it was not immediately clear what the intention was in terms of what would be harvested and what would be left. Much of that area certainly would benefit from thinning and fuels reduction.**	*A detailed description of the proposed action alternative can be found (Chapter 2 Alternatives - Description of the Action Alternative). The action alternative silvicultural prescriptions can be referenced in Attachment C. Detailed information*

		on the current condition and potential effects on forest structure can be found in the EA (Chapter 3 Affected Environment and Environmental Consequences – Vegetation).
12.4	**It is my hope that enough timber would be left for game cover (that area is used heavily for cover) and soil retention, which in that area of Belt rock, GLM flood ravaged Blackfoot drainage is a precious commodity.**	*DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Within this framework, detailed information on the existing condition and potential for effects associated with either alternative to forest structure and composition and associated generalized effects on wildlife habitats can be found in the coarse filter section. Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis which also covers several large free-ranging game species. Additionally, the Big Game analysis covers big game thermal cover and snow intercept, winter range capacity, and security habitats. (Chapter 3 Affected Environment and Environmental Consequences – Wildlife)* *The existing condition and risk to water resources is assessed at the watershed and sub-watershed scale in the Water Resources portion of this analysis. The analysis includes assessment of the proportion of forest canopy proposed for removal and the potential effects to local hydrology.*
12.5	**Also that ample large trees which are more resistant to the effects of climate change and fire remain.**	*A detailed description of the proposed action alternative can be found (Chapter 2 Alternatives - Description of the Action Alternative).* *The action alternative silvicultural prescriptions can be referenced in Attachment C.* *Detailed information on the current condition and potential effects on forest structure can be found in the EA (Chapter 3 Affected Environment and Environmental Consequences – Vegetation).*
12.6	**Given the slope angle through much of that area it is my hope that runoff issues from harvest activities would be well addressed.** I would like to thank you and your staff for the work you do for the State, and would appreciate receiving any more information you are able to offer regarding future plans for this section of State land. Best regards, Davis Plummer	*Slopes within proposed harvest areas are discussed in the Geology and Soils portion of this analysis. Proposed yarding methods on the steeper slopes within the project area are skyline/cable, and this is expected to reduce the amount of soil disturbance that could contaminate or increase runoff. Risk of increased runoff or water yield is evaluated in the water resources portion of this analysis and is expected to not be detectible in most project areas. The risk of runoff and erosion are also systematically addressed by*

		implementation of forestry BMPs, also discussed in the soils and water resources portions of this analysis.
13	Beverly Yelczyn ¼/2021 Via e-mail I just read the biased Missoula Current article regarding this project. Since this is the last date for public scoping, hopefully you are accepting email input. Not having seen the specific area, but having over 40 years experience in forestry and 31 in Western Montana and the Lolo NF, I support your proposed action. In fact, knowing the growth and yield of the area, you could probably harvest more than 4,386 mbf per acre as proposed. I understand the balance of economics, ecology and social factors and this is probably a good compromise. I encourage you to leave western larch and ponderosa pine where appropriate as the most fire resistant species. If you have any questions, contact me at this email address or 406-552-5960. Yours truly, Beverly A. Yelczyn Retired Silviculturist/Forester	DNRC Response ¼/2021 Via e-mail *Beverly Yelczyn,* *Thank you for your comments, they will be incorporated into the analysis.* *I have attached the public scoping notice (since you may have learned of the proposed project 3rd party).* *Scott Allen-Management Forester* *DNRC-Missoula Unit* *3206 Maverick Lane* *Missoula, MT 59804* *Sallen@mt.gov*
14.1	Brad Krieske 1/6/2021 Via e-mail Mr. Allen, I have recently been made aware of the proposed timber sale on section 36 up the Gold Creek rd. and I would like to voice my concerns. My wife and I bought a piece of property “kitty corner” from section 36 in 2012 and moved onto it in 2019. Between 2012 and 2019 we have spent a lot of time up here. Since we moved here I have hunted the area extensively (including section 36) On our property we continually see elk, deer, bears, coyote, wolves, cougars, moose and the tracks of Canada lynx, the snowshoe hares that support them, and foxes. I have spent time tracking these animals in the snow just to see where they live and where they go. I have seen almost all of these animals or their tracks coming in and out of section 36 at one time of the year or another. Just last year there was a Canada lynx with two cubs that traveled back and forth between section 36 and our property. This fall I watched a cougar stalking a group of deer. The elk herds that drop their calves in this area have worn deep trails on and through section 36 as well as through our property. Just last spring my wife and I watched a black bear sow and her cub travel back and forth between section 36 and our property. Moose	DNRC Response *DNRC promotes biodiversity by taking a ‘coarse-filter approach’, which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Within this framework, detailed information on the existing condition and potential for effects associated with either alternative to forest structure and composition and associated generalized effects on wildlife habitats can be found in the coarse filter section. Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis which also covers several large free-ranging game species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves. Additionally, the Big Game analysis covers big game thermal cover and snow intercept, winter range capacity, and security habitats. The Canada Lynx analysis addresses the current conditions and potential effects associated with each alternative on Canada lynx and their prey species. (Chapter 3 Affected Environment and Environmental Consequences – Wildlife)*

	frequently use the “elk highway” between section 36 and our property. I have watched them. **Section 36 holds a lot of animals. It’s obviously very important habitat that logging will affect adversely.**	
14.2	There are a few other people that are lucky enough to live up here amongst all this natural beauty and wildlife and this timber sale will forever scar what’s in our “backyards” We didn’t come up here to change this landscape or to rape it for profit. We are all here to blend in with the beauty and comings and goings of all of these animals that were here before us. **This timber sale is going to cut right up to my friends’ and neighbors’ property lines.** **Gold Creek road sees a lot of recreation traffic throughout the year and when section 36 is logged it will create a blight that every carload of people is going to have to look at.**	*The purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).* *Detailed information on the existing condition and potential for effects associated with either alternative on visual quality can be found (Chapter 3 Affected Environmental Consequences-Other Social and Economic Circumstances-Visual Quality)* *Information on the current condition, potential future impacts and mitigations to recreation can be found in this EA (Chapter 3 Affect Environment and Environmental Consequences – Recreation).*
14.3	**This area has been logged and abused for decades by numerous entities and it shows. Why then, does the DNRC feel the need to perpetuate the ransacking of this area for an abnormally low return?** Surely the DNRC has land available to pillage that is more off the beaten path. Land that can be logged without being seen and driven through by thousands of Montanans that will curse the DNRC with every passing. Surely the DNRC has land available that will yield more marketable timber to provide revenue for whichever bottomless burocracy you need to drop it into. I understand that a similar timber sale was stopped (or delayed) back in 1992 for environmental reasons. Those reasons have not changed. The concerns have not gone away. I also understand that you are just one man doing his job. These decisions are made by faceless committees that plot in the shadows and largely ignore the will of the people. I understand that but please, if you can find the time, pass along the objections and concerns of those of us that are voicing them. Pass them to someone with common sense and not dollar signs in their eyes. Thank you for your time. Sincerely, Brad Krieske 7229 One Heart Lane Bonner, MT 59823 Brad.krieske@gmail.com	*The purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).* *Economics of the action alternative were evaluated in this EA, included is an estimated return of the proposed action alternative. (Chapter 3 Affected Environment and Environmental Consequences - Economics)*

15	Peg Brownlee 1/8/2021 Via e-mail To whom it may concern—. I am writing to ask for protection of the Gold Creek area near Missoula, concerning the proposed "Goldilogs" timber sale**. I feel that adequate time needs to be given for studies on the impacts on wildlife and habitat. As you know, all care should be given when there is a plan to destroy the homes of many animals. Thinning is much less invasive than full-scale timber harvest. Instead of improving the forest, a timber sale will take many years to repair the devastation it causes**. I ask you to take the path of caution. It was decided in 1992 to protect the area from this type of activity, and I put forward to you that this was a sound decision which should be upheld. Thank you.	DNRC Response *[DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which Montana wildlife evolved, the full complement of species would persist, and biodiversity would 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 (Lozensky 1997). Detailed information on the existing condition and potential for effects to wildlife under the coarse filter within (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).* *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 considers the status for each listed species that may be affected. In the SFLMP, DNRC acknowledged that localized adverse impacts would be expected and accepted within the context of an overall strategy that supports habitat capability for these species. Detailed information on the existing condition and potential for effects to specific wildlife under the fine filter within (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).*
16	Andy Stroh 1/8/2021 Via e-mail I am in full support of the proposed timber sale as I am a user of that section of land for various recreation activities including hunting and just a walk in the woods with my dog or grandchildren. Before the last sale finally happened some parts of that were very difficult to even walk through due to blowdowns and thick undergrowth. I walked through the site repeatedly while the logging was being done and saw a lot of the larger trees that were unusable as saw logs due to a lot of center rot, trees that	DNRC Response *Thanks for your support, the purpose and need for the proposed action alternative can be found (Chapter 1 Purpose and Need for Action).*

	should have been harvested much sooner as they are overmature and beginning to die off, creating an even larger fire hazard.	
17.1	Kathy Knudsen 1/5/2021 Via e-mail ATTN: Scott Allen **The logging of this state land section would negatively impact one of the last remaining intact low elevation forests in the Missoula area. Please consider the cumulative impacts of past logging in the Gold Creek Drainage which you know has been extensive.**	DNRC Response *Cumulative effects to the vegetative community along with analysis areas and methodology can be referenced within (Chapter 3 Affected Environment and Environmental Consequences - Vegetation).*
17.2	**An EIS should address: cumulative impacts, road density, habitat needs of native flora and fauna, loss of connectivity, loss of habitat security areas, weed invasion, loss of old growth forest, impacts to all sensitive species, species surveys pretreatment, among others.** Thank you Kathy	*Old growth forest that meets the definition of Green et al. (1992) are not present in the project area. As such, the issue was dismissed from further analysis. (See Chapter 3 Vegetation – Old Growth for details on the determination)* *DNRC promotes biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state trust lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which Montana wildlife evolved, the full complement of species would persist, and biodiversity would 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 (Lozensky 1997). Detailed information on the existing condition and potential for effects to wildlife are located within (Chapter 3 Affected Environment and Environmental Consequences - Wildlife).* *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 considers the status for each listed species that may be affected. In the SFLMP, DNRC acknowledged that localized adverse impacts would be expected and accepted within the context of an overall strategy that supports habitat capability for these species.*

		Detailed information on the existing condition and potential for effects to specific wildlife under the fine filter within (Chapter 3 Affected Environment and Environmental Consequences - Wildlife). *Detailed information on the existing condition and potential for effects associated with either alternative on road densities, habitat fragmentation, corridors, and mature forested habitat patches are covered in Habitat Fragmentation, Corridors, and Linkage Zone analysis where the effects are focused on large free-ranging species such as elk, deer, grizzly bears, black bears, moose, mountain lions, or wolves Potential effects to grizzly bears associated with open roads and habitat fragmentation is also covered in the Grizzly Bear analysis. Potential effects to big game security habitats are covered in the Big Game Analysis. (Chapter 3 Affected Environment and Environmental Consequences - Wildlife)*
18	Cathy Ream 12/2020 Via phone Cathy Ream called and left a message with Amy Helena after she noticed some marking within the section. Project leader, Scott Allen, returned the call. At this time, there was an approximately 5-acre portion of a test prescription marked within the proposed project area. Scott Allen explained that he was in the initial stages of proposing a project and would be sending out public scoping notice in the near future. Cathy Ream asked what the marking scheme represented. Scott Allen explained that the larch and ponderosa were marked to cut with orange paint and all other species were marked to leave with purple paint. Cathy thanked Scott Allen for returning her call and asked to be added to the scoping list. Scott Allen added her to the email mailing list.	DNRC Response *No further DNRC response necessary.*
19	Tim Lovely 12/15/2020 Via phone and in-person conversation Tim Lovely called and then later came into the Missoula Unit after receiving the public scoping notice. Scott spoke to him and he asked about the proposed haul route. He indicated he was in the process of selling his adjoining parcel and was making sure the haul route was not though his parcel (other than the main Gold Creek road). After disclosing the name of the party that was in the process of purchasing his property, Scott Allen (project leader) told him that the other party was also on the scoping list. Tim seemed relieved that the other party	DNRC Response *No further DNRC response necessary.*

	had received the scoping notice. Tim did not bring up any other concerns about the proposed project.	

Attachment C – Silvicultural Prescriptions

SALE/PROJECT NAME: Goldielogs	**DATE:** 4/1/2022
CUTTING / TREATMENT UNIT NUMBER(s): Unit 1	**ACRES:** APPROXIMATELY 43 acres
LOCATION (TRS): Section 36 T14N R17W	**EST. HARVEST VOLUME:** 155 MBF
WATERSHED:	**ELEVATION:**
HABITAT TYPE(s): PSME/SYAL-CARU phase **FIRE GROUP:** Group 6	**ASPECT:** S/SW/E
CURRENT COVER TYPE: Western Larch/Douglas-fir	**SLOPE (%):** 16-25%
DESIRED COVER TYPE: Ponderosa Pine	**PREPARED BY:** Scott Allen

STAND DESCRIPTION

Stands within Unit 1 consist primarily of two differing stands delineated by an aspect break: A south southwest facing aspect and an east facing aspect. The dryer south southwest aspect consists of an un-even aged multistoried forest type. Large (greater than 12-inch dbh), relic ponderosa pine (PP), from previous cuts, as well as regeneration initiated during previous harvests dominate the overstory. Large Douglas-fir (DF) and a few scattered western larch (WL) are also members of the overstory. The mid-level canopy is a multi-age mix of 80% DF and 20% PP. Regeneration consists primarily of clumps of DF. The east facing portion the unit consists primarily of two strata. DF 40%, PP 35%, and WL 5%. Most regeneration is comprised of advanced Douglas-fir. Douglas-fir bark beetles are very active and have been the cause of noticeable mortality. Knapweed and thistles are established within both stands.

TREATMENT OBJECTIVES	TARGET STAND CONDITIONS
☑ Move stands toward desired future conditions	An ITS (individual tree selection) prescription to reduce overall basal area throughout the size class spectrum. Large, dominant early seral species (WL and PP) would be preferred for leave trees to aid in the recruitment of future old growth. All DF of inferior phenotype, regardless of size, would be favored for cut trees. Targeting DF for removal would help maintain the current PP future desired condition. In addition, it would be expected to suppress the amount of DF beetle within the stand. Trees exhibiting dominate traits within their respective strata; i.e. good crown ratio or other signs of vigor, would be preferred to leave in all other size classes. If areas of multiple species of similar size and phenotypical attributes existed the following species preference would be used to select leave trees: , PP, WL, and DF ..
☑ Emulate natural disturbance regimes	
☑ Promote/establish regeneration	
☑ Enhance stand growth and vigor	
☑ Address insect and disease issues	
☑ Reduce fuel loading/fire hazard	
☑ Capture value of dead/dying timber	
☑ Generate revenue for the trust beneficiaries	
☐ Other: (specify)	

PRESCRIBED TREATMENT

Even-Aged Methods	Uneven-Aged Methods	Intermediate Treatments	Salvage Treatments
☐ Clearcutting	☑ Individual Tree Selection	☐ Overstory Removal	☐ Fire Salvage
☐ Seed Tree	☐ Group Selection	☐ Commercial Thinning	☐ Insect / Disease Salvage
☐ Shelterwood	☐ Old Growth Maintenance	☐ Sanitation	☐ Weather/Blowdown Salvage
☐ check if with reserves	☐ Old Growth Restoration	☐ Precommercial Thinning	☐ Other Salvage

HARVEST IMPLEMENTATION GUIDELINES

Marking System: ☐ Cut Tree ☐ Leave Tree ☐ Sample Mark / Designate x Description ☑ Species Designation

Number/Spacing/Size of Leave Trees:	
Species Preference:	PP, WL, DF
Characteristics of cut or leave trees:	Phenotypic superior trees
Number of Snags/Snag Recruits:	2 snags and 2 recruits
Additional Information:	WL and PP marked orange to cut / DF and other species marked purple to leave

HARVEST METHOD

Yarding:	☑ Tractor	☐ Skyline	☐ Combination	☐ Excaline	☐ Other: (specify)
Ground conditions:	☑ Dry	☑ Frozen	☑ Snow	☐ Other: (specify)	
Seasonal restrictions:	☐ Summer	☐ Winter	☐ Dates: (specify)		
Equipment types/restrictions: (rubber tires, tracks, cut-to-length, etc.) N/A					
Skid trail location/spacing: dispersed skidding, a catch trail near the east side of the unit would most likely be needed					
Additional Information:					

HAZARD REDUCTION / SLASH TREATMENT				
Slash disposal:	☑ Pile & burn (landings)	☐ Pile & burn (in-woods)	☐ Broadcast burn	☐ Jackpot burn
	☐ Masticate/Chip	☐ Lop & Scatter	☐ Hand Pile	☐ Other: (specify)
Nutrient Retention: Coarse woody debris (tons/ac):			☑ Return skid coarse/fine material	
Additional Information: If unit is whole tree skid, some small amounts of slash would be returned to the unit in the form of skid trail erosion control.				

SITE PREPARATION				
Method:	☑ Timber Sale/Dispersed Skidding	☐ Dozer	☐ Excavator	☐ Broadcast Burn
	☐ Slash unwanted regeneration	☐ Chemical/Herbicide	☐ Other: (specify)	
Target % scarification:20%				
Additional Information: dispersed skidding would encourage natural ponderosa pine regeneration				

REGENERATION				
Type of Regeneration:	☑ Natural	☐ Planted	☑ Existing Advance	
Fill in below if planting:				
Estimated Number of Seedlings to Plant:				
Species:	☐ White Pine	☐ Western Larch	☐ Ponderosa Pine	☐ Douglas-fir
	☐ Spruce	☐ Lodgepole Pine	☐ Other: (specify)	
Additional Information:				

ANTICIPATED FUTURE TREATMENTS
List approximate dates of post-harvest treatments, including: Slash disposal/hazard reduction: immediate post-harvest burning of slash Planting: as needed depending on seral species regeneration Regeneration survey: monitoring of seral species regeneration Evaluate for PCT: If seral species regeneration is excessive a PCT may follow in 5-15 years post-harvest Weeds: pre and post-harvest weed mitigation as needed

SALE/PROJECT NAME: Goldielogs	**DATE:** 4/1/2022
CUTTING / TREATMENT UNIT NUMBER(s): Unit 2	**ACRES:** APPROXIMATELY 377 acres
LOCATION (TRS): Section 36 T14N R17W	**EST. HARVEST VOLUME:** 2,034 MBF
WATERSHED:	**ELEVATION:** 3600-4000ft
HABITAT TYPE(s): PSME/VACA PSME/LIBO-SYAL phase **FIRE GROUP:** Group 6	**ASPECT:** NW NE some S
CURRENT COVER TYPE: Ponderosa Pine	**SLOPE (%):** 6-35%
DESIRED COVER TYPE: Ponderosa Pine	**PREPARED BY:** Scott Allen

STAND DESCRIPTION

Stands within Unit 2 consist primarily of mature PP (ponderosa pine), WL (western larch), and DF (Doulas-fir) overstory. Current cover types match the DFC (Desired Future Condition) cover types with the exception of two stands within the unit; approximately 48 acres in the southeast portion are currently mixed conifer and approximately 13 acres located in the northeast portion of the unit are currently DF/WL. Both dominant and co-dominant stems were retained during the previous harvest. The mid-level canopy consists of a mix of a suppressed age-class similar to the overstory as well as pockets of a younger age class primarily consisting of Douglas-fir. Natural regeneration has only been successful over 30% of the unit. Regeneration primarily consists of clumps of more shade tolerant DF. Douglas-fir bark beetles and root-rot are prevalent within the stands, causing multiple half acre or larger pockets of tree mortality. At the time of analysis, more than 20 acres were infested with bark beetles. Knapweed and thistles are established within both stands.

PRESCRIBED TREATMENT

Even-Aged Methods	Uneven-Aged Methods	Intermediate Treatments	Salvage Treatments
☐ Clearcutting	☑ Individual Tree Selection	☐ Overstory Removal	☐ Fire Salvage
☐ Seed Tree	☐ Group Selection	☐ Commercial Thinning	☐ Insect / Disease Salvage
☐ Shelterwood	☐ Old Growth Maintenance	☐ Sanitation	☐ Weather/Blowdown Salvage
☐ check if with reserves	☐ Old Growth Restoration	☐ Precommercial Thinning	☐ Other Salvage

HARVEST IMPLEMENTATION GUIDELINES

Marking System: ☐ Cut Tree ☐ Leave Tree ☐ Sample Mark / Designate x Description ☑ Species Designation

Number/Spacing/Size of Leave Trees:	
Species Preference:	PP, WL, DF
Characteristics of cut or leave trees:	Phenotypic superior trees
Number of Snags/Snag Recruits:	Greater than 2 snags where available and 2 recruits
Additional Information:	WL and PP marked orange to cut / DF and other species marked purple to leave

HARVEST METHOD

Yarding: ☑ Tractor	☐ Skyline	☐ Combination	☐ Excaline	☐ Other: (specify)
Ground conditions:	☑ Dry	☑ Frozen	☑ Snow	☐ Other: (specify)
Seasonal restrictions:	☐ Summer	☐ Winter	☐ Dates: (specify)	
Equipment types/restrictions: (rubber tires, tracks, cut-to-length, etc.) N/A				
Skid trail location/spacing: dispersed skidding, a catch trail near the east side of the unit would most likely be needed				
Additional Information:				

HAZARD REDUCTION / SLASH TREATMENT

Slash disposal:	☑ Pile & burn (landings)	☐ Pile & burn (in-woods)	☐ Broadcast burn	☐ Jackpot burn
	☐ Masticate/Chip	☐ Lop & Scatter	☐ Hand Pile	☐ Other: (specify)

Nutrient Retention: Coarse woody debris (tons/ac):	☑ Return skid coarse/fine material
Additional Information: If unit is whole tree skid, some small amounts of slash would be returned to the unit in the form of skid trail erosion control.	

SITE PREPARATION				
Method:	☑ Timber Sale/Dispersed Skidding	☐ Dozer	☐ Excavator	☐ Broadcast Burn
	☐ Slash unwanted regeneration	☐ Chemical/Herbicide	☐ Other: (specify)	
Target % scarification:20%				
Additional Information: dispersed skidding would encourage natural ponderosa pine regeneration				

REGENERATION				
Type of Regeneration:	☑ Natural	☐ Planted	☑ Existing Advance	
Fill in below if planting:				
Estimated Number of Seedlings to Plant:				
Species:	☐ White Pine	☐ Western Larch	☐ Ponderosa Pine	☐ Douglas-fir
	☐ Spruce	☐ Lodgepole Pine	☐ Other: (specify)	
Additional Information:				

ANTICIPATED FUTURE TREATMENTS
Planting: as needed depending on seral species regeneration Regeneration survey: monitoring of seral species regeneration Evaluate for PCT: If seral species regeneration is excessive a PCT may follow in 5-15 years post-harvest Weeds: pre and post-harvest weed mitigation as needed

SALE/PROJECT NAME: Goldielogs	**DATE:** 4/1/2022
CUTTING / TREATMENT UNIT NUMBER(s): Unit 3	**ACRES:** APPROXIMATELY 7 acres
LOCATION (TRS): Section 36 T14N R17W	**EST. HARVEST VOLUME:** 87 MBF
WATERSHED:	**ELEVATION:** 3600-4000ft
HABITAT TYPE(s): PSME/VACA **FIRE GROUP:** Group 6	**ASPECT:**NE
CURRENT COVER TYPE: Ponderosa Pine	**SLOPE (%):** 40-70%
DESIRED COVER TYPE: Western Larch/Douglas-fir	**PREPARED BY:** Scott Allen

STAND DESCRIPTION
Stands within Unit 3 consists primarily of uneven-sized PP (ponderosa pine), WL (western larch), and DF (Doulas-fir) overstory. Dominant PP and WL are scattered among inferior or co-dominant WL stems. A portion of the larger DF in the 12–22-inch dbh (diameter at breast height) size class within the unit have been infested with Douglas-fir bark beetles. Unit 3 was not harvested during the McNamara Landing Timber Sale. Little to no natural regeneration of seral species has been successful. Regeneration consists primarily of clumps of DF. Douglas-fir bark beetles and root-rot are prevalent in the stands causing multiple half acre or larger pockets of tree mortality. At the time of analysis, ocular estimates suggested more than 20 percent of the Douglas-fir were infested with bark beetles. Knapweed and thistles are established within both stands.

TREATMENT OBJECTIVES	TARGET STAND CONDITIONS
☑ Move stands toward desired future conditions	An ITS (individual tree selection) would be used to reduce overall basal area throughout the size class spectrum. To aid in the recruitment of Old Growth in the future, large, dominant WL and PP would be preferred for leave trees. Suppressed, codominant WL would be harvested from even-age clumps of WL. Any DF of inferior phenotype, regardless of size, would be favored for cut trees. This would not only help transition the stand to the WL/DF future desired condition, it would also suppress the amount of DF beetle within the stand. Trees exhibiting dominate traits within their respective strata; i.e. good crown ratio or other signs of vigor, would be preferred for leave in all other size classes. If areas of multiple species of similar size and phenotypical attributes existed WL would be the preferred leave tree species. Reduction of basal area is expected to promote natural regeneration of early seral species.
☑ Emulate natural disturbance regimes	
☑ Promote/establish regeneration	
☑ Enhance stand growth and vigor	
☑ Address insect and disease issues	
☑ Reduce fuel loading/fire hazard	
☑ Capture value of dead/dying timber	
☑ Generate revenue for the trust beneficiaries	
☐ Other: (specify)	

PRESCRIBED TREATMENT			
Even-Aged Methods	**Uneven-Aged Methods**	**Intermediate Treatments**	**Salvage Treatments**
☐ Clearcutting	☑ Individual Tree Selection	☐ Overstory Removal	☐ Fire Salvage
☐ Seed Tree	☐ Group Selection	☐ Commercial Thinning	☐ Insect / Disease Salvage
☐ Shelterwood	☐ Old Growth Maintenance	☐ Sanitation	☐ Weather/Blowdown Salvage
☐ check if with reserves	☐ Old Growth Restoration	☐ Precommercial Thinning	☐ Other Salvage

HARVEST IMPLEMENTATION GUIDELINES	
Marking System: ☐ Cut Tree ☐ Leave Tree ☐ Sample Mark / Designate x Description ☑ Species Designation	
Number/Spacing/Size of Leave Trees:	
Species Preference:	PP, WL, DF
Characteristics of cut or leave trees:	Phenotypic superior trees
Number of Snags/Snag Recruits:	2 snags and 2 recruits
Additional Information:	marked purple to leave

HARVEST METHOD				
Yarding: ☑ Tractor	☑ Skyline	☑ Combination	☐ Excaline	☐ Other: (specify)
Ground conditions:	☑ Dry	☑ Frozen	☑ Snow	☐ Other: (specify)
Seasonal restrictions:	☐ Summer	☐ Winter	☐ Dates: (specify)	
Equipment types/restrictions: (rubber tires, tracks, cut-to-length, etc.) N/A				
Skid trail location/spacing: dispersed skidding				

Additional Information:

HAZARD REDUCTION / SLASH TREATMENT				
Slash disposal:	☑ Pile & burn (landings)	☐ Pile & burn (in-woods)	☐ Broadcast burn	☐ Jackpot burn
	☐ Masticate/Chip	☐ Lop & Scatter	☐ Hand Pile	☐ Other: (specify)
Nutrient Retention: Coarse woody debris (tons/ac):			☑ Return skid coarse/fine material	
Additional Information: If unit is whole tree skid, some small amounts of slash would be returned to the unit in the form of skid trail erosion control.				

SITE PREPARATION				
Method:	☑ Timber Sale/Dispersed Skidding	☐ Dozer	☐ Excavator	☐ Broadcast Burn
	☐ Slash unwanted regeneration	☐ Chemical/Herbicide	☐ Other: (specify)	
Target % scarification:20%				
Additional Information: dispersed skidding would encourage natural ponderosa pine regeneration				

REGENERATION				
Type of Regeneration:	☑ Natural	☐ Planted	☑ Existing Advance	
Fill in below if planting:				
Estimated Number of Seedlings to Plant:				
Species:	☐ White Pine	☐ Western Larch	☐ Ponderosa Pine	☐ Douglas-fir
	☐ Spruce	☐ Lodgepole Pine	☐ Other: (specify)	
Additional Information:				

ANTICIPATED FUTURE TREATMENTS
Planting: as needed depending on seral species regeneration Regeneration survey: monitoring of seral species regeneration Evaluate for PCT: If seral species regeneration is excessive a PCT may follow in 5-15 years post-harvest Weeds: pre and post-harvest weed mitigation as needed

SALE/PROJECT NAME: Goldielogs	**DATE:** 4/1/2022
CUTTING / TREATMENT UNIT NUMBER(s): Unit 4	**ACRES:** APPROXIMATELY 70 acres
LOCATION (TRS): Section 36 T14N R17W	**EST. HARVEST VOLUME:** 688 MBF
WATERSHED:	**ELEVATION:** 3600-4000ft
HABITAT TYPE(s): ABLA/LIBO-XETE phase, PSME/VACA, PSME/CAGE **FIRE GROUP:** Group 6	**ASPECT:**NE, E
CURRENT COVER TYPE: Western Larch/Douglas-fir	**SLOPE (%):** 40-60%
DESIRED COVER TYPE: Western Larch/Douglas-fir	**PREPARED BY:** Scott Allen

STAND DESCRIPTION

Stands within Unit 4 were left uncut during the McNamara Landing Timber Sale. The unit consists primarily of uneven-aged size class WL (western larch), and DF (Doulas-fir), PP (ponderosa pine) overstory. Dominant western larch and Douglas-fir are scattered among inferior or co-dominant western larch and Douglas-fir stems. A portion of the larger DF in the 12–22-inch dbh (diameter at breast height) size class within the unit have been infested with Douglas-fir bark beetles. Little to no natural regeneration of seral species has been successful. Regeneration consists primarily of clumps of DF.

TREATMENT OBJECTIVES	TARGET STAND CONDITIONS
☑ Move stands toward desired future conditions	An ITS (individual tree selection) would be used to reduce overall basal area throughout the size class spectrum. To aid in the recruitment of Old Growth in the future, large, dominant WL and PP would be preferred for leave trees. Suppressed, codominant WL would be harvested from even-age clumps of WL. Any DF of inferior phenotype, regardless of size, would be favored for cut trees. This would not only help transition the stand to the WL/DF future desired condition, it would also suppress the amount of DF beetle within the stand. Trees exhibiting dominate traits within their respective strata; i.e. good crown ratio or other signs of vigor, would be preferred for leave in all other size classes. If areas of multiple species of similar size and phenotypical attributes existed WL would be the preferred leave tree species. Reduction of basal area is expected to promote natural regeneration of early seral species.
☑ Emulate natural disturbance regimes	
☑ Promote/establish regeneration	
☑ Enhance stand growth and vigor	
☑ Address insect and disease issues	
☑ Reduce fuel loading/fire hazard	
☑ Capture value of dead/dying timber	
☑ Generate revenue for the trust beneficiaries	
☐ Other: (specify)	

PRESCRIBED TREATMENT

Even-Aged Methods	Uneven-Aged Methods	Intermediate Treatments	Salvage Treatments
☐ Clearcutting	☑ Individual Tree Selection	☐ Overstory Removal	☐ Fire Salvage
☐ Seed Tree	☐ Group Selection	☐ Commercial Thinning	☐ Insect / Disease Salvage
☐ Shelterwood	☐ Old Growth Maintenance	☐ Sanitation	☐ Weather/Blowdown Salvage
☐ check if with reserves	☐ Old Growth Restoration	☐ Precommercial Thinning	☐ Other Salvage

HARVEST IMPLEMENTATION GUIDELINES

Marking System: ☐ Cut Tree ☐ Leave Tree ☐ Sample Mark / Designate x Description ☑ Species Designation

Number/Spacing/Size of Leave Trees:	
Species Preference:	PP, WL, DF
Characteristics of cut or leave trees:	Phenotypic superior trees
Number of Snags/Snag Recruits:	Greater than 2 snags where available and 2 recruits
Additional Information:	marked purple to leave

HARVEST METHOD

Yarding: ☑ Tractor	☑ Skyline	☑ Combination	☐ Excaline	☐ Other: (specify)
Ground conditions:	☑ Dry	☑ Frozen	☑ Snow	☐ Other: (specify)
Seasonal restrictions:	☐ Summer	☐ Winter	☐ Dates: (specify)	

Equipment types/restrictions: (rubber tires, tracks, cut-to-length, etc.) N/A

Skid trail location/spacing: dispersed skidding
Additional Information:

HAZARD REDUCTION / SLASH TREATMENT				
Slash disposal:	☑ Pile & burn (landings)	☐ Pile & burn (in-woods)	☐ Broadcast burn	☐ Jackpot burn
	☐ Masticate/Chip	☐ Lop & Scatter	☐ Hand Pile	☐ Other: (specify)
Nutrient Retention: Coarse woody debris (tons/ac):			☑ Return skid coarse/fine material	
Additional Information: If unit it whole tree skid, some small amounts of slash would be returned to the unit in the form of skid trail erosion control. Due to the high like				

SITE PREPARATION				
Method:	☑ Timber Sale/Dispersed Skidding	☐ Dozer	☐ Excavator	☐ Broadcast Burn
	☐ Slash unwanted regeneration	☐ Chemical/Herbicide	☐ Other: (specify)	
Target % scarification:20%				
Additional Information: dispersed skidding would encourage natural Ponderosa Pine regeneration				

REGENERATION				
Type of Regeneration:	☑ Natural	☐ Planted	☑ Existing Advance	
Fill in below if planting:				
Estimated Number of Seedlings to Plant:				
Species:	☐ White Pine	☐ Western Larch	☐ Ponderosa Pine	☐ Douglas-fir
	☐ Spruce	☐ Lodgepole Pine	☐ Other: (specify)	
Additional Information:				

ANTICIPATED FUTURE TREATMENTS
Planting: as needed depending on seral species regeneration Regeneration survey: monitoring of seral species regeneration Evaluate for PCT: If seral species regeneration is excessive a PCT may follow in 5-15 years post-harvest Weeds: pre and post-harvest weed mitigation as needed