U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment

Clark Fork Face Forest
Health and Fuels Reduction

DOI-BLM-MT-B010-2022-0020-EA
December 2022

Location: Along and north of the Clark Fork River corridor from Bonner, MT to Drummond, MT. Including Wallace Creek, Bear Gulch, Rattler Gulch and vicinity.

T.10N R.14W secs 29, 32 – 35.
T.11N R.12 W secs 6-7.
T.11N R.13W secs 2,4-7, 9-10, 12, 14, 18, 22.
T.11N R.14W secs 3, 6, 14, 20.
T.11N R.15W sec 15.
T.11N R.17W secs 2, 12.
T.12N R.13W secs 4, 5, 7 – 9, 17, 18, 20, 22, 26, 28, 32, 34.
T.12N R.14W secs 2 – 6, 9 – 15, 18, 20, 22, 24, 27 – 29, 33, 34.
T.12N R.15W secs 1, 2, 10 – 15, 18, 24, 30.
T.12N R.16W secs 17 – 18.
T.12N R.18W sec 1.

U.S. Department of the Interior
Bureau of Land Management
Missoula Field Office
3255 Fort Missoula Road
Missoula, Montana 59804-7204
Phone: 406.329.3914

Table of Contents

1 Introduction

1.0 Summary of Proposed Project

The Bureau of Land Management's Missoula Field Office (BLM) is proposing forest restoration and fuels reduction treatments on BLM managed lands along and north of the Clark Fork River corridor, between Bonner and Drummond, MT. The planning area extends approximately 5 – 50 miles east of Missoula, MT in the Clark Fork River sub-basin in west central Montana. The planning area totals 247,191 acres approximately, with a mix of ownerships including BLM; US Forest Service (USFS); The Nature Conservancy (TNC); Montana Department of Natural Resources and Conservation (DNRC); the University of Montana (UM); private ownership and others. For this project, forest restoration and fuels reduction treatments are proposed on BLM managed lands only. Table 1 and Figure 1 display the mix of land ownership in the planning area. See Appendix D, Map 9.0 for a planning area location and land ownership map.

Table 1. Land ownership in the Clark Fork Face planning area.

Ownership	Acres	% of Total
BLM	23,666	10%
Forest Service	2,361	1%
Private	119,342	48%
State-DNRC	51,930	21%
State-FWP	125	0%
State-U of M	1303	1%
Stimson Lumber Company	19,222	8%
The Nature Conservancy	29,242	12%
Grand Total	**247,191**	100%

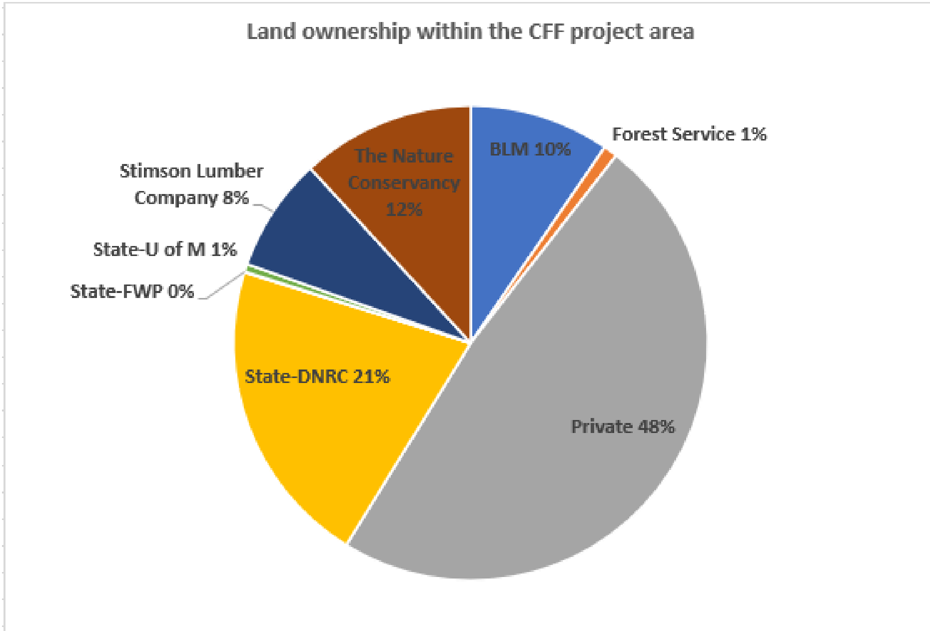


Figure 1: Land Ownership percentages within the planning area.

Natural range of variability (NRV) is a spectrum of ecological vegetative states, and the spatial and temporal variation in these states. Modeling was used to develop a quantified estimate of the NRV for the planning area and knowledge of historical conditions helped corroborate the model results. Historical conditions were established based on the publication "Historical Vegetation of Montana" (Losensky 1997). Current conditions were determined by using data collected within the planning area by BLM personnel conducting forest inventory plots as well as photo interpretation. Managing forest ecosystems within their NRV will sustain native species and biodiversity; maintain ecosystem productivity; and provide for the long-term sustainability of ecosystem values and services (Duncan et al 2010, Landres et al 1999, Swanson et al 1994, Haufler 1999, Morgan et al 1994).

Decades of fire suppression and past management activities in the planning area have resulted in current conditions that are deviated from the NRV when measured by tree species composition, density and age class distribution. This deviation in NRV results in a high susceptibility to forest insect and disease outbreaks, high fuel loading and high potential for stand replacing wildfire.

Coupled with the deviated and unhealthy state of the BLM forested stands, the private land in the planning area has experienced subdivision and rural development in the past decades. What was once a large industrial forest ownership, is now overwhelmingly (48% of the planning area) small, nonindustrial private landowners who are constructing homes and buildings in the forest (see table 1). This subdivision and rural development have effectively transitioned the entire planning area to Wildland-Urban Interface (WUI) when measured as a proximity to structures (See Appendix D, map 9.7). Because of this shift in ownership and use of the private land, the BLM's forested parcels represent an increased risk from wildfire to the private structures and improvements and also to the safety of the residents and firefighters. It is these twin realities: the deviation from NRV and the expansion of the WUI that necessitate this project.

1.1 Purpose and Need

The purpose of this Proposed Action is to implement the BLM's current policy and direction to reduce the risk of wildfire and manage forest habitats using an ecosystem management approach.

Specifically, treatments are needed to:

1. Protect life, property and firefighter safety in and near the wildland-urban interface and promote resilience to wildfire by reducing forest fuel loading and breaking up homogeneous stand conditions.
2. Restore healthy ecological conditions by increasing the acreage of forest communities that are moving towards the midpoint of NRV.
3. Maintain and enhance native and sensitive plant communities; this includes maintaining and enhancing limber pine (*Pinus flexilis)* populations where present.
4. Improve ecological health by increasing resistance and resilience to forest insect and disease outbreaks.
5. Provide local and regional economic benefits through harvest of forest products and capturing the value of dead and dying timber while it remains salvageable.

This project will improve forest health conditions for an extensive area within and near WUI. Decades of fire suppression and past management activities have altered the upland forest communities, resulting in a departure from the midpoint of the NRV. This departure is evidenced in various ways depending on Habitat Type Group (HTG) across the planning area. HTGs are groupings of Habitat Types (Pfister et al. 1997) as established in the 2021 Missoula Field Office Resource Management Plan (RMP) (USDI-BLM 2021). Habitat types are an aggregation of ecological sites of like biophysical environments (such as climate, aspect, and soil characteristics) that produce plant communities of similar composition, structure, and function. The vegetation communities that would develop over time, given no major natural or human disturbances—the climax plant community—would be similar within a particular habitat type. Existing vegetation condition (cover type) in a given habitat type can and does vary widely, reflecting each site's unique history, forest character, pattern of disturbances, and point in time along successional pathways. Tables 2 – 5 below indicate how current cover types differ from habitat type groups across the planning area.

HTGs found in the planning area are HTG-1 Warm Douglas-fir; HTG-2 Cool Douglas-fir; HTG-3 Moist Douglas-fir; HTG-4 Moist subalpine fir; HTG-5 Cold subalpine fir; HTG-6 Very cold subalpine fir and HTG-9 Non-forested grassland. Across the planning area a small amount of land has no habitat type group assigned; these areas are generally river bottom on the BLM and or urban developments on other ownerships.

Table 2: Habitat Type Groups within the planning area.

Habitat Type Group	Acres on BLM lands	% on BLM lands	Acres in CFF planning area	% in CFF planning area
AGR-Agricultural	0	0.0	3,052	1.23
HTG-1 Warm Douglas-fir	6,092	25.74	40,961	16.57
HTG-2	13,166	55.63	128,468	51.97

Cool Douglas-fir				
HTG-3 **Moist Douglas-fir**	228	0.96	2,369	0.96
HTG-4 **Moist subalpine fir**	2,588	10.93	18,154	7.34
HTG-5 **Cold subalpine fir**	80	0.34	727	0.29
HTG-6 **Very cold subalpine fir**	353	1.49	3,502	1.42
HTG-9 **Non-forested grassland**	1,058	4.47	28,674	11.60
NF	0	0.0	911	0.37
Urban	0	0.0	1,617	0.65
Water	0	0.0	786	0.32
Blank / Not Applicable	101	0.43	17,970	7.27
Grand Total	23,666	100	247,191	100

The Douglas-fir sites (HTG-1 – HTG-3) have shifted away from fire tolerant, open stands dominated by large diameter widely spaced early-seral tree species such as ponderosa pine and western larch toward less fire tolerant stands dominated by smaller diameter, more tightly spaced shade tolerant species such as Douglas-fir. In the subalpine fir sites (HTG-4 – HTG-6) this shift is characterized by homogeneous, densely stocked even-aged stands across the landscape, often dominated by lodgepole pine. These stands are lacking age and size class diversity across the landscape, which would vary over space and time in an undisturbed system. Due to the lack of moderate to high intensity fire over time these subalpine fir habitat types are also experiencing heavy ingrowth of shade tolerant species such as subalpine fir. In addition, these stands often exhibit a high accumulation of dead standing and downed trees resulting from mountain pine beetle induced mortality in the lodgepole pine, and high levels of defoliation in the firs from the Western spruce budworm. The non-forested grassland sites (HTG-9) have also been subject to fire exclusion and other management, and exhibit an altered species composition, namely conifer encroachment.

Table 3: Proposed Treatment Acres within Habitat Type Groups 1- 3 by Current Cover

Proposed Treatment Acres within Habitat Type Groups 1- 3 by Current Cover								
Current Cover	HTG-1	% of HTG-1	HTG-2	% of HTG-2	HTG-3	% of HTG-3	Grand Total	% of all HTGs
AGR	-	0%	-	0%	-	-	-	0%
ALTERED-GRASSES	-	0%	-	0%	-	-	-	0%
CW	-	0%	25	0%	-	-	25	0%
DF	2,888	56%	5,531	52%	100	0	8,519	53%
DF-AF	307	6%	67	1%	-	-	374	2%
DF-ES	-	0%	62	1%	-	-	62	0%
DF-J	201	4%	46	0%	-	-	247	2%
DF-LP	1,170	23%	2,538	24%	107	1	3,815	24%
DF-LP-AF	-	0%	-	0%	-	-	-	0%
DF-PP-LP	2	0%	-	0%	-	-	2	0%
L	4	0%	-	0%	-	-	4	0%
L-DF	43	1%	435	4%	-	-	478	3%
LP	-	0%	64	1%	-	-	64	0%
LP-AF	-	0%	-	0%	-	-	-	0%
MESIC-SHRUBS	-	0%	76	1%	-	-	76	0%
NF	-	0%	-	0%	-	-	-	0%
PP	74	1%	297	3%	-	-	371	2%
PP-CW	-	0%	-	0%	-	-	-	0%
PP-DF	374	7%	1,516	14%	-	-	1,889	12%
PP-DF-J	-	0%	14	0%	-	-	14	0%
PP-J	17	0%	3	0%	-	-	20	0%
RIPARIAN-GRASSES	-	0%	-	0%	-	-	-	0%
UPLAND-GRASSES	32	1%	64	1%	-	-	96	1%
URBAN	-	0%	-	0%	-	-	-	0%
WATER	-	0%	-	0%	-	-	-	0%
XERIC-SHRUBS	9	0%	-	0%	-	-	9	0%
Grand Total	**5,121**	**1**	**10,737**	**1**	**207**	**1**	**16,066**	**100%**

Table 4: Proposed Treatment Acres within Habitat Type Groups 4-6 by Current Cover

Proposed Treatment Acres within Habitat Type Groups 4-6 by Current Cover								
Current Cover	HTG-4	% of HTG-4	HTG-5	% of HTG-5	HTG-6	% of HTG-6	Grand Total	% of all HTGs
AGR	-	0%	-	0%	-	0%	-	0%
ALTERED-GRASSES	-	0%	-	0%	-	0%	-	0%
CW	8	0%	-	0%	-	0%	25	1%
DF	829	37%	-	0%	229	76%	1,058	41%
DF-AF	194	9%	-	0%	54	18%	248	10%
DF-ES	133	6%	-	0%	-	0%	133	5%
DF-J	5	0%	-	0%	-	0%	5	0%
DF-LP	853	39%	-	0%	-	0%	853	33%
DF-LP-AF	9	0%	-	0%	-	0%	9	0%
DF-PP-LP	-	0%	-	0%	-	0%	-	0%
L	-	0%	14	20%	-	0%	14	1%
L-DF	35	2%	-	0%	-	0%	35	1%
LP	79	4%	9	13%	18	6%	106	4%
LP-AF	16	1%	46	67%	-	0%	62	2%
MESIC-SHRUBS	-	0%	-	0%	-	0%	-	0%
NF	-	0%	-	0%	-	0%	-	0%
PP	-	0%	-	0%	-	0%	-	0%
PP-CW	17	1%	-	0%	-	0%	17	1%
PP-DF	37	2%	-	0%	-	0%	37	1%
PP-DF-J	-	0%	-	0%	-	0%	-	0%
PP-J	-	0%	-	0%	-	0%	-	0%
RIPARIAN-GRASSES	-	0%	-	0%	-	0%	-	0%
UPLAND-GRASSES	-	0%	-	0%	-	0%	-	0%
URBAN	-	0%	-	0%	-	0%	-	0%
WATER	-	0%	-	0%	-	0%	-	0%
XERIC-SHRUBS	-	0%	-	0%	0	0%	-	0%
Grand Total	**2,214**	**0**	**68**	**0**	**302**	**146%**	**2,601**	**100%**

Table 5: Proposed Treatment Acres within Habitat Type Group 9, NA and Blank by Current Cover

Proposed Treatment Acres within Habitat Type Groups 9 - Blank by Current Cover								
Current Cover	HTG-9	% of HTG-9	HTG-NA	% of HTG-NA	HTG-Blank	% of Blank	Grand Total	% of all HTGs
AGR	-	0%	-	0%	1	10%	-	0%
ALTERED-GRASSES	5	1%	-	0%	-	0%	-	0%
CW	-	0%	-	0%	-	0%	25	5%
DF	-	0%	-	0%	-	0%	-	0%
DF-AF	-	0%	-	0%	-	0%	-	0%
DF-ES	-	0%	-	0%	-	0%	-	0%
DF-J	-	0%	-	0%	-	0%	-	0%
DF-LP	-	0%	-	0%	-	0%	-	0%
DF-LP-AF	-	0%	-	0%	-	0%	-	0%
DF-PP-LP	-	0%	-	0%	-	0%	-	0%
L	-	0%	-	0%	-	0%	-	0%
L-DF	-	0%	-	0%	-	0%	-	0%
LP	-	0%	-	0%	-	0%	-	0%
LP-AF	-	0%	-	0%	-	0%	-	0%
MESIC-SHRUBS	113	25%	-	0%	-	0%	113	22%
NF	3	1%	20	49%	2	22%	25	5%
PP	-	0%	-	0%	-	0%	-	0%
PP-CW	-	0%	-	0%	-	0%	-	0%
PP-DF	-	0%	-	0%	-	0%	-	0%
PP-DF-J	-	0%	-	0%	-	0%	-	0%
PP-J	-	0%	-	0%	-	0%	-	0%
RIPARIAN-GRASSES	1	0%	-	0%	-	0%	1	0%
UPLAND-GRASSES	324	73%	-	0%	-	0%	324	63%
URBAN	-	0%	19	48%	5	47%	24	5%
WATER	-	0%	1	2%	2	22%	3	1%
XERIC-SHRUBS	-	0%	-	0%	-	0%	-	0%
Grand Total	**447**	**0**	**40**	**0**	**11**	**0**	**516**	**100%**

As indicated by Tables 3-5 above, current cover type differs from HTG across the planning area. This is expected as habitat type is an indication of potential vegetation or climax condition, and current cover is the existing vegetation at the time of the latest inventory in 2014, 2015. Where current cover type and HTG align, climax conditions have developed or are developing in the absence of disturbance. One example of this where approximately 50% of the Douglas-fir Habitat Type Groups are dominated by Douglas-fir cover types (row 4 of table 3 above). Some minor mapping errors are possible as where approximately 24 acres of urban land are proposed for treatment (table 5 above). These errors are expected to be minor in extent and will be handled by minor adjustments during implementation.

Table 6: Current Cover Type Code Descriptions

Current Cover	Description
ALTERED-GRASSES	Non-forested
CW	Cottonwood
DF	Doulgas-fir
DF-AF	Douglas-fir - Subalpine fir
DF-ES	Doulgas-fir - Engelmann spruce
DF-J	Doulgas-fir - Juniper
DF-LP	Doulgas-fir Lodgepole pine
DF-LP-AF	Doulgas-fir - Lodgepole pine - Subalpine fir
L	Western larch
L-DF	Western larch - Douglas-fir
LP	Lodgepole pine
LP-AF	Lodgepole pine - Subalpine fir
MESIC-SHRUBS	Non-forested
NF	Non-forested
PP	Ponderosa pine
PP-CW	Ponderosa pine - Cottonwood
PP-DF	Ponderosa pine - Doulgas-fir
PP-DF-J	Ponderosa pine - Doulgas-fir - Juniper
PP-J	Ponderosa pine - Juniper
UPLAND-GRASSES	Non-forested
URBAN	Non-forested
WATER	Non-forested
XERIC-SHRUBS	Non-forested

The departure from the midpoint of the NRV has resulted in forest conditions that are highly susceptible to and experiencing forest insect and disease outbreaks as documented by the USDA Forest Health and Protection entomologists and pathologists (Haavik, L. and Costanza, K., 2020). Current conditions predispose these forests to naturally uncharacteristic wildfire, exacerbated by continuous crowns and dense ladder fuels in Douglas-fir habitat types and continuous patches of even aged stands in subalpine fire habitat types across the landscape (BLM forest inventory, 2014). Past insect and disease outbreaks in the planning area increased tree mortality and the proportion of dead standing and downed trees, creating particularly large fuel loads. These unhealthy forest conditions on BLM lands pose a risk to the extensive private tracts and resources interspersed with federal land in the planning area. Land ownership patterns and related complexities in the planning area have precluded substantial forest health and fuels reduction efforts in the past.

1.2 Decision to be Made

The BLM will decide whether to implement the Proposed Action or an alternative to the proposed action. The BLM may decide to implement either all or a subset of the actions described in the Proposed Action. If there is a decision to move forward with some or all of these activities the BLM will also decide the extent, location, timing, and project design features associated with each activity.

1.3 Land Use Plan Conformance

The Proposed Action is in conformance with the 2021 Missoula RMP (USDI-BLM 2021). The Proposed Action complies with the RMP goals and guidelines; specifically, as listed:

VEGETATION: FOREST VEG AND SPECIAL STATUS PLANT SPECIES

Goals

FV-G-2. Restore or maintain forests within the natural range of variability (NRV) for each habitat type group in terms of species composition, structure, density, and disturbance patterns. Emulate disturbance patterns in terms of intensity, frequency, and scale.

FV-G-4. Create, maintain, and restore vegetative communities that are resilient to changing disturbance regimes (e.g., drought, wildfire, insects, and pathogens), allowing for shifting of plant communities, structure, and ages across landscapes.

Objectives

FV-OBJ-1. Increase the number of acres in each habitat type group that are within the mid-range natural range of variability for that habitat type group to restore ecological conditions consistent with suitable disturbance regimes.

FV-OBJ-2. Increase acres of treatment on the landscape where appropriate through management opportunities (mechanical, as well as prescribed fire) to emulate or restore natural disturbance patterns.

FV-OBJ-3. Treat approximately 15,000 acres per decade, with a goal of moving 10 percent per decade of forest vegetation that is currently near the lower or upper bounds of the natural range of variability (NRV) toward the midrange of NRV by using mechanical means or prescribed fire, or both.

FV-OBJ-5. Manage vegetation structure, density, species composition, patch size, pattern, and distribution to reduce impacts of wildland fires and forest insect outbreaks that are outside the NRV.

FV-OBJ-8. Promote development of fire-resilient forests for public safety, wildland firefighter safety, and to reduce the risk of catastrophic wildland fire. Work collaboratively with all land management partners to manage public, private, and tribal lands. Apply prescribed burns and mechanical or hand fuels treatments to reduce the potential for uncharacteristic wildfires. Apply maintenance treatments at appropriate levels to retain fire resilient conditions.

Management Actions and Allowable Uses

FV-MA-1. Design treatments to emulate disturbance and move conditions toward stand density, species composition and structure, which are within NRV for all habitat types.

FV-MA-2. Consider vegetation management treatments in warm dry habitat type groups a moderate to high priority based upon departure from NRV, and treatments in cool moist and cold habitat type groups a moderate to low priority based upon departure from NRV.

FV-MA-4. Maintain adequate access for management activities and treatments including permanent or temporary roads as necessary. Determine road locations based on topography, drainage, soil type, and other natural features to minimize erosion. Rehabilitate skid trails and temporary roads by appropriate methods that disperse runoff, reduce erosion, and promote revegetation as needed.

FV-MA-5. Apply site-specific treatments to emulate historic disturbance patterns within the historic range of variability in terms of intensity, frequency, and scale.

FV-MA-9. In the wildland-urban interface (WUI), prioritize fuels reduction to address site-specific conditions and objectives for public safety rather than moving vegetation toward NRV or managing for any other objectives.

FV-MA-10. Prioritize stands with characteristics indicating a high risk of developing epidemic levels of forest insects and/or disease for treatments to reduce risk across all habitat type groups.

FV-MA-11. Manage slash to be conducive to revegetation and advantageous to the passage of wildlife. Dispose of slash when necessary to reduce fire hazard in the WUI or to accomplish other resource objectives.

FV-MA-14. Maintain or, where practical, enhance site productivity on lands available for harvest: (a) minimize insect and disease losses with harvesting and management practices; (b) precommercial thin stands to maximize growth on residual trees; and (c) participate in tree improvement cooperatives and use genetically improved seedlings in reforestation of these lands.

FV-MA-17. Apply project-level design features as appropriate (Appendix P).

This document has been prepared to comply with the National Environmental Policy Act (NEPA). The authority for BLM actions is found in the Federal Land Policy and Management Act (USDI-BLM 1976) (43U.S.C. 1701). The Proposed Action presented in this EA is consistent with federal and state legislation pertaining to land management, water and air quality, threatened and endangered species, and antiquities protection.

Section 106 of the National Historic Preservation Act (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 requires Federal agencies to take into account the effects their actions would have on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Cultural resources are locations of past or current human activity, occupation, or use and include prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places. Cultural resources can also be natural features including native plant localities that are considered important to a culture, subculture, or community. Traditional Cultural Properties (TCPs) are places associated with the traditional lifeways, cultural practices, or beliefs of a living community. These sites are rooted in the community’s history and are important in maintaining cultural identity. Locations of TCPs are often not known to the BLM but may still be present in the planning area.
Section 7 of The Endangered Species Act (ESA) requires that the BLM consult with the U.S. Fish and Wildlife Service (USFWS) when land use planning to ensure the Proposed Actions do not jeopardize the recovery of threatened and endangered species or adversely modify their critical habitats.

Canada lynx (*Lynx canadensis*) (threatened) grizzly bear (*Ursos arctos horribilis*) (threatened) and North American wolverine (*Gulo gulo luscus*) (proposed) may inhabit the planning area. The Biological Opinion on the Effects of the Bureau of Land Management, Missoula Field Office Revised Resource Management Plan on Grizzly Bears, Canada Lynx, and Designated Lynx Critical Habitat (USDI-FWS 2020) would be followed. The Canada Lynx Conservation Assessment and Strategy, 3rd edition (Interagency Lynx Biology Team 2013) would be followed. Canada lynx critical habitat is present and Federal Register, Vol 79, No. 177, Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment would be followed. The Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy (USDI-FWS 2013) and the Grizzly Bear Recovery Plan (USDI-FWS 1993) would be followed.

The proposed action complies with bull trout and habitat management policy found in the 2021 Missoula FO RMPA. The RMPA guidance is based on compliance with the 2015 Recovery Plan for the Conterminous United State Population of Bull Trout and key support documents Conservation Strategy for Bull Trout on USFS lands in Western Montana (2013) and the Updated Interior Columbia Basin Strategy (2014). Bull trout (threatened) and bull trout designated critical habitat would not be affected due to factors associated with design features (Appendix F) and conservation measures incorporated into the proposed action; as well as the distant proximity and local topography of vegetation treatments and haul routes (Appendix D map 9.4) to occupied bull trout habitat and bull trout designated critical habitat.

1.4 Issues Identified for Analysis

1.4.1 Issue 1 – How will the Proposed Action impact forest vegetation in the context of wildfire resiliency, forest fuel loading, firefighter safety, NRV and forest vegetation resistance and resilience to forest insects and disease outbreaks?

1.4.2 Issue 2 – How will the Proposed Action impact local and regional economies?

1.4.3 Issue 3- How will the Proposed Action impact Canada lynx and Canada lynx critical habitat; grizzly bear and their habitat; and the contiguous U.S. wolverine Distinct Population Segment?

1.5 Issues Identified but Eliminated from Further Analysis (If Applicable)

The following Issues Identified but Eliminated from Further Analysis have corresponding rational, or criteria listed. See Appendix F for a full list of Design Features for the Proposed Action, many of which have been developed specifically to address these eliminated issues.

How will harvest and fuel treatment operations impact soil productivity of specifics soils requiring protection for ecological health (biological soil crusts)?

Eliminated from detailed analysis because loss of biological soil crusts would be avoided through buffering of soil crust locations during treatment layout (see Appendix F: Design Features for the Proposed Action).

How will road construction impact unstable soils?

Eliminated from detailed analysis because unstable soils will be reviewed during unit layout and avoided during road construction (see Appendix F: Design Features for the Proposed Action).

How would harvest operations impact coarse woody debris?

Forest management activities have the potential to benefit large woody debris through strategic recruitment by cutting and leaving large wood in situ. Smaller materials are left in place through slashing of small diameter trees (see Appendix F: Design Features for the Proposed Action).

How will mechanical harvest operations impact soil productivity?

The inclusion of design features and best management practices to protect soil resources has been proven effective by long term monitoring studies and field review of best management practices. Avoidance of harvesting and yarding timber materials on wet soil conditions is the best method to maintain and protect soils (see Appendix F: Design Features for the Proposed Action).

How will mechanical harvest operations impact lotic and lentic riparian features properly functioning condition (PFC) status?

The Missoula RMP (USDI-BLM 2021), Appendix B discusses the effectiveness of managing for Riparian Conservation Areas (RCAs) through adaptive management techniques that improve or maintain aquatic habitat at the site-specific level.

For the Clark Fork Face project, RCAs for all lotic and lentic features were evaluated to determine appropriate Riparian Management Objectives (RMOs) and assess RCA widths; these site-specific RCAs and RMOs are available in the Clark Fork Face project record. The intent of these buffers is to meet the objectives of Montana Stream Management Zone (SMZ) buffers, meet the intent of the Montana DEQ MOU to manage streams to maintain or improve water quality in 303(d) listed stream in support of the Clean Water Act, and meet Forestry Best Management Practices (MT-DNRC 2015) to maintain water quality (see Appendix F: Design Features for the Proposed Action).

How will prescribed fire operations impact hydrologic function of riparian areas (lotic and lentic features)?

Incorporation of design features will minimize fire effects in riparian areas; the intent of this design feature is not to eliminate fire from riparian areas, rather it is to reduce fire severity in order to manage for riparian benefits, including expedited soil biogeochemical cycling and riparian seed germination (see Appendix F: Design Features for the Proposed Action).

How will construction of new <u>temporary</u> roads impact hydrologic function of riparian areas (lotic and lentic)?

Impacts from temporary roads are anticipated to be short term in duration and result in removal of the road prism from the landscape. Mitigations to restore soil and hydrologic function of these features would facilitate recovery of these features, with recovery of soil-water infiltration, vegetation, and soil recovery occurring in 10 to 40 years (Luce 1997, Lloyd et al. 2013) (see Appendix F: Design Features for the Proposed Action).

How would implementation of the proposed project adversely affect cultural resources?

By implementing the design features listed in Appendix F as well as those listed in the RMP (USDI-BLM 2021) and the Programmatic Agreement the impact is reduced to a point it is not significant (see Appendix F: Design Features for the Proposed Action).

How would disturbance from project implementation affect Special Status Plants: keeled bladderpod and Howell's gumweed?

By implementing the design features listed in Appendix F as well as those listed in the RMP (USDI-BLM2021) and BLM Special Status Species Management, Manual 6840 (USDI-BLM 2008) the impact to keeled bladderpod and Howell's gumweed is reduced to a point it is not significant (see Appendix F: Design Features for the Proposed Action).

How would implementation of the proposed project affect livestock grazing within an allotment?

Forest improvement and fuel reduction projects generally do not have negative impacts on livestock grazing. This is both because the season of vegetation treatment operations (summer and winter) generally does not coincide with livestock season of use, and livestock are not generally affected by machinery operations. Additionally, portions of the proposed treatments are located in areas not currently grazed by livestock.

How would project implementation impact solid mineral development?

If there are no active solid minerals operations present at the time of implementation, the issue can be dismissed because the resource is not present. The scale of solid minerals projects are smaller (<5 acres), a few weeks of work/season), and flexible in operation. Therefore, impacts to solid minerals are below the threshold of significance (see Appendix F: Design Features for the Proposed Action).

How would abandoned mine lands impact on-the-ground safety of the workforce implementing the vegetation treatment under the CFF.

With AML site avoidance as a design feature, the issue can be dismissed. If there are no AML features identified, the issue can be dismissed because the resource is not present (see Appendix F: Design Features for the Proposed Action).

How would construction and rehabilitation of roads affect the visual characteristics of the landscape?

By implementing the design features listed in Appendix F as well as those listed in the RMP (UDSI-BLM 2021) the impact to visual characteristics is reduced to a point it is not significant (see Appendix F: Design Features for the Proposed Action).

How would cutting units affect the visual characteristics of the landscape?

By implementing the design features listed in Appendix F as well as those listed in the RMP (UDSI-BLM 2021) the impact to visual characteristics is reduced to a point it is not significant (see Appendix F: Design Features for the Proposed Action).

How would increased traffic from operation affect recreationists (i.e. rock climbers, snowmobilers, hunters, tourists)?

By implementing the design features listed in Appendix F, signage and road restriction should reduce the impact to a point it is not significant (see Appendix F: Design Features for the Proposed Action).

How would permanent road construction provide access to the public?

Permanent roads will be closed to the public through some sort of physical barricade (i.e. Kelly hump, rocks, gate) and temporary roads are for authorized use only. There are no new open motorized routes proposed therefore road construction will have no impact on motorized access (see Appendix F: Design Features for the Proposed Action).

How would operations effect the National Winter Recreation Trail/Garnet Winter Backcountry Byway?

Short term impacts are potential however by implementing the design features listed in Appendix F as well as those listed in the RMP (UDSI-BLM 2021) the impact to the National Winter Recreation Trail/Garnet Winter Backcountry Byway is reduced to a point it is not significant (see Appendix F: Design Features for the Proposed Action).

How would proposed treatments affect fisheries habitat within the planning area (including SSS species and designated critical habitat)?

When treatments are designed to comply with the Aquatic and Riparian Habitat Conservation Strategy, adverse impacts to aquatic habitats will be negligible. The strategy includes Riparian Conservation Areas (buffers) with exceptions based on IDT site specific analysis that allow for treatments that maintain or enhance Riparian Management Objectives. In general, the strategy calls for 300' RCAs to preserve riparian function, water quality and aquatic habitat complexity on fish bearing streams, including SSS (westslope cutthroat and bull trout) and Designated Critical Habitat (bull trout) (see Appendix F: Design Features for the Proposed Action).

How will new road construction affect fisheries habitat within the planning area (including SSS species and designated critical habitat)?

New road construction is not planned to take place in RCAs. New road construction adjacent to RCAs will follow BMPs (MT-DNRC 2015) and Design Features to minimize or eliminate potential impacts to fisheries habitat. All authorized activities will be designed and implemented to conserve Riparian Management Objectives, indirectly conserving fisheries habitat (see Appendix F: Design Features for the Proposed Action).

How will proposed treatments affect the western toad and habitat within the planning area?

Western toads concentrate near wetlands associated with stream corridors and lentic waterbodies. By following BMPs (MT-DNRC 2015) and Design Features that conserve riparian and wetland habitats, western toad populations and habitats will be minimally affected (see Appendix F: Design Features for the Proposed Action).

How will proposed treatments affect Environmental Justice
Environmental Justice was considered, but no issues of concern were identified in the Clark Fork Face planning area. Within the Clark Fork Face planning area, 25% of the population is low income and 10% minority. This is less than the percentages within the broader reference point of the tri-county area (Missoula, Granite, and Powell Counties) in which 32% of the population is low-income and 11% of the population is considered minority. It is not anticipated that there would be any disproportionate impacts on the existing EJ population(s) within the planning area and, therefore, an issue considered but not carried forward for detailed analysis. This analysis could be revisited if additional information is revealed as a result of public comment or other source during the EA process

How would the Proposed Action affect BLM Special Status terrestrial wildlife species and their habitat? By implementing the design features listed in Appendix F, BLM Special Status terrestrial wildlife species and their habitat will be minimally affected. See Appendix F: Design Features for the Proposed Action as well as Appendix I: Wildlife Issues Considered but Not Analyzed in Detail.

How would the Proposed Action impact migratory birds and their habitat? By implementing the design features listed in Appendix F, migratory birds and their habitat will be minimally affected. See Appendix F: Design Features for the Proposed Action as well as Appendix I: Wildlife Issues Considered but Not Analyzed in Detail.

How would the Proposed Action affect big game species and their habitat, specifically winter range, disturbance/displacement, and forage availability? By implementing the design features listed in Appendix F, big game species and their habitat, specifically winter range, disturbance/displacement, and forage availability will be minimally affected. See Appendix F: Design Features for the Proposed Action as well as Appendix I: Wildlife Issues Considered but Not Analyzed in Detail.

2 Alternatives

2.0 Alternative 1 – No Action Alternative

The No Action Alternative would not implement the Proposed Action. The No Action Alternative would result in no acres treated on BLM lands in the planning area. The No Action Alternative would fail to meet the purpose and need of the Proposed Action to protect life, property, and firefighter safety in and near the WUI; restore healthy ecological conditions; maintain and enhance native plant communities; increase resistance and resilience to forest insects and disease and provide local and regional economic benefits. Without treatment, the stands would continue to exhibit heightened risk of uncharacteristic wildfire, continued forest pest outbreaks and epidemics, and further deviation from the midpoint of NRV. These persistent and increasingly unhealthy forest conditions would present a continued and heightened potential for loss of private structures and life due to catastrophic wildfire, as well as loss of habitat for wildlife including federally listed threatened species.

The BLM would continue to implement current federal and state regulations, policies, and decisions concerning water and air quality, fire suppression, noxious weed management, and threatened and endangered species.

2.1 Alternative 2 – Proposed Action Alternative

Proposed Action Objectives

1. Protect life, property and firefighter safety in and near the wildland-urban interface and promote resilience to wildfire by reducing forest fuel loading and breaking up homogeneous stand conditions.
2. Restore healthy ecological conditions by increasing the acreage of forest communities that are moving towards the midpoint of NRV.
3. Maintain and enhance native and sensitive plant communities; this includes maintaining and enhancing limber pine (*Pinus flexilis)* populations where present.
4. Improve ecological health by increasing resistance and resilience to forest insect and disease outbreaks.
5. Provide local and regional economic benefits through harvest of forest products and capturing the value of dead timber while it remains salvageable.

Mechanical and manual treatments will be used alone and in combinations to achieve these objectives. Specifically, these treatment types are:

1. Mechanical treatments involve the use of equipment such as wheeled tractors, crawler-type tractors, skidders, feller bunchers, excavators, bobcats, or specially designed vehicles with attached implements. These treatments include timber harvest with prescribed fire, and fuels management which may include mastication, grinding, machine piling and/or chipping.
2. Manual treatments include the use of hand tools and hand-operated power tools. These treatments include fuels augmentation (hand felling sapling to pole-sized trees augment fuels in sufficient quantities to better achieve burn objectives), thinning, prescribed fire, and limber pine (*Pinus flexilis)* enhancement. Conifer cone collection and planting may occur throughout the planning area depending on specific cone yield and reforestation needs.

Table 7: Proposed Treatments

CFF Proposed Treatment Acres	
Treat Group	**Acres**
Fuels Management	2,394
Limber Pine Enhancement	306
Prescribed Fire	5,068
Thinning	1,567
Timber Harvest with Prescribed Fire	9,812
Grand Total	**19,147**

Table 8: Proposed Treatments by Habitat Type Group

	Habitat Type Group Acres									
Treatment Group	**HTG-1**	**HTG-2**	**HTG-3**	**HTG-4**	**HTG-5**	**HTG-6**	**HTG-9**	**NA**	**(blank)**	**Grand Total**
Fuels Management	519	1,200	0	212	22	32	381	20	8	2,394
Limber Pine Enhancement	102	191	12				1			306
Prescribed Fire	1,240	3,153	128	356	14	89	65	20	3	5,068
Thinning	309	867	7	356	8	19	1			1,567
Timber Harvest with Prescribed Fire	2,951	5,326	59	1,290	23	162	0			9,812
Grand Total	**5,121**	**10,737**	**207**	**2,214**	**68**	**302**	**447**	**40**	**11**	**19,147**

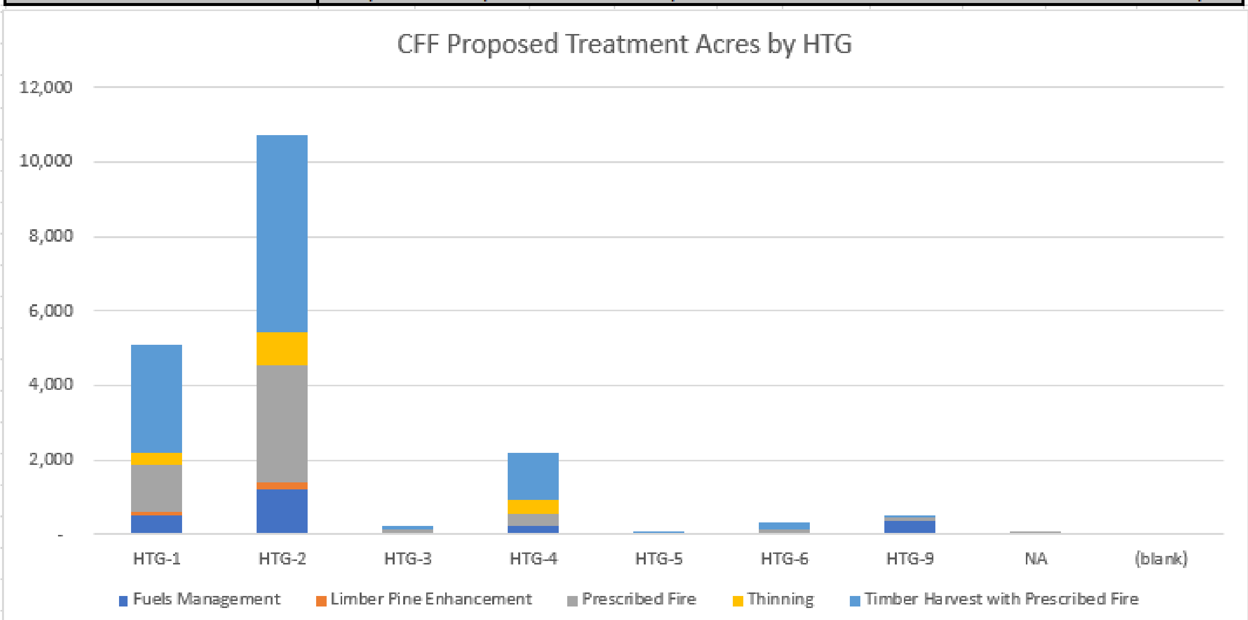


Figure 3: CFF Proposed Treatment Acres by HTG

In some cases, treatment objectives will overlap, as in the case where limber pine enhancement occurs within a Fuels Management treatment unit, or Fuels Management occurs within a Thinning treatment unit. In these cases, the individual treatment unit would have multiple objectives. See Table 9 below.

Table 9: The original thirteen proposed treatment types based on site specific stand conditions were consolidated into five proposed treatment groups based on the highest anticipated ground disturbance.

CFF Proposed Treatments by Treatment Group				
Fuels Management	Timber Harvest with Prescribed Fire	Limber Pine Enhancement	Prescribed Fire	Thinning
Fuels_Mgt	Harvest_Rx Burn	PIFL	Rx Burn	Thin
PIFL_Fuels_Mgt	Harvest_Rx Burn_Fuels_Mgt		Rx Burn_PIFL	Thin_PIFL
Rx Burn_Fuels_Mgt	Harvest_Rx Burn_PIFL			
Thin_Fuels_Mgt				

For brevity thirteen original proposed treatment types based on site specific stand conditions were consolidated into five treatment groups for the proposed action. Approximate acres per treatment have been presented above according to the proposed treatment with the highest anticipated ground disturbance (Mechanical > Manual). The complete stand list with full proposed treatment is available in the project record. See Appendix D. Map 9.1 for approximate locations of proposed treatments and 9.2 for habitat types on BLM lands within the planning area.

Prescribed Fire Treatments (Approximately 5,068 acres)

Objectives for the prescribed fire treatments are to protect life, property and firefighter safety in and near the WUI and promote resilience to unnaturally intense wildfire by reducing forest fuel loading, to create or maintain early seral conditions, and to create seedbeds to encourage natural regeneration. The prescribed burns will be low to moderate intensity broadcast burns resulting in varying degrees of mortality to the seedlings, saplings, and pole sized conifers, and low to moderate severity fire effects in the medium, large, and very large conifers. In treatment units where fuel augmentation is needed, sapling to pole-sized trees will be hand felled to augment fuels in sufficient quantities to better achieve objectives.

Within in HTG-1 – HTG-3, (approximately 4,521 acres) in Douglas-fir and ponderosa pine cover types, burns will be intended to reduce small diameter conifers by 50 to 75%, while keeping mortality in the medium to large trees at less than 10%, reduce duff to less than 40 percent from present levels, and increase mineral soil exposure less than 10 percent. In western larch cover types the burns will be intended to increase mineral soil exposure by at least 50% to create favorable seedbeds for western larch regeneration, while keeping mortality in the medium to large trees at less than 20%.

Within HTG-4 – HTG-6, (approximately 459 acres) in lodgepole pine cover types, the burns will be intended to increase mineral soil exposure by 20-50% to create favorable seedbeds for lodgepole pine regeneration. Within mixed conifer cover types, burns will be intended to reduce small diameter conifers by 50 to 75%, while keeping mortality in the medium to large trees at less than 20%, reduce duff to less than 40 percent from present levels, and increase mineral soil exposure less than 20 percent. In western larch cover types the burns will be intended to increase mineral soil exposure by at least 50% to create favorable seedbeds for western larch regeneration.

Across the planning area approximately 87 acres of the proposed prescribed fire treatment are within HTG-9 or have no HTG assigned. Treatments as described above would be applied as appropriate based on site conditions.

Control lines may be used on all or portions of prescribed fire unit boundaries. These control lines may be roads, trails, rock scree, or constructed firelines. Firelines may be constructed by hand, machines, or using fireline explosives. Existing roads and trails accessing these units would be maintained for use during implementation. It is anticipated that approximately 300 – 1000 acres of prescribed fire treatments would occur per year, including post-harvest burning over the next 10 – 15 years. Following treatments, these sites will be monitored using the Missoula Field Office Prescribed Fire and Fuels monitoring protocols for effectiveness. Maintenance treatments such as follow up prescribed burning would be considered and implemented as needed following the initial treatment.

See Appendix E, Figure 6 for a representative stand image and Figures 18 and 19 for implementation examples. See Appendix D. Map 9.1 for approximate locations of proposed prescribed fire treatments.

Fuels Management Treatments (Approximately 2,394 acres)

The planning area is located in two Fire Management Zones (FMZ) as established by the 2021 Missoula RMP (USDI-BLM 2021). The FMZ classification is used to guide and prioritize wildfire response and fuels management. FMZ 1 is characterized as having a high instance of values at risk, or areas at high risk of catastrophic fire due to current vegetation conditions, where an unplanned wildland fire is likely to cause negative effects. These lands are within and adjacent to the WUI, intermingled with private and state lands, and contain important cultural, recreational, economic, or biological resources. FMZ 2 is generally further from values at risk, where wildland fire is desired to manage ecosystems, but constraints limit the use of wildland fire. Within FMZ 2, the full range of fuels treatments including mechanical, manual and prescribed fire on lands in this category will be important to the success of wildland fire management.

The objectives of the Fuels Management Treatments are to protect life, increase the safety of firefighters, and protect property, improvements, and infrastructure. This is accomplished by reducing fuels (tree densities and associated slash) so that during a wildland fire event there will be a greater potential for ground fire rather than crown fire, giving fire managers more options for fire management.

These treatments will be the highest priority on BLM administered lands within the within the WUI and Fire Management Zone I and take precedence over other resources (USDI-BLM 2021). Within the WUI and Fire Management Zone I, these treatments may occur within Canada lynx habitat within lynx analysis units, and lynx critical habitat (USDI-BLM 2021). Within the areas designated as critical lynx habitat, treatments will focus on areas that do not provide the habitat structures constituting foraging and denning habitats in current condition.

Fuels management treatments may also occur within FMZ 2 and in that case multiple resource objectives would be pursued. Where treatments occur within Canada lynx habitat within lynx analysis units, and lynx critical habitat, treatments would be designed to enhance and create dense early stand initiation forage habitat, in a mosaic pattern across the landscape over space and time. These treatments are intended to result in short-term effects with long-term benefits to snowshoe hare, red squirrel, and lynx, however, to the extent possible these treatments would only be applied in areas not currently providing lynx foraging and denning habitats (USDI-BLM 2021).

Table 10: Proposed Treatments by Fire Management Zone

Treatment Acres by Fire Management Zone			
	Fire Management Zone		
Treatment Group	**FMZ 1**	**FMZ 2**	**Grand Total**
Fuels Management	2,378	16	2,394
Limber Pine Enhancement	306		306
Prescribed Fire	4,981	87	5,068
Thinning	1,490	77	1,567
Timber Harvest with Prescribed Fire	9,117	695	9,812
Grand Total	**18,272**	**876**	**19,147**

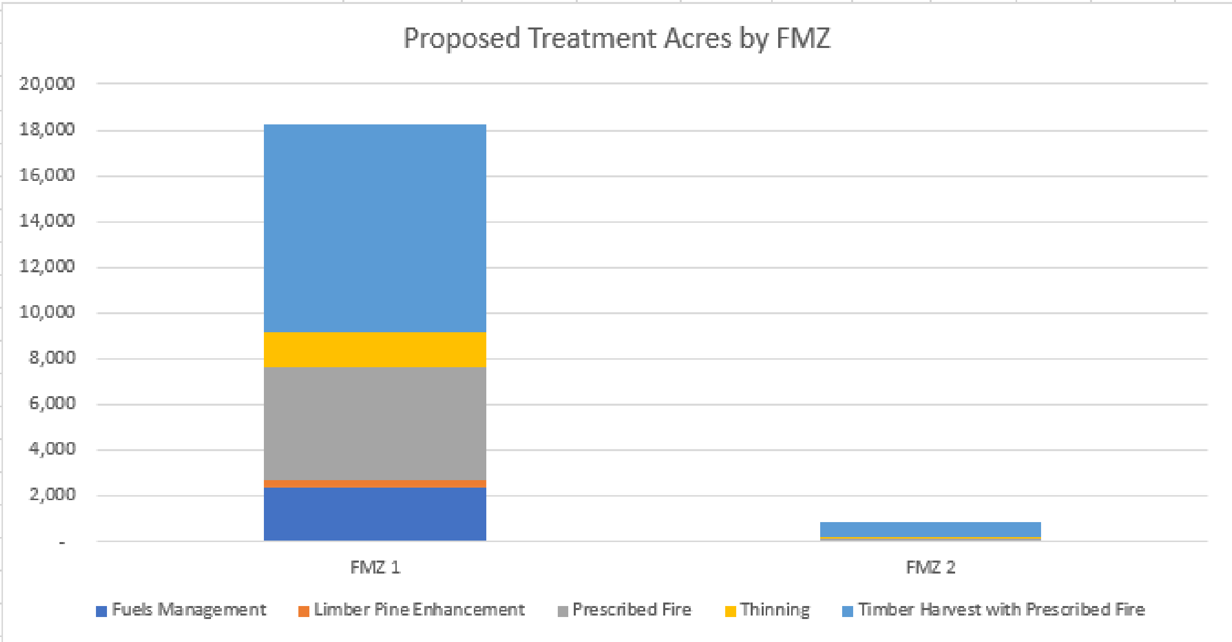


Figure 4: CFF Proposed Treatment Acres by FMZ

In these fuels management treatments, trees favored for removal would generally be shade tolerant ingrowth in the understory, while trees favored for retention would be shade intolerant species in the overstory. Via these treatments canopy base heights would be lifted by removing ladder fuels, and stocking would be reduced sufficiently to discourage crown to crown ignition. Where dense early stand initiation establishment is an objective or thinning from below is not feasible due to poor forest health, insect and disease infestation or similar site specific conditions, group selection silvicultural systems may be prescribed where opening size would be sufficient to recruit and sustain shade intolerant regeneration. Fuels management treatments may be accomplished through timber harvest, stewardship (contracts wherein forest products are traded for services), service contract or by other means such as Force Account (actions performed by agency personnel), Intergovernmental Order or Cooperative Agreement (actions performed by cooperators). The biomass created during the treatments (limbs, tops, small trees) will be removed or treated either by the machinery (masticator, chipper, etc) or burned (piled or broadcast). Following treatments, these sites will be monitored using the Missoula Field Office Prescribed Fire and Fuels monitoring protocols for effectiveness.

Stands initially selected for this treatment are BLM forested stands, within ¼ mile of a structure, according to the Montana State Library GIS (Geographic Information System) structure database (See Appendix D, map 9.7). It is possible that additional structures have been built since that data was published (version date: Dec. 2020), or vegetation may have changed since the inventory was conducted in 2014. On-site conditions may dictate a larger buffer in some places or treating along primary travel-ways and escape routes. It is anticipated that approximately 300 – 1000 acres of fuels management treatments would occur per year over the next 5 to 10 years. Following treatments, these sites will be monitored using the Missoula Field Office Prescribed Fire and Fuels monitoring protocols for effectiveness. Maintenance treatments such as follow up fuels management would be considered and implemented as needed following the initial treatment.

See Appendix E, Figure 8 for a representative stand, and Figure 11 for post-treatment example. See Appendix D. Map 9.1 for approximate locations of proposed fuels management treatments.

Timber Harvest with Prescribed Fire (Approximately 9,812 acres)

The objectives for this treatment are to protect life, property, and firefighter safety in and near the WUI, restore healthy ecological conditions; maintain and enhance native plant communities; increase resistance and resilience to forest insects and disease, and provide local and regional economic benefits, as well as the prescribed fire treatment objectives above.

Various silvicultural systems will be used to meet the proposed action objectives depending on forest conditions existing at the specific treatment units.

Within HTG-1 – HTG-3, (approximately 8,337 acres) on Douglas-fir dominated sites uneven-aged silvicultural systems to include group selection and single tree selection will be utilized to reduce residual stocking to approximately 60 – 80 square feet of basal area per acre and reduce the mean diameter of at least 50% of the Douglas-fir in the stand to less than 10”. Where western larch is present, opening size would be sufficient to recruit and sustain shade intolerant regeneration, which is generally no smaller than having a radius of one site potential tree height (SPTH) or approximately 0.72 acres in stands with 100’ SPTH. This residual stand would be categorized as having a Low Douglas-fir Beetle (DFB) hazard rating, according to the DFB infestation risk management guidelines released by the US Forest Service Forest Health and Protection (USFS FHP) group (Kegley 2011). If revisions to the recommendations are made by the USFS FHP group, the newest and best information will be utilized.

On ponderosa pine dominated sites within these habitat type groups, uneven-aged silvicultural systems to include group selection and single tree selection will be utilized to randomly distribute Individuals, Clumps and Openings (ICO) across the harvest area. In this case, an individual is a tree having no other trees within roughly 20’ (approximately 6 meters); clumps can be small (2-4 trees within 20’ of each other) or large (5+ trees within 20’ of each other), and openings are areas without trees (Churchill et all, 2013). Note that trees within clumps have interlocking crowns. Opening size would be sufficient to recruit and sustain shade intolerant regeneration, which is generally no smaller than having a radius of one SPTH or approximately 0.72 acres in stands with 100’ SPTH. Density induced tree mortality may occur within clumps where residual stocking is greatest, however at the stand level residual stocking would be reduced to < 80 square feet of basal area per acre. The treatment created openings will increase heterogeneity across the landscape and the resulting regenerated stands would increase age / size class diversity in the planning area thereby shifting conditions towards the midpoint of NVR. Due to the reduction in basal area, and resulting multi-storied stand development, this residual stand would be categorized as having a low Mountain Pine Beetle (MPB) hazard rating according to the MPB infestation risk management guidelines released by the USFS FHP group (Gibson 2004). If revisions to the recommendations are made by the USFS FHP group, the newest and best information will be utilized.

Where mortality or insect infestation already exists due to MPB, DFB, Western Spruce Budworm (WSB), or root diseases, sanitation and salvage harvests (removal of trees killed, infested or likely to be infested) would be utilized to reduce insect reproduction or the spread of root/stem diseases in the stand, and to reduce fuel loading and corresponding fire hazard within the stand. If blowdown occurs after harvest, removal of trees that are blown over will likely occur to reduce the potential for DFB, Pine Engraver (Ips Pini) (Livingston 2010, and Haavik, L. and Costanza, K., 2020) or other forest pest population increases in accordance with the Forest Product Objective 5 of the 2021, Missoula RMP (USDI-BLM 2021). These treatments would also move harvested stands toward a multi aged stand structure, which mimics stand structures developed by mixed severity fire regimes. See Appendix E, Figures 2, 3, 4 for representative stands, and figures 12, 13 and 15 for post-treatment examples.

Within HTG-4 – HTG-6, (approximately 1,476 acres) on lodgepole pine dominated sites, even-aged silvicultural systems to include shelterwood, seed tree or regeneration harvests may be used to mimic moderate – high severity and stand replacing fire regimes. Because of the WUI within the planning area, and adjacent private resources, implementing moderate to high severity prescribed burns are not an available management option in this area. For that reason, we plan to mimic these disturbances with mechanical treatment. These treatments would often retain less than 30 square feet of basal area per acre to encourage re-initiation of early seral species via natural regeneration. The treatment created openings will increase heterogeneity across the landscape and the resulting regenerated stands would increase age / size class diversity in the planning area thereby shifting conditions towards the midpoint of NVR. Increasing age and size class diversity would create or add to the mosaic effect where even-aged or single species stands have developed. In addition to the shift towards midpoint of NRV, these mosaics across the landscape and improved heterogeneity within the stand would greatly reduce the planning area's susceptibility to a large scale MPB outbreak (Gibson 2004).

On mixed conifer dominated sites within HTG-4 – HTG-6, ecologically appropriate silvicultural systems will be utilized to emulate disturbance. Where western larch is present, opening size would be sufficient to recruit and sustain shade intolerant regeneration, which is generally no smaller than having a radius of one SPTH or approximately 0.72 acres in stands with 100' SPTH. A mosaic of successional stages would be distributed across the landscape to deter future landscape scale mountain pine beetle or other insect epidemics. In order to reduce the stand's susceptibility to WSB, treatment created opening size or crown spacing would be sufficient to recruit and sustain shade intolerant regeneration (Pederson et al. 2011). Where mortality or infestation already exists due to insect or disease activity, sanitation and salvage harvests would be utilized to reduce insect reproduction in the stand, and to reduce fuel loading and corresponding fire hazard within the stand. If blowdown occurs after harvest, removal of trees that are blown over would likely occur to reduce the potential for forest pest population increases in accordance with the Forest Products Objective 5 of the 2021, Missoula RMP (USDI-BLM 2021) . See Appendix E, Figure 10 for a representative stand, and figures 14, 16 and 17 for post-treatment examples.

Within the Canada lynx habitat occurring in Lynx Analysis Units and lynx critical habitat, (generally Engelmann spruce (ES) and subalpine fir (AF) cover types within HTG 4 – HTG 6), harvest treatments would not include burning and timber harvest would be conducted to leave shrub cover (by conducting operations over snow cover) where possible. Treatments will focus on areas not currently hosting lynx foraging or denning habitat.

Within Canada lynx habitat in designated Lynx Analysis Units and critical habitat (generally ES and AF cover types within HTG 4 – HTG 6), treatments would be designed to enhance or create dense early stand initiation foraging habitat and dense mature multistory denning habitat, in a mosaic pattern across the landscape over space and time. In areas not currently providing lynx foraging and denning habitats treatments are intended to result in short-term effects with long-term benefits to snowshoe hare, red squirrel, and lynx (USDI-BLM 2021).

Across all habitat type groups, in areas having sufficient regeneration of desired species as dictated by NRV, an intermediate silvicultural treatment such as thinning would be utilized to accelerate the development of larger size classes of trees and shift species composition in the overstory. The BLM would utilize naturally occurring retention groups and openings such as areas incompatible with harvesting (talus slopes, rock outcrops) and agency specified reserve areas (riparian areas, wildlife travel corridors, retention patches) to create or maintain groups and openings.

Within HTG-4 – HTG-6 and in Canada lynx critical habitat where an intermediate silvicultural treatment such as thinning is proposed as described above, irregular thinning techniques such as Variable Density Thinning (VDT) (thinning which incorporates a range of stem spacings and reserve areas) or Adaptive Complexity Thinning (ACT) would be utilized. ACT is an intermediate silvicultural treatment specifically designed to restore complex structure and promote spatial complexity in homogeneous young forests (Fahey et al. 2018). See the Thinning proposed treatment section for a full description of ACT.

It is estimated that just over half (57%) of the treatment area would be skyline (cable) yarded with full or partial log suspension, while the remainder (43%) would be ground-based (tractor-skidded). Cable yarding would be used on slopes over roughly 40 percent and in all riparian protection zones. A low to mixed severity prescribed burn would follow harvest.

Species diversity and increased tree vigor are anticipated to improve resilience to disturbance and would occur as a result of harvest and burning treatments by shifting tree species composition, density and arrangement to conditions that more closely resemble the NRV. This would be accomplished by: increasing proportion and establishment of early seral species; accelerating the development of larger size classes of trees; developing multi-aged or two aged stand structures; recruiting quality wildlife habitat snags and coarse down woody debris; and increasing patch sizes to more closely resemble natural patterns (See Appendix G).

It is anticipated that approximately 300 – 1000 acres of timber harvest with prescribed fire treatments would occur per year, over the next 10 – 15 years. Post-harvest monitoring would include regeneration surveys on the first, third- and fifth-year following regeneration harvests, noxious weed monitoring on soils exposed from harvesting and landing operations, blowdown monitoring following severe wind events and forest pest monitoring following USFS FHP guidelines (Haavik, L. and Costanza, K., 2020). Based on regeneration surveys that are conducted, whenever possible, the BLM would plant conifers species into openings larger than approximately 20 acres in size resulting from treatment when natural regeneration does not become established to desired levels within 15 years or cannot be reasonably expected in 15 years (USDI-BLM 2021) (see Appendix F). Maintenance treatments such as follow up sanitation, salvage, prescribed burning or fuels management would be considered and implemented as needed following the initial treatment.

Generally, dead trees greater than 24 inches DBH would not be permitted to be cut for firewood unless they are within two tree lengths of an open road. An exception to this is if there is a high density of dead trees creating a public safety hazard and the needs for snag dependent wildlife habitat have been met, dead trees greater than 24 inches DBH could be harvested (USDI-BLM 2021) (see Appendix F).

See Appendix D. Map 9.1 for approximate locations of proposed timber harvest with prescribed fire treatments

Temporary and permanent road construction.

Temporary and permanent road construction is proposed to enable implementation of timber harvest with prescribed fire treatments, which often would include fuels reduction and a number of additional objectives (see Table 9 in this section). Approximately 6 miles of temporary roads are proposed and would be constructed to BLM engineering and design specifications. Temporary roads would be utilized for a specific treatment and are expected to remain on the landscape for approximately 3 years from construction. Following use and at the conclusion of the treatment, all temporary roads would be obliterated or made impassable, and have native seed applied (See Appendix E. Figure 22). Approximately 16 miles of new permanent roads are proposed and would be constructed to BLM engineering and design specifications, including all applicable laws, regulations, and Best Management Practices (MT-DNRC 2015). Permanent roads would remain post-treatment for long term land management objectives. All proposed roads permanent and temporary, would be permanently closed to public motorized use. Zero miles of new open motorized routes are proposed.

To facilitate the proposed action, approximately 19 miles of roads currently existing on the landscape would be added to the BLM System. This change is not an increase of road miles or density as they are currently existing but would lead to better mapping, maintenance and upkeep by classifying them as BLM System roads. No change of road closure status is proposed; therefore, zero miles of new open motorized routes are proposed.

All existing roads used to transport machinery and logs would be maintained or improved to the standards found in *Best Management Practices for Forestry in Montana, as revised* (MT-

DNRC, 2015). See Appendix D. Map 9.4 for Approximate haul route and road construction locations.

Thinning (Approximately 1,567 acres)

The objective of thinning is to reduce stem densities to allow for growing space and corresponding improved tree vigor. Intermediate silvicultural practices would be implemented through thinning from below and improvement treatments where trees favored for removal would be overtopped, poor formed or poor performing individuals as well as those impacted by forest insects, disease or physical damage. Trees favored for retention would be well formed, dominant and codominant individuals as well as those expressing resistance to or no ill effects from forest insects and disease (see Appendix E, Figure 5).

Where appropriate, (typically within HTG-4 – HTG-6 and in Canada lynx critical habitat) irregular thinning techniques such as Variable Density Thinning (VDT) (thinning which incorporates a range of stem spacings and reserve areas) or Adaptive Complexity Thinning (ACT) would be utilized. ACT is an intermediate silvicultural treatment specifically designed to restore complex structure and promote spatial complexity in homogeneous young forests (Fahey et al. 2018). ACT as is similar to low thinning (thinning from below) in that one of its purposes is to release tall, well-formed crop trees (especially the shade-intolerant species). However, this method is distinguished by its lower height limit and its incorporation of reserves. Crop trees are selected for release at a semi-regular spacing and the largest competing neighbors are cut to reduce competition and accelerate growth, but, importantly, shade-tolerant seedlings and shrubs less than 3’ (1 m) tall are retained for understory snowshoe hare cover in the short-term, and to accelerate development of multiple canopy layers over the longer term, a habitat characteristic preferentially used by both snowshoe hare and Canada lynx. ACT is also characterized by incorporation of forest reserves and is a form of irregular or variable-density thinning in this respect. These treatments would randomly distribute gaps and clumps across the treatment areas to emulate natural stand structure and for wildlife habitat benefits.

Thinning treatments are intended to result in short-term effects with long-term benefits to snowshoe hare, red squirrel, and lynx, by expediting the development of dense mature multistory denning habitat. Additionally, the BLM would utilize naturally occurring retention groups and openings such as areas incompatible with treatment (talus slopes, rock outcrops) and agency specified reserve areas (riparian areas, wildlife travel corridors, retention patches) to create or maintain groups and openings (USDI-BLM 2021).

Improved forest resiliency and species diversity would occur through thinning by shifting tree species composition to conditions that more closely resemble the NRV. These treatments will provide long-term reduction in hazardous fuels, an increase in individual tree diameter growth and create stands more resilient to future insect and disease outbreaks. Trees would be manually cut with chainsaws to site specific specifications. Trees would be lopped and scattered or piled so slash does not exceed a depth of 18 inches.

It is anticipated that approximately 300 – 1000 acres of thinning treatments would occur per year, over the next 5 -10 years. See Appendix E, Figure 9 for a representative stand, and figures

20 and 21 for post-treatment examples. See Appendix D. Map 9.1 for approximate locations of proposed thinning treatments.

Limber Pine (*Pinus flexilis*) Enhancement (Approximately 306 acres)

Limber pine is a native five-needled pine occurring in isolated stands within the planning area. In recent decades, limber pine populations across the region have decreased due to White Pine Blister Rust (WPBR) infection (Schwandt et al. 2013) as well as Mountain Pine Beetle (MPB) infestation (Gibson 2004). The effects of these forest insects and diseases on the population have been exacerbated by stresses from climatic shifts and fire suppression. The limber pine population within the planning area includes mature cone-bearing trees as well as advanced regeneration however the population's health overall is quite poor as documented by BLM's forest inventory which occurred in 2014 – 2015 and subsequent field visits as well as the USFS Forest Health and Protection Entomologists and Pathologists (Haavik, L. and Costanza, K., 2020) (See Appendix E, Figure 1).

Limber Pine Enhancement treatments include stand level thinning to reduce stand density and increase residual tree growing space as well isolated clearing around individual limber pine known as daylighting. Activities to improve individual tree growing space such as thinning or daylighting may be incorporated into other projects such as timber harvest, fuels management and thinning or may be performed as an independent treatment. Where no other treatments are prescribed, this action would be performed manually with chainsaws or hand tools, which is the case with the approximately 300 acres of limber pine within the planning area. Other enhancement treatments may include cone collection and seedling planting. These activities would be performed manually or by hand.

It is anticipated that approximately 50 – 100 acres of limber pine enhancement treatments would occur per year, over the next 5 -10 years. See Appendix D. Map 9.1 for approximate locations of proposed limber pine enhancement treatments.

See Appendix D map 9.1 for approximate location of all proposed treatments. For all of the proposed treatments, acres and locations referenced are approximate and would change slightly during project layout and implementation. While total acres for each treatment type analyzed would not be exceeded during implementation, individual treatment units are expected to be slightly different in acres and location. In most cases, individual treatment units will be smaller in size and extent due to routine features encountered in the field during layout. In some cases, they will be larger, incorporating adjacent stands with similar vegetation conditions.

See Appendix F for a complete list of Project Design Features for the Proposed Action.

2.2 Alternatives Considered but not Analyzed in Detail

Approximately 4,519 acres (19.1%) of BLM managed land within the planning area were considered for treatment but deferred due to concerns over road building on excessively steep slopes, road building within Riparian Habitat Conservation Areas (RHCA) in Bull Trout Critical Habitat, access across USFS and private lands, or to maintain un-roaded, secure habitat characteristics, especially for grizzly bears. See Appendix E, Figure 7 for a representative stand with no treatment proposed. These changes decreased the amount of proposed road construction by roughly half.

An alternative was considered that included no new temporary or permanent road construction. By only including stands accessible via existing roads, the proposed treatments were reduced by 29% (from approximately 19,147 acres to 13,627 acres) with the most significant decreases in the proposed limber pine enhancement, 46% (approximately 306 acres to 165) and proposed Timber Harvest with Prescribed Fire 40% (approximately 9,812 acres to 5,874).

Proposed Treatment	Alternative 2 proposed treatment acres.	Potential treatment acres without new road const.	Change in acres
Fuels Management	2,394	2,187	-9%
Limber Pine Enhancement	306	165	-46%
Prescribed Fire	5,068	4,056	-20%
Thinning	1,576	1,344	-14%
Timber Harvest with Prescribed Fire	9,812	5,876	-40%
Grand Total	**19,147**	**13,627**	**-29%**

Table 11: Potential treatment acres without new road construction.

As stated in section 2 above, the objectives of the proposed action are as follows:

1. Protect life, property and firefighter safety in and near the wildland-urban interface and promote resilience to wildfire by reducing forest fuel loading and breaking up homogeneous stand conditions.
2. Restore healthy ecological conditions by increasing the acreage of forest communities that are moving towards the midpoint of NRV.
3. Maintain and enhance native and sensitive plant communities; this includes maintaining and enhancing limber pine (*Pinus flexilis)* populations where present.
4. Improve ecological health by increasing resistance and resilience to forest insect and disease outbreaks.
5. Provide local and regional economic benefits through harvest of forest products and capturing the value of dead timber while it remains salvageable.

As the proposed Timber Harvest with Prescribed Fire and the Limber Pine Enhancement treatments are integral to achievement of all five stated objectives, a reduction in nearly ½ (40%) the acres in these two treatments and nearly 1/3 (29%) across the entire proposed treatment has been determined to not meet the Purpose and Need of this project.

3 Affected Environment and Environmental Consequences

3.0 General Setting

The planning area extends approximately 5 – 50 miles east of Missoula, MT in the Clark Fork River sub-basin in west central Montana. The planning area totals approximately 247,191 acres, with a mix of ownerships including BLM (10%); US Forest Service (USFS) (1%); The Nature Conservancy (TNC) (12%); Montana Department of Natural Resources and Conservation (DNRC)(21%); the University of Montana (UM) (1%); small individually owned private (48%) and Stimson Lumber Company (8%). For this project, forest restoration and fuels reduction treatments are proposed on BLM managed lands only, within the planning area. Table 1 in Section 1 displays the mix of land ownership in the planning area. See Appendix D, Map 9.0 for a planning area location and land ownership map.

Decades of fire suppression and past management activities in the planning area have resulted in current conditions that are deviated from the Natural Range of Variability (NRV) when measured by tree species composition, density and age class distribution. This deviation from the NRV results in high susceptibility to forest insect and disease outbreaks, high fuel loading and high potential for uncharacteristic wildfire.

Coupled with the deviated and unhealthy state of the BLM forested stands, the private land in the planning area has experienced subdivision and rural development in the past decades. What was once largely industrial forest ownership is now overwhelmingly (48% of the planning area) small, nonindustrial private landowners who are constructing homes and buildings in the forest. This subdivision and rural development have effectively transitioned the entire planning area to Wildland-Urban Interface (WUI) when measured as a proximity to structures. Because of this shift in ownership and use of the private land, the BLM's forested parcels represent an increased risk from wildfire to the private structures and improvements and also to the safety of the residents and firefighters.

3.1 Methodology and Assumptions

A comparison will be made between current conditions and what is considered to be a natural range of variability (NRV) to describe the affected environment and to develop desired conditions for forest vegetation within the planning area. NRV was developed by using "Historical Vegetation of Montana" (Losensky 1997) as a basis for understanding ecologically sustainable conditions. Current conditions were determined by using data collected within the planning area (BLM forest inventory 2014 – 2015 as well as subsequent field visits).

Natural range of variability (NRV) is a spectrum of ecological vegetative states, and the spatial and temporal variation in these states. Modeling was used to develop a quantified estimate of the NRV for the planning area and knowledge of historical conditions helped corroborate the model results. Historical conditions were established based on the "Historical Vegetation of Montana" (Losensky 1997). Current conditions were determined by using data collected within the planning area by BLM personnel conducting forest inventory plots as well as photo interpretation. Managing forest ecosystems within their NRV will sustain native species and biodiversity; maintain ecosystem productivity; and provide for the long-term sustainability of ecosystem values and services (Duncan et al 2010, Landres et al 1999, Swanson et al 1994, Haufler 1999, Morgan et al 1994).

3.2 Resource Issue 1

Issue 1 – How will the Proposed Action impact forest vegetation in the context of wildfire resiliency, forest fuel loading, firefighter safety, NRV and forest vegetation resistance and resilience to forest insects and disease outbreaks?

3.2.1 Affected Environment

Prior to Euro-American influence in the Clark Fork Face planning area, the composition, structure and density of the vegetation was a result of natural disturbance processes and succession. Since that time, land use practices such as timber harvest, road construction, urban development, livestock grazing, and fire exclusion have altered the conditions of upland vegetation. Land use and land management practices and policies that have functionally suppressed fire in the affected landscape have had profound effects on many ecological communities, ecosystem processes, and the biodiversity which is dependent on a fire-influenced native condition.

Fire has been important in shaping vegetation structure and composition in the Interior Columbia Basin for thousands of years and was the dominant disturbance process which historically sustained forest ecosystems and biodiversity at the watershed scale (Johnson et al 1994). Many anecdotal and scientific reports have documented the widespread occurrence of fire throughout the region. The causes of these fires were both natural and human-caused. Lightning caused fires during the summer months were abundant and spread across the landscape according to fuels, weather, and topography. Native Americans purposefully ignited fires for thousands of years for a multitude of reasons including food gathering, clearing migration routes, hunting large game, enhancing plant resources, and fighting battles (Pyne 2001). These fires were mostly surface fires that maintained low and variable tree densities, light and patchy ground fuels, simplified forest structure, and favored fire-tolerant trees such as ponderosa pine, Western larch and lodgepole pine and a low and patchy cover of associated fire-tolerant shrubs and grasses (Hessburg et. al 2005). Based on historical accounts (Arno 1980, Gruell 1983, Wellner 1970) and recent fire-scar studies (Agee 1993, Agee 1998, Agee 2004, Fischer and Bradley 1987, Arno et al. 1997, Arno et al. 1995, Barrett 2004), fire in the planning area was a relatively frequent disturbance event prior to Euro-American settlement.

Fire also provided other important feedbacks and effects to the forest landscape. For example, frequent surface fires favored fire tolerant trees such as western larch by periodically exposing patches of mineral soil which larch seed needs to successfully germinate. They maintained fire tolerant forest structures by elevating tree crown bases and scorched or consumed many seedlings, saplings, and pole-sized trees. The fires cycled nutrients from branches and foliage to the soil where they could be used by other plants and promoted the growth and development of low and patchy understory shrub and forb vegetation. Surface fires reduced the long-term threat of large scale running crown fires by reducing the fuel bed and metering out individual tree and group torching, and they reduced competition for site resources among surviving trees, shrubs, and herbaceous cover (Hessburg et al 2005).

As a result of timber harvest associated with European-American settlement and mining activities that took place in the Clark Fork Face planning area in the late 1900s and just after the turn of the 20th century (1920's), many large trees were removed. The checkerboard pattern of ownership in the planning area is a result of a railroad land grant from the General Land Office to the Northern Pacific Railroad to build a northern transcontinental railroad route. They were granted every other section along a 50-mile buffer of the proposed route. These lands then were sold to The Anaconda Company, who sold to Champion International, who sold to Plum Creek Timber Company, who sold to Stimpson Lumber Company who finally sold to TNC. These industrial private forest lands account for about half the planning area, and do not have very many large or very large trees on them.

Fires continued to play an important role in shaping the landscape until the 1940's, when fire suppression was effective enough to limit the role of natural fire throughout the region (Pyne, 1982). Currently the role of wildfire is very limited in the planning area, due in part to the policy of full fire suppression that has been in effect since 1921. The Blackfoot Fire Protection Association (BFPA) was formed in that year and provided forest fire protection to approximately 1.2 million acres of private, state, and federal land, including all of the lands within the planning area. Over five decades, the BFPA built a system of roads, trails, and lookouts that made the organization highly effective in suppressing most fires at less than 10 acres in size. In 1970, the BFPA transitioned fire suppression responsibilities to the State of Montana Department of Natural Resources and Conservation (MT DNRC). Since 1921, very few fires escaped initial attack or affected any major vegetation change within the planning area until 2000. The last two decades we have seen several significant fires escape initial attack including the Ryan Gulch Fire in 2000 (17,100 acres), Dirty Ike Fire in 2003 (824 acres), the Packer Gulch Fire in 2006 (3,059 acres), the Mile Marker 124 Fire in 2007 (6,493 acres), the Felan Gulch in 2012 (177 acres), the Nimrod Fire in 2013 (603 acres), and the Anderson Hill Fire in 2021 (745 acres). Combined these fires have burned 25,440 acres or 10 percent of the planning area, and 684 acres or 3 percent of BLM lands in the planning area. See Appendix D, Map 9.10 fire history map for location and extent of fires.

The planning area is located in two Fire Management Zones (FMZ) as established by the 2021 Missoula RMP (USDI-BLM 2021). The FMZ classification is used to guide and prioritize wildfire response and fuels management. FMZ 1 is characterized as having a high instance of values at risk, or areas at high risk of catastrophic fire due to current vegetation conditions, where an unplanned wildland fire is likely to cause negative effects. These lands are within and adjacent to the WUI, intermingled with private and state lands, and contain important cultural, recreational, economic, or biological resources. FMZ 2 is generally further from values at risk, where wildland fire is desired to manage ecosystems, but constraints (such as private inholdings) limit the use of wildland fire. Within FMZ 2, the full range of fuels treatments including mechanical, manual and prescribed fire on lands in this category will be important to the success of wildland fire management. Most of the BLM lands in the planning area are in FMZ 1 (22,601 or 96%), while 1,064 acres or 4% are in FMZ 2 (See Figure 3 in section 2.1 and Appendix D, Map 9.6).

These past management practices have resulted in accumulations of surface and canopy fuels which have increased the potential for large scale high severity fires (Mutch et al. 1993; Kolb et al. 1998; Keane et al., 2002; Stephens and Ruth, 2005). Because productivity exceeds decomposition in most of the west, surface fuels tend to increase in the absence of disturbance. Tree seedlings, saplings, and fire-sensitive shrubs have become more common and thereby have increased understory fuel loadings. In most coniferous forests, canopy fuels also increase and become more available without disturbance as more shade tolerant trees become established in the understory and overstory (Keane et al., 2002), which is the case within much the planning area. In the absence of fire, Douglas-fir seedlings and saplings have become established and are proliferating in the understory of stands having an overstory of Douglas-fir, ponderosa pine and/or western larch. This has, in effect, created a fuel ladder for fire to easily transition from a low to moderate intensity surface fire into a high intensity crown fire. In many locations across the planning area, the risk of large-scale high severity wildfire and insect and disease infestation has steadily increased due to fire suppression and past management. The State of Montana's recent risk assessment for the Montana Forest Action Plan clearly illustrates these conditions across the planning area. Their Priority Areas for Focused Attention includes 87,780 acres, 35% of the planning area due to wildfire risk, distance to WUI, and insect and disease risk. 11,158 of these acres are on BLM. See Appendix D, Map 9.9 for location.

Historic fire regimes of the Clark Fork Face planning area have and continue to be directly and indirectly altered by human actions. As previously described, Native Americans interacted and influenced this landscape for thousands of years using fire, and those influences are incorporated into the fire history of the area. It is the extent of human influence over the last 100 years that is of primary concern when considering the cumulative impacts to fire regimes in the planning area. Domestic livestock grazing, commercial logging, road and rail construction, urbanization, and rural development all have contributed to the direct or indirect exclusion of fires (Hessburg et al 2005). In particular, land conversion to residential and urban development are obvious changes. Many of the former Stimpson lands have been sold into private ownership. Relatively dense subdivision development in the planning area has occurred in the lower areas of several drainages near the Clark Fork River including Wallace Creek, Kendal Creek , Donovan Creek , and Cramer Creek. In addition to these areas with more concentrated structures, there are numerous residences and structures dispersed on private lands throughout the planning area (see Appendix D Maps 9.7 and 9.8). These subdivisions and structures and a buffer around them make up the WUI for this project (Appendix D Map 9.7).

The planning area contains three counties which each have their own Community Wildfire Protection Plans (CWPP). These county level CWPPs are directly tied to the Healthy Forests Restoration Act of 2003 (HFRA). The HFRA effort asked communities to assume a greater role in identifying lands for priority fuels reduction treatment and proposed treatment recommendations. Each CWPP has been completed in different years (Missoula 2018, Powell 2021, and Granite 2005), and each one defines WUI slightly different. Some of the older CWPPs do not have recent development in their WUI layers. The 2021 Missoula RMP incorporated the CWPP WUI layers. According to the RMP, about 70% of the CFF planning area is considered WUI (175,830 acres) and 5,064 of those acres occur on BLM lands (24%). In order to pick up newer development in the WUI, we used the 2020 Montana Structure Framework from Montana State Library, which we buffered by a ¼ mile to develop the proposed fuels management treatments (Appendix D Map 9.7). The Missoula County CWPP recognizes critical egress areas in the following drainages: Cramer Creek, Wallace Creek, and Donovan Creek. The Missoula Ranger District of the Lolo National Forest is working to develop an all-lands focused fuels and forest resiliency project called Wildfire Adapted Missoula (WAM). The CFF planning area includes 62,268 acres of WAM, or about 25% of the planning area. 1,311 of the WAM boundary covers BLM, mostly in the Wallace Creek drainage (See Appendix D, Map 9.9).

A comparison will be made between current conditions and what is considered to be a natural range of variability (NRV) to describe the affected environment and to develop desired conditions for forest vegetation within the planning area. NRV was developed by using "Historical Vegetation of Montana" (Losensky 1997) as a basis for understanding ecologically sustainable conditions. Current conditions were determined by using data collected within the planning area (BLM forest inventory 2014 – 2015 as well as subsequent field visits). Managing forest ecosystems within their natural range of variability (NRV) will sustain native species and biodiversity; maintain ecosystem productivity; and provide for the long term sustainability of ecosystem values and services (Duncan et al 2010, Landres et al 1999, Swanson et al 1994, Haufler 1999, Morgan et al 1994). The concept of managing forests to move towards or remain within their NRV was utilized to create desired conditions for the Clark Fork Face planning area. Historic conditions provide insight for understanding the set of conditions and processes that sustained ecosystems and biodiversity in the past and provides a reference against which to evaluate current ecosystem change. Recognizing that historic conditions are a single point in time and may not be an attainable goal given current conditions and climactic uncertainties, historic conditions were used provide a context for evaluating current ecosystem conditions, identifying departures and associated risks to ecosystem components, and were used to develop the desired conditions. Desired conditions address size class and structural distributions and tree-stocking levels across the CFF landscape as a strategy to minimize forest vulnerability to stressors consistent with disturbances expected under current and future climates (www.adaptationpartners.org). Managing vegetation in the face of uncertainty requires a variety of approaches and strategies that are focused on enhancing ecosystem resistance and resilience. Overall, desired future conditions reflect what are ecologically sustainable conditions.

In order to describe and contrast differences between present conditions, NRV and desired conditions, forest vegetation in the planning area was divided into broad habitat type groups (HTGs) and a description and comparison of conditions was completed for each group. HTGs are groupings of similar habitat types. Habitat types are an aggregation of ecological sites of like biophysical environments (such as climate, aspect, elevation and soil characteristics) that produce plant communities of similar composition, structure, and function. The vegetation communities that would develop over time, given no major natural or human disturbances—the climax plant community—would be similar in a specific habitat type. Existing vegetation condition (cover type) in a given habitat type can and does vary widely, reflecting each site's unique history, forest character, pattern of disturbances, and point in time along successional pathways. Habitat types are described in detail in Forest Habitat Types of Montana (Pfister et al. 1977). Differences between current and the NRV and a description of desired conditions are summarized below by habitat type group and are displayed in more detail in Appendix G.

Habitat Type Group 1: Warm Douglas-fir (approximately 6,085 Acres, 26%)

These are low elevation dry sites that support ponderosa pine on the driest sites and Douglas-fir on the more moist sites in this group. Prior to disruption of the natural fire regime, bunchgrasses dominated the understory and tree density was low (Green et al., 1992, errata 2008). Fires were generally frequent and non-lethal with a relatively uniform pattern. Average fire frequency ranged between 5 and 25 years (Fischer and Bradley, 1987). Pre-suppression composition and structure was typically open, park-like, multi-storied and multi-aged stands of ponderosa pine with lesser amounts of Douglas-fir. The frequent low severity fires maintained open stand conditions by removing understory shrubs and selectively thinning understory trees. Prior to disruption of the natural fire regime, diseases and insects (bark beetles and root diseases) caused scattered individual and occasional group mortality.

Fire suppression efforts have successfully excluded fire for several natural fire cycles. This has resulted in the warm and dry Douglas-fir habitat types being dominated by increased Douglas-fir composition and density with marked changes in forest structure. Dominant species composition has shifted away from ponderosa pine toward more shade tolerant Douglas-fir. The amount of area in a very large size class (> 21" DBH trees) has been reduced from historic ranges. Seedling / sapling, pole (5.1" – 9" DBH), Medium (9.1"-15") and large (15.1"- 21") tree size classes exceed historic ranges. Historic open uneven aged stand structures are currently under-represented and have been replaced by dense even aged second growth ponderosa pine and multi-storied Douglas-fir dominated stands. Current fire frequency in most of the planning area is greater than 50 years. Unplanned fire occurrence within the planning area under current conditions would likely result in stand-replacement crown fires (Fischer and Bradley, 1987; Graham et al., 2004).

Habitat Type Group 2: Cool Douglas-fir (approximately 13,191 Acres, 56%)

This habitat type group comprises the largest area (>50%) within the CFF planning area. In some areas it is similar to Habitat Group 1 in that it supports relatively open grown ponderosa pine and Douglas-fir forests if there were an intact disturbance regime. Sites in HTG-2 have slightly higher soil moisture and cooler temperatures resulting in some vegetation differences when compared to HTG-1, most notably the occurrence of some areas having a higher proportion of Douglas-fir in them and the occurrence of scattered western larch in some stands. If the fire regime had not been disturbed higher fire frequency sites (typically located adjacent to HTG-1 areas) would be dominated by ponderosa pine and longer fire return interval sites would have less ponderosa pine and increased amounts of Douglas-fir and scattered Western larch. The increased moisture availability on these sites allows them to support greater tree densities. Shrubs and moist site forbs dominate the understory; pinegrass and elk sedge are often well represented. Ponderosa pine and western larch are shade intolerant species whose abundance varies by habitat type phase which is related to time since disturbance. Douglas-fir is typically present at most stages of stand development. The dominant fire groups range from dry Douglas-fir habitat types (fire group 4) to more moist Douglas-fir habitat types (fire group 6) (Fischer and Bradley, 1987). Average fire frequency ranged between 5 and 50 years. Historically fire severity was variable, ranging from frequent, low intensity, non-lethal, understory fires to more infrequent, mixed severity fires.

Endemic level outbreaks of western spruce budworm are within NRV and occur during warm and dry climatic cycles in the HTG, increasing tree stress and predisposing Douglas-fir to other primary mortality agents such as Douglas-fir beetle on a small scale. However, widespread occurrence of western spruce budworm (WSB) defoliation and predisposal to Douglas-fir beetle are currently being experienced throughout this HTG (Flower, et al, 2014; Haavik, L. and Costanza, K., 2020) which are outside of NRV.

The absence of fire as a disturbance process and past harvest have resulted in corresponding shifts in species composition and stand structures. In terms of the NRV, ponderosa pine is underrepresented and have been replaced by shade intolerant Douglas-fir which is overrepresented. The amount of area in pole (5”-9” dbh) and very large size class (> 21” dbh trees) has been reduced from historic ranges. Medium (9.1”-15”) and large (15.1”- 21”) tree size classes exceed historic ranges. Much of the area occupied by HTG 2 within the Clark Fork Face area has dense, continuous, closed canopy Douglas-fir dominated stands with declining ponderosa pine and western larch. Overstocked Douglas-fir stands with dense understories often result in moderate to high burn severities (Fischer and Bradley, 1987).

Habitat Type Group 3: Moist Douglas-fir (approximately 230 Acres, 1%)

The moist Douglas-fir habitat type group comprises a small amount of the CFF planning area (<1%). Currently species composition within this habitat type group is primarily Douglas-fir with remnants of ponderosa pine, Western larch and/or lodgepole pine (fire group 6). Historically, mixed severity fires on 25-125 year average intervals functioned to maintain open stands of larger size-class western larch and Douglas-fir with western larch dominating the sites. Ponderosa pine and/or lodgepole pine, either as minor or major seral components, were also present depending on the site and disturbance regime. Late seral structures varied depending on site location and topography. Sites in areas with higher moisture content and retention such as valleys or north or east aspects were commonly open grown with large to very large size-classes present. These were almost pure western larch stands (Losensky 1997). Late seral structures were commonly uneven-aged in single-storied (or grouped two- storied) configurations of individuals or small, scattered even-aged groups with patches of reproduction or pole-sized trees in the openings. Drier sites on slopes or on south or west aspects were highly variable in age and species composition, although western larch still tended to exhibit dominance. Late seral stands on these drier sites generally were multi-layered with a mixture of species represented by small patches missed by earlier fire events (Losensky 1997).

Some sites are within the historical fire interval for portions of the mixed and lethal fire regimes within this type. However, the lower severity surface fires that historically occurred on shorter return intervals have been affected by fire suppression. With fire suppression, development of coniferous understories is increasing thereby shifting stand structure to multi-storied stands and creating ladder fuels. Stand density is continuing to increase, predisposing portions of this type to a higher percentage of lethal fires instead of mixed severity fire.

Patch size due to changes in the fire frequency and intensity as well as previous logging within these types, has shifted the patch size to a smaller size than what historically occurred (see Appendix G: HTG 6: Cool and Moderately Dry Douglas-fir Series table for more detail).

In the absence of fire, stand understories have developed Douglas-fir thickets over much of the area occupied by this habitat type group within the CFF area. Historical logging that targeted removal of the dominant seral species (western larch, ponderosa pine and lodgepole pine) has allowed for an acceleration of a shift in species composition to a higher percentage of Douglas-fir while altering structure to more multi-layered, dense and younger age-class stands. As displayed in detail in Appendix G, there is a lack of ponderosa pine, Western larch and lodgepole pine (which historically comprised 74-95% of the species composition within this habitat type group) and an overabundance of Douglas-fir. Douglas-fir is currently dominant on 82% of this HTG where historically it is estimated that it occupied between 10%-15%. There is an overabundance of seedling / saplings and medium (9.1" – 15" DBH) size classes, while pole (5.1" – 9" DBH), large (15 – 21.1" DBH) and very large (> 21" DBH) trees are lacking (Appendix G). Fire intensity is currently mixed or lethal severity as evidenced by recent wildfire activity.

Habitat Type Group 4: Moist subalpine fir (approximately 2,588 Acres, 11%)

Mixed and stand replacement fires on 50-200+ year average intervals maintain mixed conifer forests dominated by western larch with Douglas-fir, lodgepole pine, spruce, subalpine fir and deciduous hardwoods (i.e. Scouler's willow and aspen). Historically this type generally exhibited a higher diversity of overstory tree species and understory tree, shrub, forb and graminoid species than many of the other habitat types. The combination of mixed and stand replacement fire regimes created the high diversity on the landscape. This HTG occurred in a matrix with HTGs 5 and 6. (Losensky 1997).

Many stands were multi-layered (1-3 layers; Arno and others 1997), with a mixture of species present occurring in small patch remnants/stands of various ages created from previous fire events (Losensky 1997). Climax multi-storied stands comprised of fire susceptible species (i.e. subalpine fir and spruce) required long time periods to develop. The development time of the climax stands in combination with the fire regimes generally did not allow these stands to develop to any great degree on the landscape (Fischer and Bradley 1987). Where late seral climax stands did occur, they would only persist on moister sites dependent on setting and juxtaposition with natural fire breaks (e.g., riparian, topographic, rock/scree and past fire patterns including "reburn" patches).

Historically patch size within this HTG was dependent on frequency, duration, intensity and severity of the fires occurring. On lands currently managed by the BLM containing this HTG (mid-elevations), patch sizes varied from small to large (50 to >500 acres, with 50% between 50-250 acres) and varied by extent of type and juxtaposition to adjoining fire groups (regimes).

In addition to fire, bark beetles and root diseases caused mortality in small groups under endemic conditions in HTG 4. Periodic outbreaks of western spruce budworm commonly occurred during warm dry climatic cycles and extensive host availability. These conditions increased stress and predisposed relatively dense multi- storied stands to primary mortality agents. Dwarf mistletoe infection in lodgepole pine was commonly associated with late seral stages and relatively open, two-storied stand structures also functioned to increase fire risk.

Extensive lodgepole pine mortality caused by mountain pine beetle epidemics occurred infrequently, usually concurrent with HTG 5 and 6 as a function of elevation and host quality and quantity relationships, commonly exacerbated by prolonged fire free intervals interrupted by drought cycles. Mountain pine beetle infestations have been recorded from as far back as 1894 (MT DNRC 2008). The last major mountain pine beetle outbreak, before the current outbreak, occurred in the1970's to early 80's and affected approximately 4 million acres within the state. Epidemic mountain pine beetle mortality predisposed affected areas to high risk of stand replacement fire at the landscape scale following windthrow and development of ladder fuels in canopy gaps.

Without fire as a disturbance agent, the seral species within this type gradually lose hold of the site and allow subalpine fir and Engelmann spruce to dominate (Davis 1980). Current conditions have higher tree density and greater spatial continuity of these types when compared to historic conditions. The combination of both conditions allows insect and disease epidemics and stand replacement events outside of their historical scale, interval and pattern to occur. As the time between disturbances lengthens, components of aspen, shrub and grasslands that may have existed on the landscape historically decrease and are replaced by shade-tolerant conifers (Brown and Smith 2000). Lack of appropriate disturbance, both temporally and spatially, have increased both ladder fuels and down woody debris allowing the fire regime to shift from mixed severity to greater acres in the stand replacement type. Overall vegetation biodiversity also decreases as the fire regime changes (Brown and Smith 2000).

These sites generally occur on relatively moist and cool to cold slopes and benches between 3,200-7,000 feet in elevation (Pfister and others 1977; Arno and others 1985). On lands managed by the BLM within this HTG, current patch sizes range from small to medium (<50 acres up to 150 acres). Currently 68% of these patches are less than 50 acres. Douglas-fir, lodgepole pine, Engelmann spruce and subalpine fir are currently the dominant species on sites within this HTG. On BLM managed lands, there is an over abundance of pole (5.1 – 9" DBH), medium (9.1 0 15" DBH) and large (15.1 – 21" DBH) size classes, while the seedling / sapling (0-5" DBH) and the very large (>21" DBH) size classes are unrepresented. For more detail on comparisons between current and desired conditions within this HTG, refer to Appendix G.

Habitat Type Groups 5 and 6: Moist subalpine fir (approximately 433 Acres, 1.8%)

Habitat Type Group 5: Cold Subalpine fir (approximately 80 Acres, <1%)
Habitat Type Group 6: Very Cold Subalpine fir (approximately 355 Acres, 1.5%)

Stand replacement fires on 125-250 year intervals functioned to perpetuate extensive even-aged, single- storied lodgepole pine stands. Evidence suggests that "reburn" events periodically occurred within 50 years following a lethal fire event. These lower severity "thinning" fires occurred at the stand scale but were probably rare at the landscape scale. Ground fires removed invading shade-tolerant competition from the understory and reduced risk of higher severity fires. Longer fire-free intervals resulted in establishment of subalpine fir and other shade tolerant species in the understory (dependent on seed source) leading to two- storied structures as lodgepole pine succeeded to other species over the course of 100-200 years.

Development of complexity in composition and structure was rare as a function of low representation of persistent fire resistant species; distance from seed source; slow succession rates; and fuel conditions (including low decomposition rates) which generally favored high severity fire regimes over lower severity regimes.

Patch sizes were generally medium to large (150 to greater than 500+ acres) as a function of setting and juxtaposition with other high severity fire groups. Large scale wind-driven events during drought cycles were common in this type.

Extensive lodgepole pine mortality caused by mountain pine beetle epidemics occurred infrequently, usually concurrent with HTG-4 as a function of elevation and host quality and quantity relationships, commonly exacerbated by prolonged fire free intervals interrupted by drought cycles. Mountain pine beetle infestations have been recorded as far back as 1894 (MT DNRC 2008). The last major mountain pine beetle outbreak, before the current outbreak, occurred in the1970's to early 80's and affected approximately 4 million acres within the state. Epidemic mountain pine beetle mortality predisposed affected areas to high risk of stand replacement fire at the landscape scale following windthrow and development of ladder fuels in canopy gaps. Dwarf mistletoe infection in lodgepole pine was commonly associated with late seral stages and relatively open, two-storied stand structures also functioning to increase fire risk.

Lodgepole pine is the dominant seral species throughout the type and subalpine fir is the indicated climax species, rarely achieving dominant status at the landscape scale. This status is a function of seed source and slow succession rates which are often interrupted by stand replacement fire. Douglas-fir is a minor seral component on warmer drier sites transitional to HTG-3 sites. Spruce is a minor seral component on moister sites that are generally transitional to HTG-4 sites.

Overall, individual stands are within the historical range of conditions for this type, however age class and shade-tolerant species compositions of the stands have shifted and are now covering a higher than natural proportion of the landscape (Arno and Fiedler 2005). Due to fire suppression within the last 100 plus years, stands within this HTG that have not experienced fire or harvest have shifted age classes from young, immature into mostly mature and overmature which allows large acreages of this type to exist in a lodgepole pine 'old forest' state. Lodgepole pine forests within this late seral state are within the age and size classes to be predisposed to mountain pine beetle epidemics and dwarf mistletoe infestation (Losensky 1997). These mature and overmature lodgepole forests are currently occurring over a larger area than they did historically, creating a loss of diversity within this type (Losensky 1997; Fiedler et al. 2004). Loss of diversity is occurring spatially since the patch sizes are not within historical context. Vegetation diversity is being reduced since fire disturbance in this type allows for development of shrub fields and understory forb and grass components (Fiedler et al. 2004).

As discussed in 'Wildland Fire in Ecosystems: Effects of Fire on Flora' (Brown and Smith 2000), fuel loading and buildup is an important factor for length of fire interval within an area. Due to mortality associated with the 2010-2015 mountain pine beetle outbreak, fuel loading within many stands in this HTG has increased exponentially as lodgepole pine snags fall. This increase in fuel loading has prepared these stands for stand replacement fires, potentially at a larger scale than what occurred historically.

These sites occur across a range of conditions depending on the habitat type. The range of sites include moderate to steep slopes on north to east aspects, dry slopes and ridges, cool and moist uplands, well- drained benches and frost pocket basins between 5,000-8,5000 feet in elevation (Pfister et al. 1977). Patch sizes on lands managed by the BLM within these HTGs range from small to medium (50 acres up to 150 acres) with almost 70% of these patches less than 50 acres in size. Dominant species in order of abundance are lodgepole pine and Douglas-fir. On BLM managed lands in HTG-5, there is an overabundance of pole (5.1 – 9” DBH), and medium (9.1 - 15” DBH) size classes, while the seedling / sapling (0-5” DBH), and large (15.1 – 21” DBH) and the very large (>21” DBH) size classes are unrepresented. On BLM managed lands in HTG-6, there is an overabundance of seedling / sapling (0-5” DBH), and medium (9.1 - 15” DBH) size classes, while the pole (5.1 – 9” DBH), and large (15.1 – 21” DBH) and the very large (>21” DBH) size classes are unrepresented. For more detail on comparisons between current and desired conditions within this HTG, refer to Appendix G.

Habitat Type Groups 9, (approximately 1,056 Acres, 4%)

Within the planning area approximately 1,056 acres are within HTG-9.These sites are a mix of historically non-forested grass / shrub / riparian lands. Historically these dry sites would have self-maintained due to frequent fire return intervals of lethal severity in light flashy fuels. Land use and fire suppression over the last century has reduced or eliminated fire’s role on the landscape and has allowed conifer encroachment into many historically non-stocked upland sites. These sites now hold an overabundance of trees of all size classes and are in many cases outside NRV due to that stocking. Within HTG-9, the riparian areas would have seen less frequent fire and so the impact of fire suppression and the resulting deviation from NRV is less, although the impacts of other historic land uses (i.e.. Grazing) remains significant. For more detail on the current size class and stand structures within HTG-9, refer to Appendix G.

NA and Blank: Non-forest, Agriculture and Urban (approximately 82 Acres, <1%)

As stated earlier in this section and in greater detail in the Resource Issue 2 Affected Environment, land conversion from forestland to rural development (Wildland Urban Interface) has increased dramatically over the last several decades, and the planning area now holds over 2,600 homes and structures (see Appendix D Map 9.7). Current conditions are detailed in the Appendix G, however no desired condition, or deviation from NRV has been established for these 82 acres approximately.

CFF Planning Area by HTG BLM ONLY		
HTG	acres	% of total
HTG-1	6,085	26%
HTG-2	13,191	56%
HTG-3	230	1%
HTG-4	2,588	11%
HTG-5	80	0.3%
HTG-6	355	2%
HTG-9	1,056	4%
Not Applicable	57	0.2%

(blank)	25	0.1%
Grand Total	23,666	100%

Table 12: CFF Acres by HTG on BLM only.

3.2.2 Environmental Effects —No Action Alternative

The No Action alternative does not involve any active management strategies and the landscape would remain highly vulnerable to stressors currently present. Proposed Actions designed to increase stand vigor and long-term resistance to unnatural fire and insect and disease damage would be deferred, increasing the risk of stress-induced insect and disease damage in response to increasingly higher tree densities and competition while ultimately predisposing stands to higher risk of crown fire over time (Hood et al. 2016, Byler 1990, Carlson 1989, Fiedler et al. 2004, Graham et al. 1999).

From the USFS Northern Region, Forest Health Protection, Missoula Field Office Trip Report MFO-TR-20-06:

> *No Action: DFB-caused mortality and WSB defoliation and mortality in understory Douglas-fir will continue. Continued WSB defoliation will cause reductions in growth, and thus timber value. Also, survival of understory Douglas-fir will not be likely, as caterpillars feeding in chronically infested trees in the overstory will fall to the understory and kill the smaller trees with fewer energy reserves. Drought or other short-term disturbance is likely within the 15 y management horizon of this project, which could easily initiate, and possibly sustain, a DFB outbreak in high hazard stands.* (Haavik, L. and Costanza, K., 2020).

The No Action alternative would allow understory vegetation to continue to develop, intensifying ladder fuel accumulations. This would result in a continuation of the shift in species composition to Douglas-fir in the understory. Where young ponderosa pine and western larch exists in the understory it would be outcompeted by Douglas-fir, as conditions are favorable for its dominance. Wildfire occurrence could result in rapidly spreading high intensity crown fires due to sapling and pole thickets beneath the main canopy (Fischer and Bradley 1987). This type of fire is likely to result in high levels of mortality in the ponderosa pine and western larch component in the understory and overstory and consume ponderosa pine and western larch seed sources, potentially reducing its distribution across the landscape. Opportunity to reduce fire risk to adjacent high value areas would be also be lost while the risk of independent crown fire and severe surface fire would increase over time. The opportunity to increase fire suppression efficiency and effectiveness through establishment of fuel breaks adjacent to and within the WUI would be lost. A continued decline in associated wildlife habitat would occur over time as bunchgrass and understory communities would be reduced as conifer canopy cover continues to increase. Overall, the effects are a degradation of ecologically at-risk native forb and bunchgrass communities and dry, open ponderosa pine, western larch and Douglas-fir communities. This alternative would move sites on their present trajectory away from ecologically sustainable desired future conditions.

CFF BLM Acres per HTG and Percent Change NO ACTION				
Habitat Type Group	acres	% of total BLM	No Action Treatment Acres	% change on BLM
HTG-1	6092	26%	0	0%
HTG-2	13166	56%	0	0%
HTG-3	228	1%	0	0%
HTG-4	2588	11%	0	0%
HTG-5	80	0%	0	0%
HTG-6	353	1%	0	0%
HTG-9	1058	4%	0	0%
Not Applicable	58	0%	0	0%
(blank)	23	0%	0	0%
Grand Total	**23646**	**100%**	**0**	**0%**

Table 13: CFF BLM Acres per HGT and Percent Change with No Action.

3.2.2.1 Reasonably Foreseeable Actions

The reasonably foreseeable actions within the next two decades, associated with the no action alternative, are continued timber harvest, fuels management and vegetation treatments on the non-BLM public and private lands within the planning area. On BLM lands in the planning area, continued fire suppression and corresponding accumulation of fuels as well as diminishing forest health is expected. These treatments without the proposed action will still have the effect of improving the forest health, vigor and resilience in the area, however the effectiveness of these treatments will be diminished by the BLM's lack of action. BLM will be failing to address forest health and fire risk identified by multiple agencies and efforts such as the Montana Forest Action Plan and Wildfire Adapted Missoula (see Appendix D, Map 9.9). See Appendix H for a complete list of reasonably foreseeable actions in the planning area over the next two decades.

3.2.3 Environmental Effects—Alternative 2

This effects analysis addresses how the Proposed Action alternative will impact forest resources in the context of species composition, density, structure, and fuel loading. The amount of proposed treatment by habitat type group is displayed below. See Appendix 9, Map 9.2 for Habitat Type Groups within the planning areas and Map 9.1 for the proposed action map.

	Habitat Type Group Acres									
Treatment Group	HTG-1	HTG-2	HTG-3	HTG-4	HTG-5	HTG-6	HTG-9	NA	(blank)	Grand Total
Fuels Management	519	1,200	0	212	22	32	381	20	8	2,394
Limber Pine Enhancement	102	191	12				1			306
Prescribed Fire	1,240	3,153	128	356	14	89	65	20	3	5,068
Thinning	309	867	7	356	8	19	1			1,567
Timber Harvest with Prescribed Fire	2,951	5,326	59	1,290	23	162	0			9,812
Grand Total	**5,121**	**10,737**	**207**	**2,214**	**68**	**302**	**447**	**40**	**11**	**19,147**

Table 14: Proposed Treatment Acres by HTG

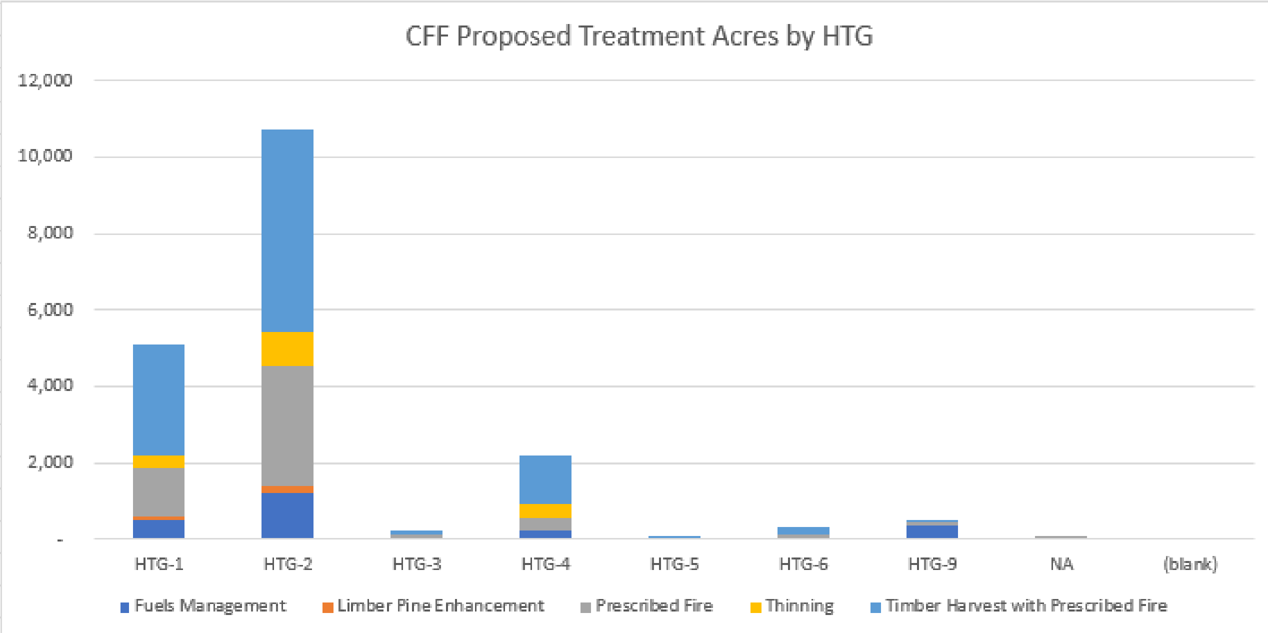


Figure 5: Proposed Treatment Acres by HTG

Fuels Management, Limber Pine Enhancement, Prescribed Fire, Thinning or Timber Harvest with Prescribed Fire are proposed on 19,147 or 81% of BLM lands within the proposed planning area across all HTGs (Table 15 below). These treatment types are expected to have similar effects to forests and fuels within the planning area, so they are grouped for purposes of the effects analysis. The immediate effects of prescribed fire, timber harvest with prescribed fire, thinning, limber pine enhancement and fuels management treatments include: 1) a shift in species composition towards desired conditions which are within the natural range of variability, as described in the detailed Proposed Action (See Appendix G for NRV and Desired Conditions). 2) a reduction in tree density; and 3) increased tree vigor as thinning increases stand photosynthetic efficiency and net primary productivity in residual trees by as much as 20%, functioning to increase crown vigor and resulting diameter growth (Smith et al. 1997).

CFF Acres per HTG and Percent Change							
Habitat Type Group	BLM acres	% of total BLM	Proposed Treatment Acres	% change on BLM	Total acres all ownerships	% of total	Proposed Treatment as % of total
HTG-1	6,085	26%	5121	84%	40,964	17%	2%
HTG-2	13,191	56%	10737	82%	128,472	52%	4%
HTG-3	230	1%	207	91%	2,368	1%	0%
HTG-4	2,588	11%	2214	86%	18,155	7%	1%
HTG-5	80	0%	68	85%	726	0%	0%
HTG-6	355	1%	302	86%	3,503	1%	0%
HTG-9	1,056	4%	447	42%	28,676	12%	0%
Not Applicable	57	0%	40	69%	62	0%	0%
(blank)	25	0%	11	48%	24,267	10%	0%
Grand Total	**23,666**	**100%**	**19147**	**81%**	**247,191**	**100%**	**8%**

Table 15: Percent Change per HTG on BLM and Total across the CFF planning area.

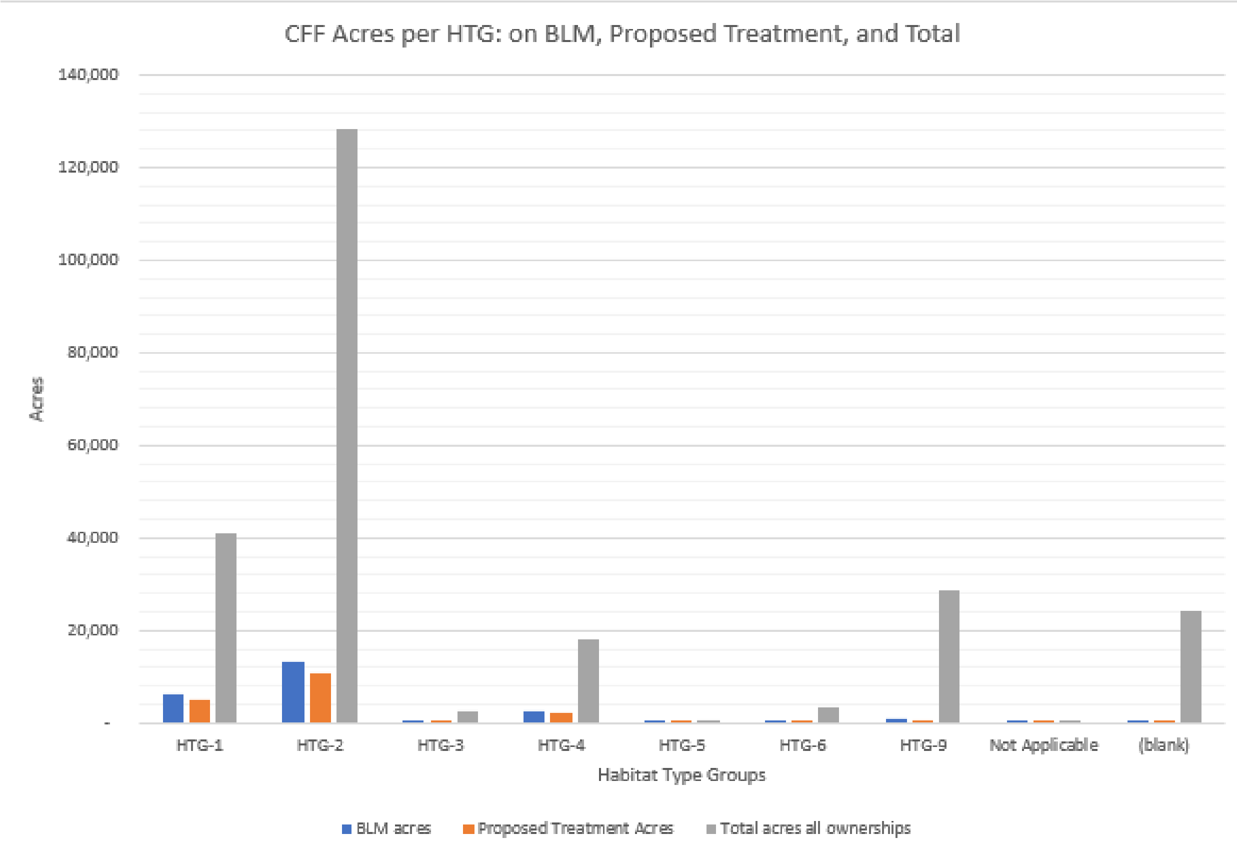


Figure 6: Acres per HTG: on BLM, Proposed Treatment, and total across all ownerships.

As indicated above, while the proposed treatment will treat approximately 81% of the BLM ownership in the planning area, it will only effect 8% of the entire planning area and less than 4% of any given HTG.

Long term effects of proposed prescribed fire, timber harvest with prescribed fire, thinning, limber pine enhancement and fuels management treatments include: 1) accelerated development of a size class distribution (stand structure) that more closely resembles desired conditions which would be within the natural range of variability (see Appendix G); 2) movement toward open uneven aged stand structures that are currently under-represented through thinning and harvest of the dense even aged second growth in the planning area. Uneven aged silvicultural systems that are proposed for timber harvest create or maintain multi-aged stand structures (Smith et al. 1997); 3) proposed treatments would increase tree vigor and as a result increase resilience to insect and disease disturbances outside of the natural range of variability over time by diminishing competition for water and nutrients and by favoring non-host species and creating species diversity (Hood et al. 2016, Byler 1990, Carlson 1989); and 4) wildfire risk in the context of occurrence probability would not be affected through implementation of proposed actions. Proposed treatments would modify fuel loading, arrangement, and continuity to reduce the risk of high intensity crown fire at the stand level across the planning area while improving fire suppression efficacy and efficiency near and within the WUI. Mechanical fuel treatments followed by prescribed burning has been shown to reduce fire severity over burning alone or deferring pre burn fuel treatments (Pollet and Omi 2002, Omi et al. 2006, Peterson et al. 2005). Increased ground cover of bunchgrasses, forbs and shrubs would occur as a result of Proposed

Actions due to a reduction in tree canopy cover and the resulting abundance of sunlight.

Prescribed fire without thinning or harvest is proposed on approximately 5,068 acres or 21% of BLM lands within the planning area across all HTGs. Prescribed fire is proposed on sites that support understory vegetation with thickets of conifer encroachment below the main canopy. Douglas-fir is the primary understory conifer species. As described in the Proposed Action, one of the objectives of this treatment is to restore and maintain early seral conditions in ponderosa pine and western larch stands. Direct effects of proposed prescribed burning would include a reduction in seedling and sapling sized Douglas-fir by 50 to 75%, an increase in mineral soil exposure which creates favorable seedbeds for western larch and ponderosa pine regeneration and a reduction in ladder fuels and surface fuel loading. These direct effects would create the following indirect effects: 1) a shift in species composition from an overabundance of shade tolerant Douglas-fir to early seral fire adapted ponderosa pine and western larch; 2) increased representation and vigor of understory bunchgrasses and shrubs; 3) movement towards or maintenance of open uneven aged stand structures; and 4) a reduction in risk of wildfires burning outside their natural range of variability.

The suite of proposed treatments are designed to shift species composition, structure and density towards the midpoint NRV as stated. Stand structure current conditions on BLM lands and desired conditions are as follows (charts prepared from data presented in Appendix G):

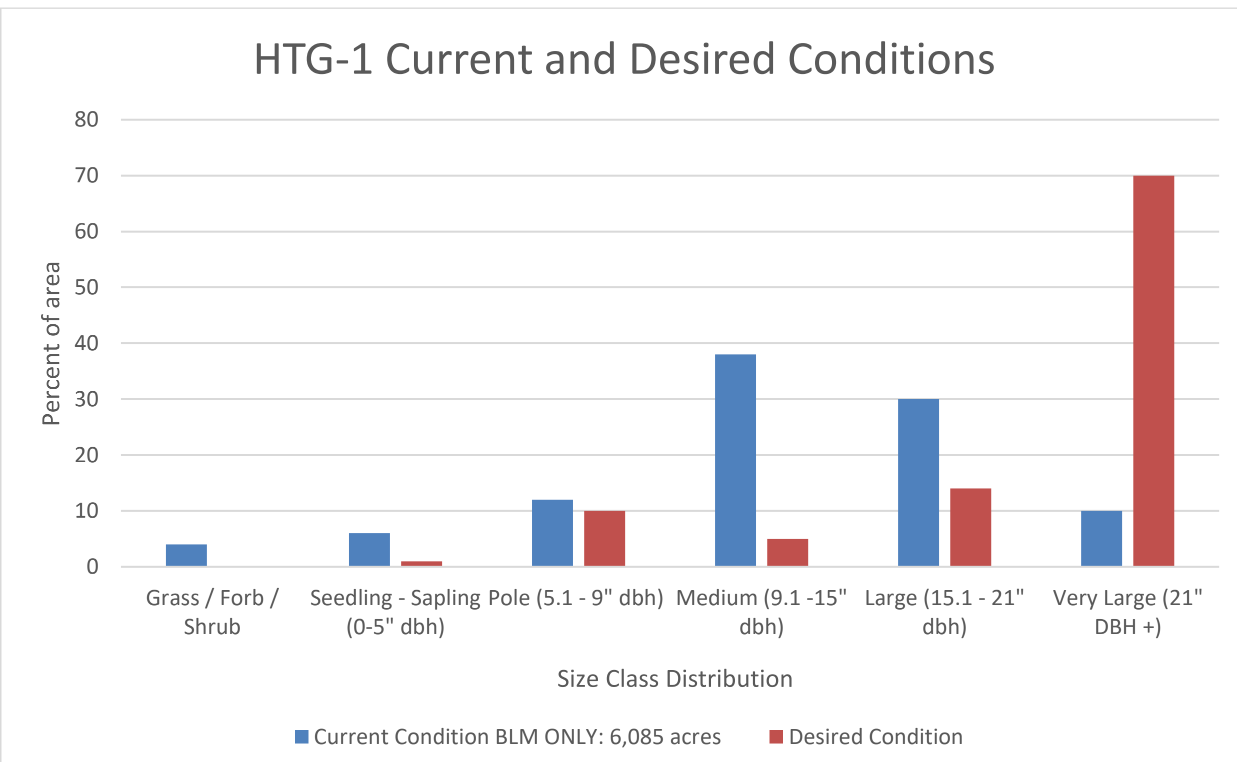


Figure 7: HTG-1 Current and Desired Conditions

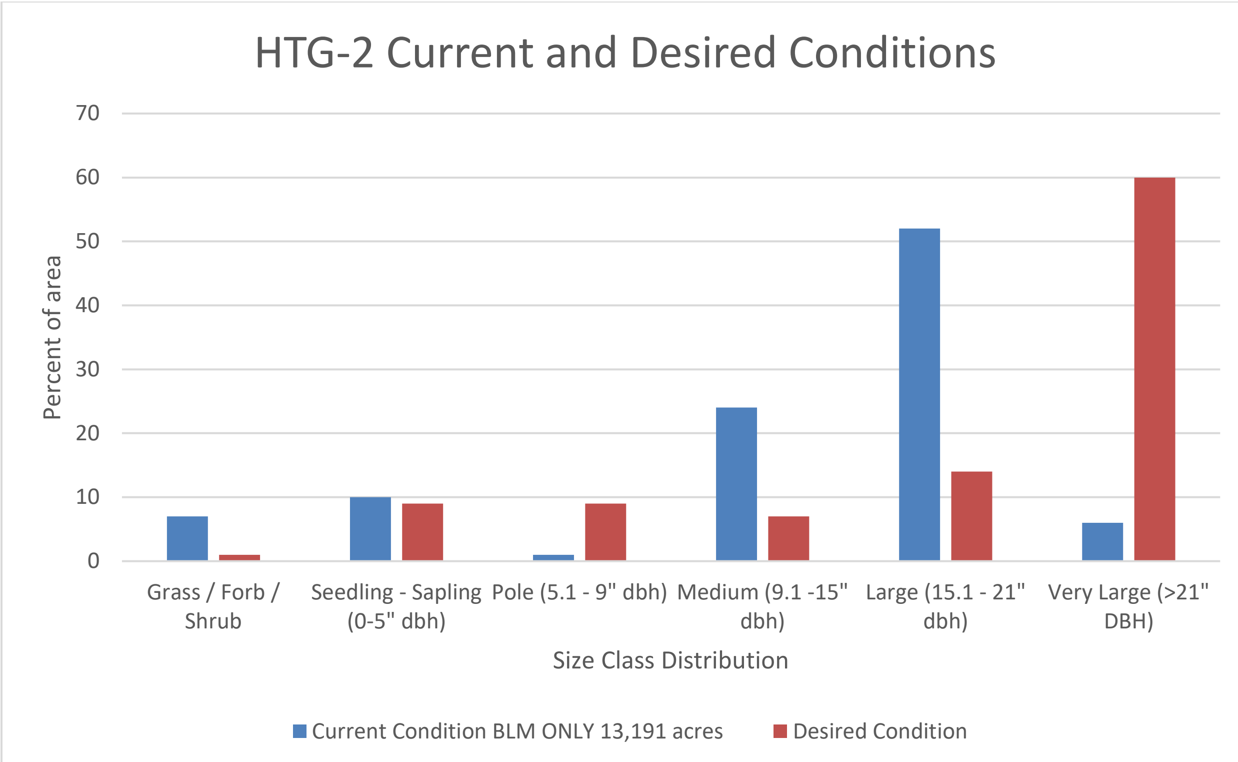


Figure 8: HTG-2 Current and Desired Conditions

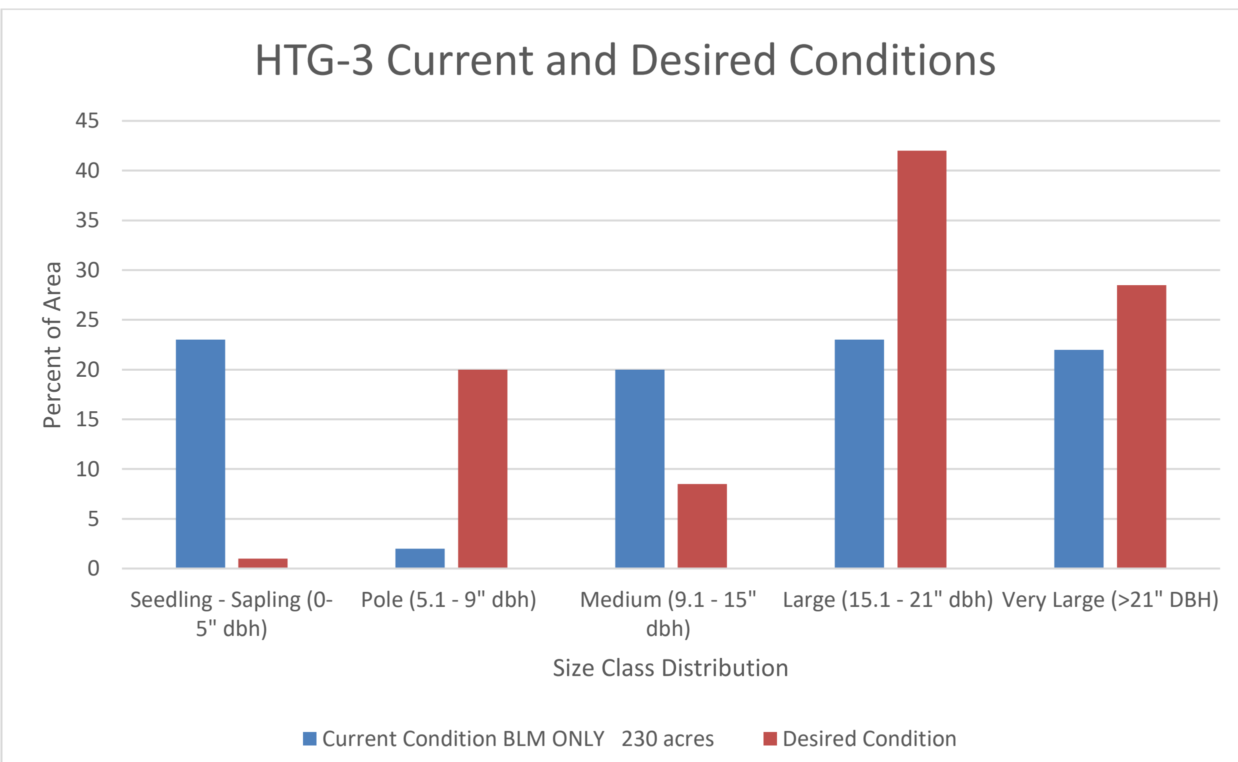


Figure 9: HTG 3 Current and Desired Conditions

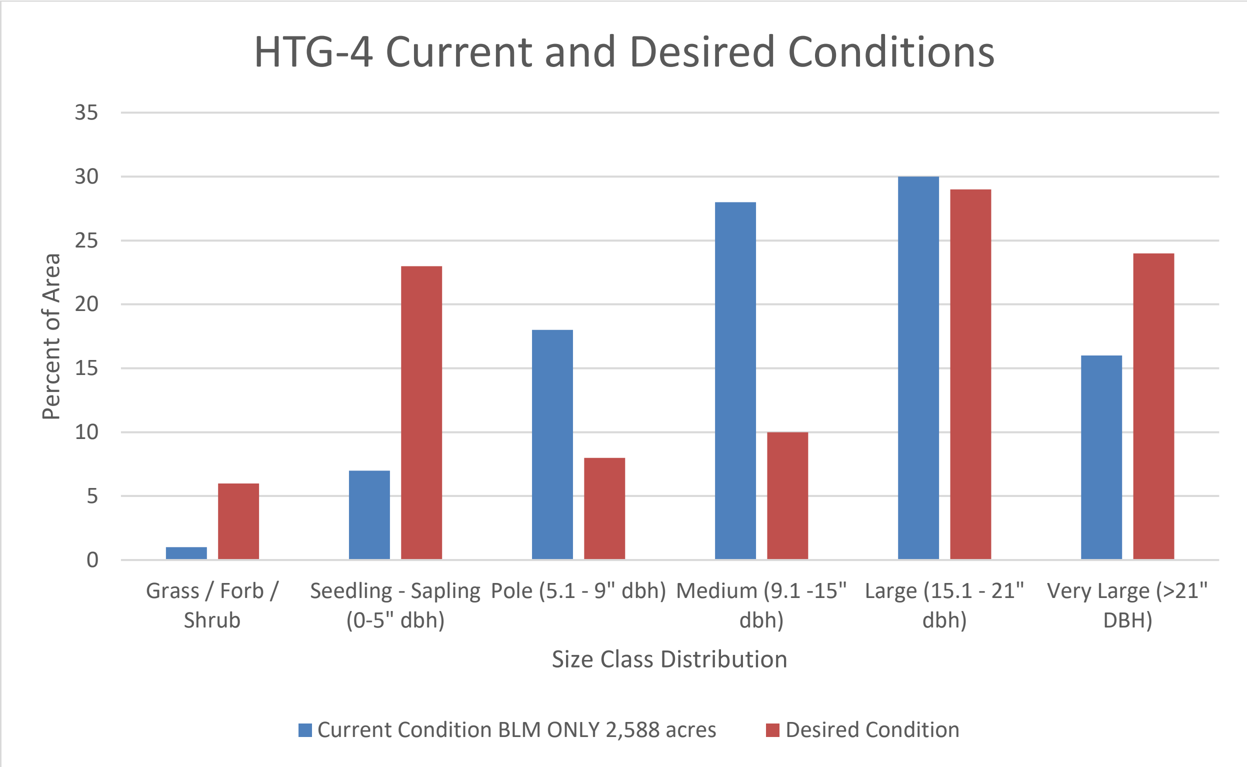


Figure 10: HTG 4 Current and Desired Conditions

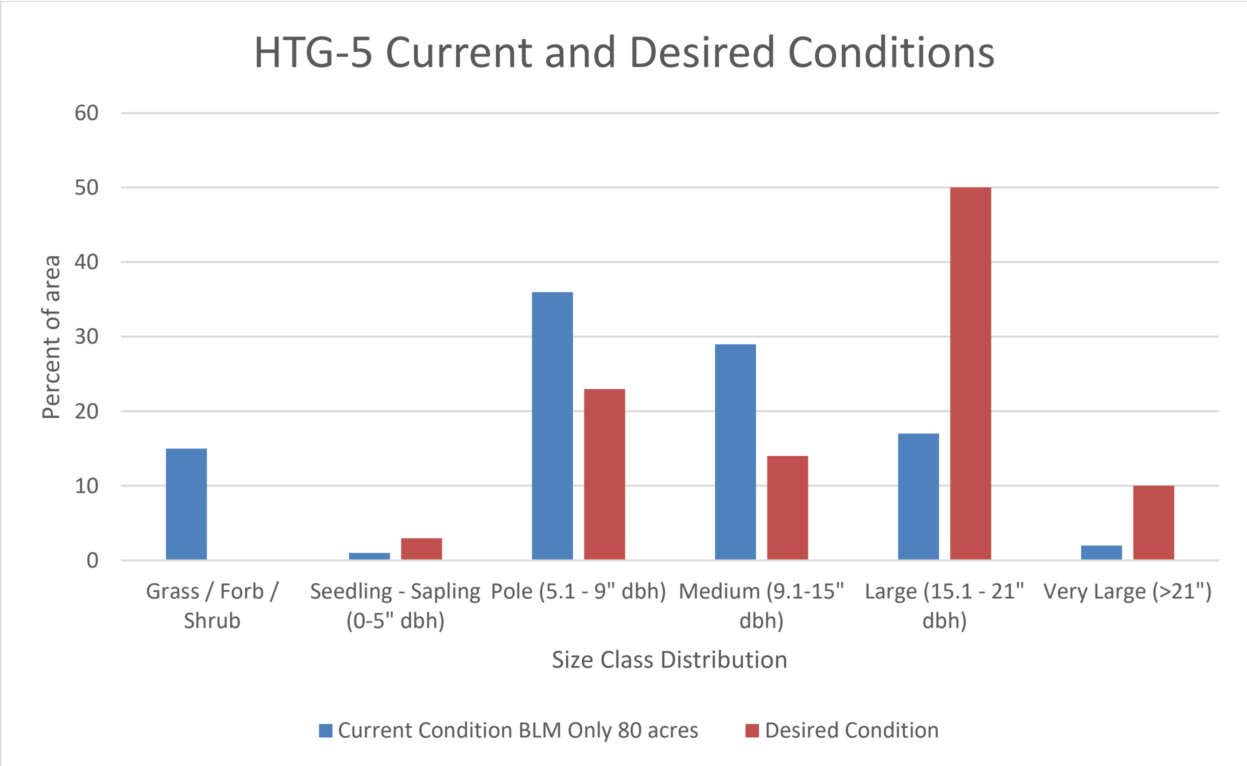


Figure 11: HTG 5 Current and Desired Conditions

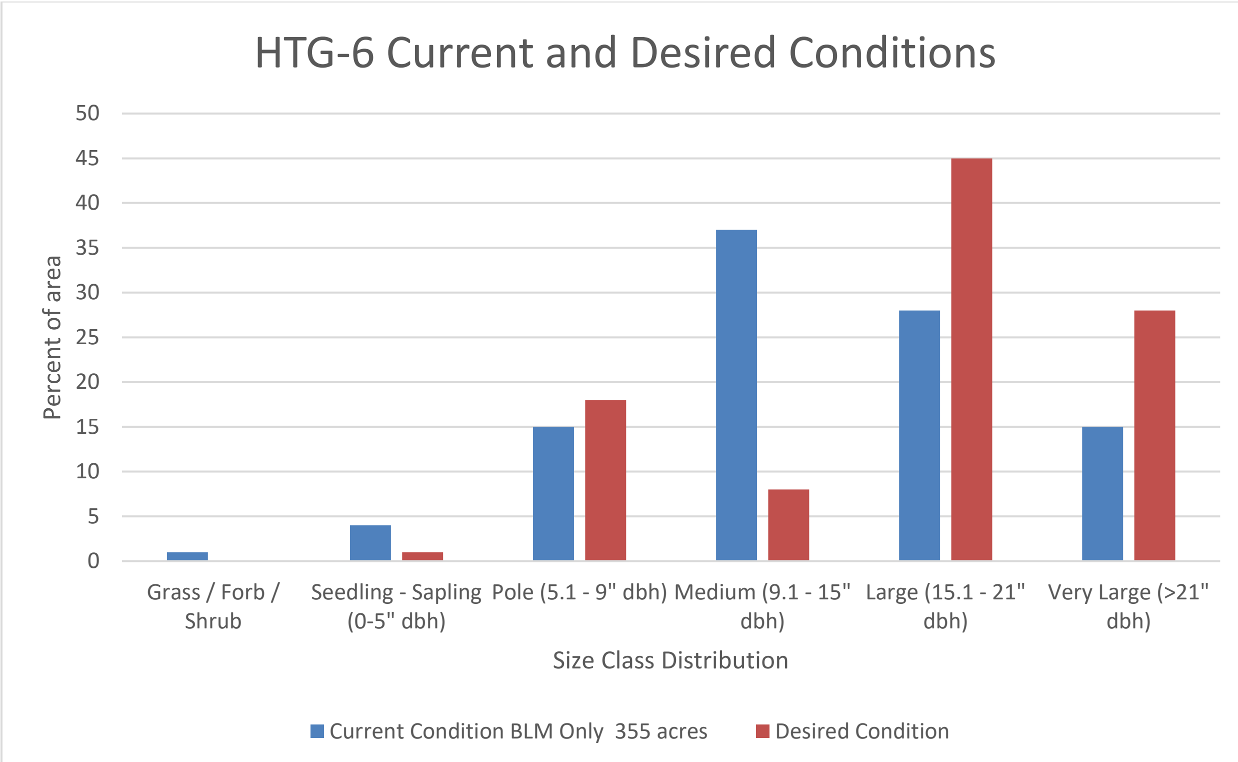


Figure 12: HTG 6 Current and Desired Conditions

Current Condition and Desired condition charts were not prepared for HTG-9, NA or Blank and these are generally non-forested or less deviated from NRV. See Appendix G for detailed site conditions and desired conditions.

3.2.3.1 Cumulative Effects

The reasonably foreseeable actions are stated in section 3.2.2.1. Cumulatively, effect of these neighboring treatments working in concert with the proposed action will be an increased scale of improvement of the forest health, vigor and resilience in the planning area and reduced threat of historically uncharacteristic wildfire. While fire suppression will continue to occur, the proposed action will have the effect of shifting species composition, structure and density toward midpoint NRV, and reducing fuel loadings and associated wildfire risk to the structures and values in the planning area. Improved forest health and resiliency, reduced wildfire severity and improved safety is expected throughout the planning area.

3.3 Resource Issue 2

Issue 2 – How will the Proposed Action impact local and regional economies?

3.3.1 Affected Environment

Prior to Euro-American settlement in the area which began in the early 19th century, Native Americans had an economy based on barter and trade. The first non-native people in the area en masse were fur trappers who arrived in pursuit of beaver pelts and other furs of value which occurred not long after the Lewis and Clark Corps of Discovery passed through the area in 1806. The trappers traded with the Native Americans and with each other, gathering annually at rendezvous to trade pelts for cash and goods. The Native Americans also traded pelts to the white men in exchange for rifles, tools and other goods.

The trappers were followed by miners in pursuit of precious metals and by 1900 largescale mining operations were active in Western Montana. Loggers and cattlemen followed the gold booms to support and profit from the mining operations.

From Losenky's Historical Vegetation of Montana, 1997:

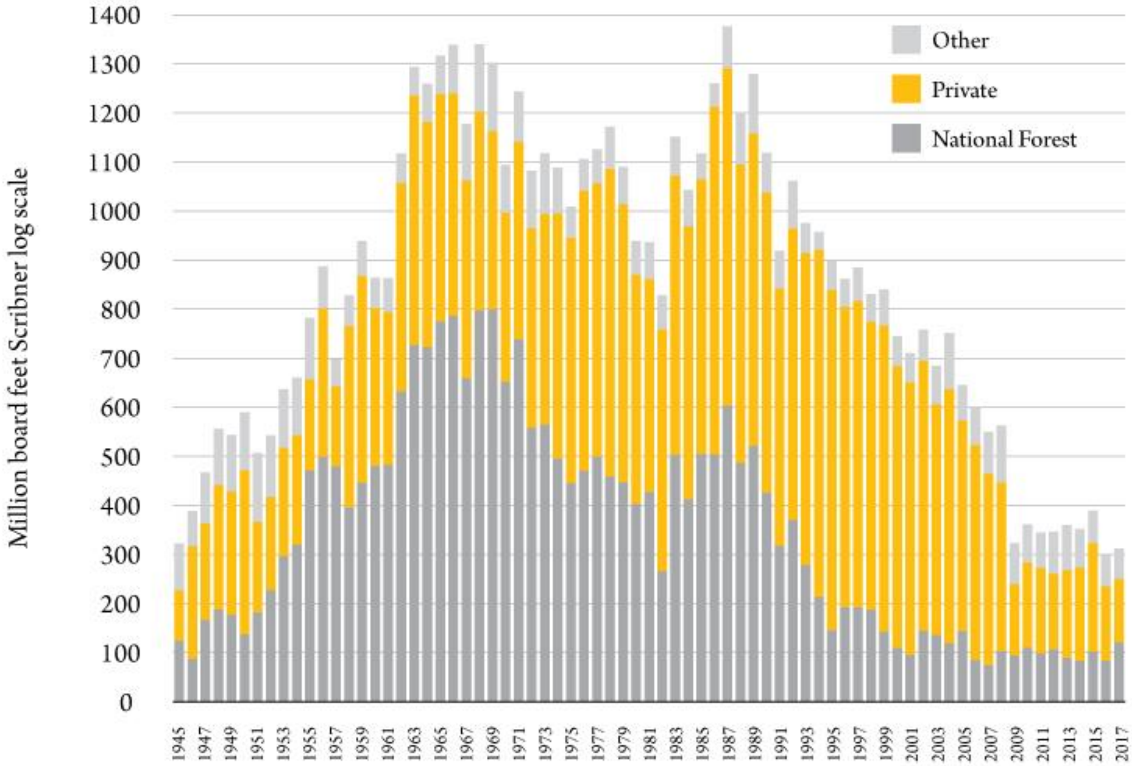
> *Settlement (of the area) began in the 1840's but it wasn't until the arrival of the Northern Pacific Railroad and development of the mines in Butte and Anaconda in the 1880s that there was any significant impact on the forest structure. By the 1890s major portions of the Clark Fork and Bitterroot Valleys had been logged. Leiberg reports "that below Grantsdale* (in the Bitterroot Valley*) fully 90 percent of the accessible merchantable timber has been cut (1899a).*

Many sawmills were built to support the growing towns and mining operations in the area including those that still operate in Deer Lodge, MT, Bonner, MT, and Seeley Lake, MT (just east, west, and north of the planning area, respectively).

As described, the local economies were dominated by mining, logging and ranching from the late 19th century until the mid-20th century. After WWII when the copper mining operations in Butte, MT and nearby areas peaked, mining has become a lessor contributor to the local economy, though some mining does still occur in the planning area.

Locally and across Montana, timber harvest levels which peaked on USFS lands in the 1960s have diminished in recent years and most steeply since the early-1990s. Harvest levels from private ownership remained high above USFS for many years (roughly 1963 through 2007), although these harvest levels too have significantly dropped since the early 2000s (See Figure 13 below). Along with this decline in timber harvesting, employment in the forest products industry declined as well.

Figure 13: Montana timber harvest by ownership, 1945-2017. (Morgan et al. 2018)



As stated in the Montana Business Quarterly:

> *In 2000, wood and paper jobs were 28 percent of the state's manufacturing employment and 31 percent of labor income. In 2016, only 13 percent of jobs and 11 percent of income was generated by wood products manufacturing.*
>
> *The long decline of the wood products industry in Montana began in response to vigorous harvesting from the 1960s through the 1980s. Public campaigns to protect forest habitats, water and soil quality, and endangered species became national news.*
>
> *In response, the U.S. Forest Service and the Bureau of Land Management drastically reduced timber harvests on federal forests nationwide – nearly every western state was affected. Montana's total timber harvests retreated from 1.3 billion board feet in 1987 to less than 300 million board feet in 2016. In the same time period, lumber production fell from 1.6 billion board feet to barely 500 million board feet, and wood product sales declined from $1.8 billion to less than $565 million* (Smith et al. 2018).

Within the last two decades as harvest levels dropped, private industrial timber lands became more valuable for real estate development than timber production, land ownership patterns began to shift away from large private industrial forestlands to small non-industrial (residential) ownerships.

As stated in the Montana Business Quarterly:

> *Over the past 20 years, there has been a major shift in timberland ownership in Montana. More than half a million acres of industrial timberland has been sold and transferred to various state, federal and other nongovernmental or private landowners. Some of this timberland is no longer actively managed for timber production* (Smith et al. 2018).

This land ownership shift has resulted in structures and private development extended further and further into the forestlands and has also resulted in a loss of recreational opportunity on the industrial forestlands which were often managed as pseudo-public land, with hunting, camping, snow machining and other recreation freely available. As evidenced by aerial photography, development within the planning area has greatly increased in the last several decades (see Figure 14 below).

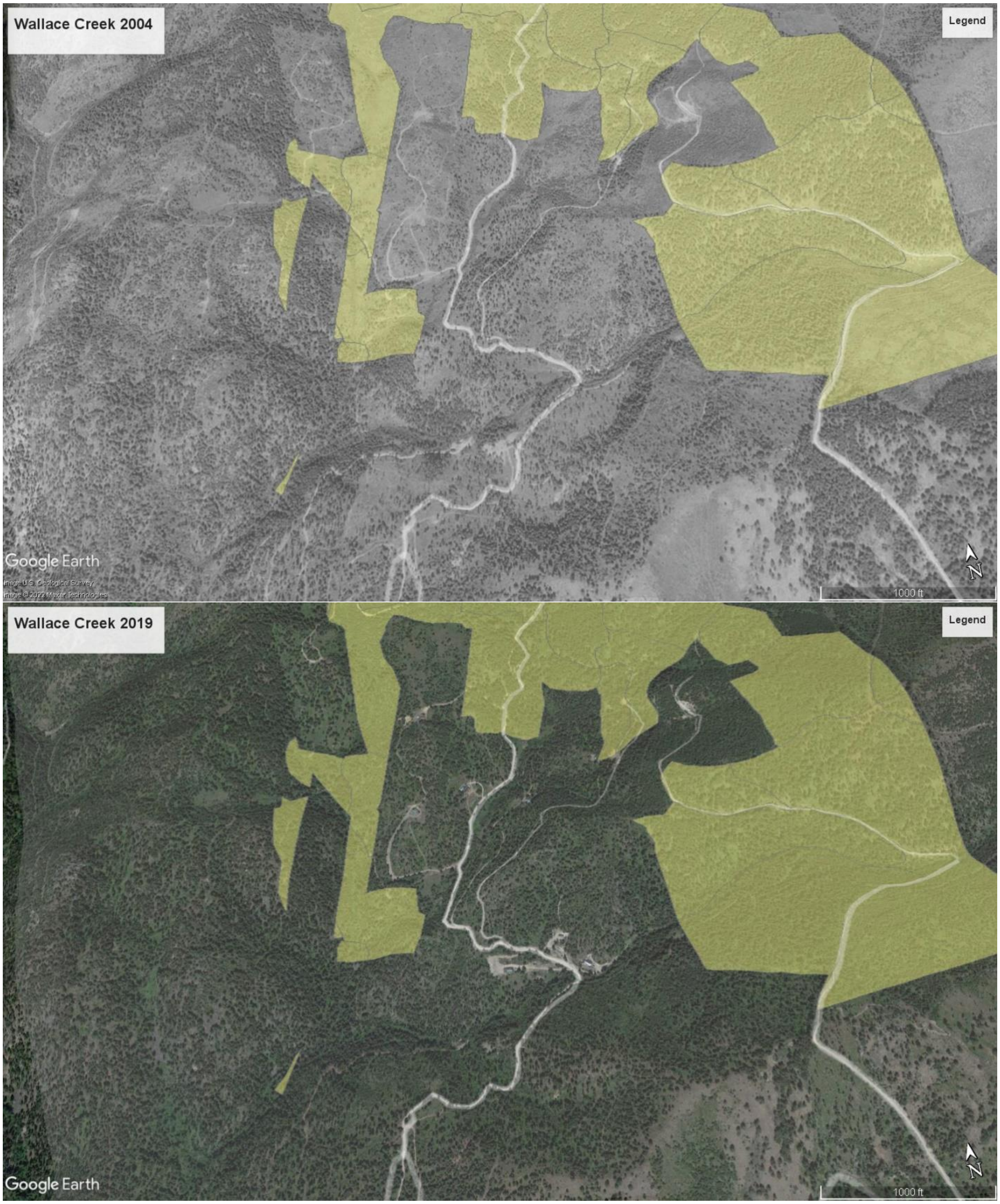


Figure 14: Google Earth imagery from 2004 (upper) and 2019 (lower) clearly shows increased residential development adjacent to BLM ownership (yellow shaded) within the CFF planning area. Source: Google Earth.

In recent years (early 2000s and on) tourism and outdoor recreation have become greater contributors to local economies. Often considered to be inspired by the 1992 film "A River Runs Through It" which was based on Norman McClean's accounts of growing up on the Clark Fork and Blackfoot Rivers, more and more people are moving to western Montana and the Clark Fork region or finding it an attractive place to vacation or buy a recreational property. The rising price of real estate in western Montana has contributed greatly to the local economies and represents the next great shift in land use, where lands are valued less for extractive resources and more for urban development.

From the 2020 US Census, Montana's population has increased 9.6% from 2010 – 2020, adding roughly 95,000 individuals and now (as of 2020) has exceeded 1,000,000 people for the first time. Within the planning area, Missoula is among Montana's top three most populous counties (Source: https://www.census.gov/library/stories/state-by-state/montana-population-change-between-census-decade.html).

In that light, where > 50% of the planning area is privately owned, and more and more private land is becoming developed each year, the public lands in the area are becoming increasingly important to the local economies, both traditional and contemporary. By providing habitats for big game such as deer, elk and black bear, public lands are in great demand for local and out-of-state-hunters. By providing aesthetically pleasing viewsheds, the public land is in great demand for real estate developers and private landowners. By providing year-round outdoor recreation from hiking and biking to OHV and snowmachine opportunities the public land is in great demand for recreationists. And too, the public lands provide some of the last opportunities for sustainably managed timber in the area, benefiting the remaining forest products industry and economies both locally and regionally.

3.3.2 Environmental Effects—No Action Alternative

The No Action alternative would result in no implementation of the proposed action. There would be no production of forest products and no resulting benefit to local and regional economies. The decline of traditional economies would be compounded, and the loss of local jobs exacerbated. With the reduction of workforce in the forest products sector, implementing forest treatments both commercial and non-commercial (revenue and non-revenue producing) becomes more difficult and costly. On a long enough timeline, the very real loss of infrastructure in the forestry sector may eventually limit and/or eliminate the opportunity for forest management and fuels reduction projects in the future.

With the No Action Alternative, there would be no reduction in the forest's present risk of catastrophic wildfire and resulting threat to private values at risk. There would be no decrease in the forest's susceptibility to forest pests and no preservation of the forestland's scenic value which is expected decrease if large scale wildfire or forest pests kill large swaths of forest.

3.3.2.1 Reasonably Foreseeable Actions Effects

With no action alternative, the trend of decreasing timber production across the regional and local level is expected to continue with annual infrastructure loss in the forestry sector eventually leading to a loss of opportunities to manage forests as state above.

The remaining large private landownerships are expected to be divided and sold into small ownerships as the trend of subdivision and development continues. More and more people are expected to move into the area, pushed out of areas of higher development by real estate costs and the opportunity to create their own place.

Costs of fire suppression are expected to increase and forest pests continue to cause mortality in the forested stands and fuels accumulate unabated. Recent wildfire trends indicate that larger and larger fire will impact the landscape, bringing with them ever greater suppression, rehabilitation and restoration costs to local, state and federal agencies, as well as private landowners and insurance companies.

3.3.3 Environmental Effects—Alternative 2

One quantifiable measure of how the Proposed Action will impact local and regional economies, is dimensional lumber production from proposed timber harvesting and prescribed fire treatments. Some commonly stated estimates are that the average contemporary home uses 6.3 board feet of lumber per square foot (SQFT), and the average American home is 2,261 SQFT. Based on those estimates, an average home uses 14,244 board feet of lumber for construction. This project is estimated to yield 50 million board feet over the next decade, the equivalent of the volume needed to build 3,510 homes.

In its 2015 report, the National Association of Home Builders (NAHB) estimated the one-year impacts of building 100 single-family homes in a typical local area include, $28.7 million in local income, $3.6 million in taxes and other revenue for local governments, and 394 local jobs (NAHB 2015). This project is expected to yield 5 million board feet annually (fifty million board feet over ten years), enough timber to build 351 homes per year. That means the estimated economic impact per year from the timber harvesting and prescribed fire treatments alone is $100.45 million in local income, $12.6 million in taxes and other revenue for local governments, and 1,379 local jobs (based on the numbers from NAHB 2015 expanded to 350 homes per year).

Expanded out to over 3,500 homes over ten years that is a very significant economic impact, and it is not limited to the local economy. Based on local observations, timber harvested from Western Montana is often hauled up to 200 miles before being processed and transported even further to retail outlets. In this way it becomes clear that while this project was not designed for timber volume production alone, this action will certainly have a substantial impact on the local and regional economies.

In addition to the timber harvesting and prescribed fire treatment, the other treatments (fuels management, thinning, limber pine enhancement and prescribed fire) will have beneficial economic impacts as well.

A comparatively smaller number of jobs will be created or sustained through implementation of these treatments which largely rely on manual laborers or heavy equipment operators. However, since many of the jobs which are bolstered through the timber harvesting and prescribed fire treatment require the same skill set as required for the other treatments (timber felling or prescribed fire specialists for example) the effects of the full suite of treatments will be cumulative on local jobs and economy.

As stated above, a primary objective of this project is to protect life, property and firefighter safety in and near the wildland-urban interface. On its website American Family Insurance (AMFAM.com) states costs can average anywhere from $3,000 to $5,000 to recover and restore a home after a small fire. Larger fires that destroy the roof or kitchen can cost as high as $50,000 and up. Based on 2021 data from the Montana State Library, there are 2,629 structures within the planning area (see Appendix D. Map 9.7). While many of those are in rural communities such as Clinton, MT many too are located near and adjacent to the BLM forestlands. For example, in the Rattler and Mulkey Gulches within the planning area, approximately 44 identified structures are present (see Appendix D. Map 9.8). Were these homes and buildings to burn due to a wildfire in those 2 subdrainages, based on the figures above the cost to individuals and insurance companies could easily exceed $2,000,000.

This is not a vague possibility; in the last two decades we have seen seven significant fires escape initial attack including the Ryan Gulch Fire in 2000 (17,100 acres), Dirty Ike Fire in 2003 (824 acres), the Packer Gulch Fire in 2006 (3,059 acres), the Mile Marker 124 Fire in 2007 (6,493 acres), the Felan Gulch in 2012 (177 acres), the Nimrod Fire in 2013 (603 acres), and the Anderson Hill Fire in 2021 (745 acres). Combined these fires have burned 25,440 acres or 10 percent of the planning area, and 684 acres or 3 percent of BLM lands in the planning area. Three of those fires involved structure losses: the Ryan Gulch fire had 2 structures lost; the Packer Gulch fire had 3 structures lost and the Anderson Hill Fire destroyed 1 structure.

See Appendix D, Map 9.10 fire history for location and extent of fires.

Through Fuels Management and the other proposed treatments, a primary objective of this project is to reduce the potential for fires which ignite on the BLM forestlands to impact or damage those homes and values at risk and benefit the local individuals and communities through protection from loss or restoration costs.

In addition to the anticipated savings due to protection from loss represented above, reduced fuel loadings and improved fire resiliency in forest stands would reduce the cost of fire suppression, which in these areas is provided by the USFS and the MT DNRC. In its 2013 report “Wildland Fire Research”, Headwater Economics states:

> *At the national level, fire costs represent nearly half of the U.S. Forest Service’s budget and total expenses have exceeded $3 billion annually, more than twice what it cost a decade ago.*
>
> *Using Montana as a case study, Headwaters Economics found that protecting the average home from a wildfire event costs roughly $8,000 and that 27 percent of firefighting costs are attributable to protecting homes in the WUI. Statewide, protecting homes from forest fires costs an average of $28 million annually. If development on private land near fire-prone forests continues, costs associated with home protection likely will rise to $40 million by 2025.*
>
> (Summary: Wildland fire research. 2013)

The current trend of development in the forested landscape is not expected to reverse, although it could slow as the real estate market corrects and interest rates increase. Regardless, the roughly 2,600 homes and structures currently within the planning area represent a potential $20,800,000 in suppression costs based on the figures above. Treatments such as are proposed with this Alternative are expected to reduce suppression costs significantly and reduce the forests likelihood of producing catastrophic wildfires, thereby by saving national, state, and local taxpayer dollars and agency operating budgets.

3.3.3.1 Cumulative Effects

The reasonably foreseeable actions are stated in section 3.3.2.1. The proposed action is expected to contribute to local and regional economies both through commodity production and reduced restoration and fire suppression costs. The cumulative effects of these actions will be additive to similar work being implemented and accomplished by other land management agencies present in the planning area such and the USFS and the MT DNRC as well as work being accomplished on private land through State and County grants. The compounding effects of all these actions are expected to be a large-scale reduction in the wildfire risk in the area, sustained workforce in the forestry sector in western Montana, and reduced fire suppression costs at large. See Appendix H for a complete list of reasonably foreseeable actions in the planning area for the next two decades.

3.4 Resource Issue 3

3.4.1 Affected Environment Issue 3- How will the Proposed Action impact Canada lynx and Canada lynx critical habitat; grizzly bear and their habitat; and the contiguous U.S. wolverine Distinct Population Segment?

The Missoula Field Office submitted a Biological Assessment (BA) to the US Fish and Wildlife Service on April 28th, 2022. Supplemental documents were submitted on June 6, 2022, August 19, 2022, September 24, 2022, and Oct. 20, 2022. The BA disclosed the Effects of the Proposed Action on grizzly bear, Canada lynx, Canada lynx Designated Critical Habitat, and North American wolverine.

The BLM determined the proposed action would not affect the western yellow-billed cuckoo (threatened) or whitebark pine (proposed) because those species and habitat are not present within the action area. Bull trout (threatened) and bull trout designated critical habitat would not be affected due to factors associated with design features and conservation measures incorporated into the proposed action and distant proximity and local topography of vegetation treatments and haul routes to occupied bull trout habitat and bull trout designated critical habitat.

During Section 7 formal consultation with the USFWS, the Proposed Action, potential effects, and determinations were discussed. On November 8, 2022 the FWS concurred with the BLM's determination of may *affect and likely to adversely affect* grizzly bears (*Ursus arctos horribilis*), Canada lynx (*Lynx canadensis*), and designated lynx critical habitat. The BLM also determined that the Project would have *no effect* on western yellow-billed cuckoo (*Coccyzus americanus*), bull trout (*Salvelinus confluentus*), or designated bull trout critical habitat and is *not likely to jeopardize the continued existence* of wolverine (*Gulo gulo luscus*) or whitebark pine (*Pinus albicaulis).* At that time the FWS responded with a Biological Opinion (BO) as well as an Amended Incidental Take Statement (ITS) for the 2020 Missoula Field Office RMP. The BO included conservation recommendations designed to minimize or avoid effects to the extent possible. The conservation recommendations were incorporated into the proposed action as design features. The BA, supplements, BO and ITS are incorporated by reference into this NEPA analysis, which summarizes the effects to these species and their habitat as described in the BA.

Land patterns and recreation.
Interstate highway US-90 and the Clark Fork River run along the southern edge of the Project area. The analysis area includes developed and dispersed recreation sites, cabins and residences. A mosaic of land ownership characterizes the analysis area including 56% private lands (see table 1). Historically, much of the analysis area was used for industrial timber production mixed with large and small mining operations roughly during the period 1850-2000, and former townsites exist within the area.

Currently, the analysis area is popular for numerous recreational activities including camping, river sports, snowmobiling, hunting, fishing, hiking, skiing, UTV riding, and mountain biking. The BLM lands are grazed by cattle to varying degrees, typically at light to moderate levels. Ongoing activities include small-scale mining, homesite development, road construction (including into newly purchased parcels), and fire suppression. Subdivision of former industrial timber lands has led in part to a large increase in structures since 2000. Montana State Library data showed 2629 structures in the Project Area on Dec. 30, 2020 (see figure 9.7 in Appendix D). Small scale timber harvest and fuels treatments including thinning and pile burning are ongoing, with planned projects discussed in the next section.

Grizzly bear:

The analysis area for grizzly bears was the 247,191-acre (386.2-mi^2) planning area. This area would be large enough to include multiple (roughly 4 to 10) female grizzly bear home ranges. A 30-year timeframe was used to analyze potential project effects on grizzly bears. This timeframe includes the predicted 5-15 year project duration plus time for initial forest regeneration to occur.

Grizzly bears are federally protected as a threatened species under the Endangered Species Act (PL 93-205, as amended). The 2013 draft NCDE Grizzly Bear Conservation Strategy (USDI-FWS 2013) and the 2019 Conservation strategy for the grizzly bear in the Northern Continental Divide Ecosystem (NCDE) (NCDE Subcommittee 2019) established a zoned system to support grizzly bear range expansion and recovery in the Northern Continental Divide region. The CFF planning area includes lands in NCDE Zone 1, NCDE Zone 2, and lands not within an NCDE category.

Grizzlies have expanded their range in the NCDE in recent decades, with males, females, and females with cubs documented in the planning area. Information regarding grizzly bear use in and near the planning area was collected from the MT FWP 2021 Annual Report (Sells et al. 2021), and through phone conversations and email exchanges with MT FWP biologist Jamie Jonkel (Oct. 2021 and March 2022), and USFWS grizzly bear office biologist Jennifer Fortin-Noreus (March 2022). Five grizzly bear dens have been documented in different locations within the Garnet Range in the last 20 years. For the past 5 years in the Nevada Valley (approx. 12 miles north of the planning area) as many as 40 grizzly bears have been documented at a given time feeding in hay and other agricultural fields during summer months. MT FWP considers the planning area to be an important “stepping stone” for linkage between grizzly population centers. An adult male grizzly was recently documented using areas both north and south of I-90 in and near the planning area, and denning south of the interstate (Adams and Cast 2021, Cast 2022).

As a habitat generalist, grizzly bears utilize a wide range of habitats for foraging/hunting and cover/security. Grass, forbs, berries, insects, rodents and ungulates comprise the primary food sources for grizzly bears. The planning area is not limited in general foraging habitat suitability, with a diverse mosaic of habitats across the 247,191-acre area supporting vegetation and prey species. Road density and secure habitat availability are considered primary indicators of habitat suitability for the NCDE grizzly population.

Roads open to public motorized use (open roads) have been found to diminish grizzly bear habitat suitability. Human disturbance associated with these roads displace grizzly bears from otherwise suitable foraging and cover habitats and increase potential for human/bear conflicts, and some grizzlies avoid roads. Open road density in the planning area is relatively high (2.46 mi /mi^2), with an open road density of 3.49 mi/mi^2 on BLM-managed lands in the planning area. Road density is negatively correlated with grizzly bear secure habitat, generally meaning blocks of habitat more than 500m from a road. Approximately 2.5% of proposed treatments occur in secure habitat, greater than 500m from existing roads.

Canada Lynx:

The USFWS listed Canada lynx as a threatened species in 2000. Lynx populations in Montana occur in the southern portion of a widely distributed metapopulation whose core is in the northern boreal forests of Alaska and Canada (Interagency Lynx Biology Team 2013). Lynx populations are tied to snowshoe hare populations cycles. Southern snowshoe hare populations exist at lower densities than northern populations and do not appear to be as cyclic (Hodges 2000, Koehler and Aubry 1994). Lynx densities are naturally lower in Montana and have average home ranges nearly twice the size of populations in the northern boreal forests (Aubry et al. 2000, Murray et al. 2008, MNHP 2022a).

Squires and Laurion (2000) found median home range sizes for lynx in Montana to be 92 ± 1mi^2 for males and 44 ± 19 mi^2 for females. The Garnet Range contains the southern-most lynx population in Montana, except for a few individuals documented in the Greater Yellowstone Area. From 1999–2006, reproduction was documented at 57 dens of 19 female lynx in Seeley Lake, the Garnet Range, and the Purcell Mountains in western Montana (Squires et al. 2008, Interagency Lynx Biology Team 2013). The last lynx observation reported to the BLM in the analysis area (all 4 LAUs) was in 2010, and the last lynx observation documented in the planning area was in 1998. In 2016, a lynx detection was reported 10.6 miles north of the planning area.

Lynx habitat occurs in mesic coniferous forests that experience cold, snowy winters and provide a prey base of snowshoe hare (Interagency Lynx Biology Team 2013). Snowshoe hare require hiding and thermal cover and forage provided by multi-story forests with dense horizontal cover. We consider forest Habitat Type Groups (HTG, see Table 2) 4-6 suitable for lynx foraging or denning habitat, especially when the HTG nears climax condition. The climax tree species, typically subalpine fir and Engelmann spruce often mixed with lodgepole pine, allow the development of dense horizontal cover. Moist Douglas-fir could also provide potential lynx foraging habitat in the advanced regeneration stage. However, when these stands reach mature condition large crowns tend to diminish the understory horizontal cover needed for snowshoe hare production.

For Canada lynx, the USFWS defines the action area for effects analysis as a Lynx Analysis Unit

(LAU) or multiple LAUs. The Clark Fork Face analysis area for lynx includes the acreage of the Bear Creek, Elk Creek, Union Creek and McElwain Complex LAUs, totaling 190,066 acres. In the Clark Fork Face planning area, 85,188 acres fall within an LAU (34.5% of the planning area). Approximately 19,790 LAU acres are on BLM land, and of those, 16,284 acres are proposed for treatment. The proposed treatments occur in 9 Habitat Type Groups (HTGs 1-9, described above). Potential lynx foraging or denning habitat was considered to exist in HTGs 4, 5 and 6, where subalpine fir or Engelmann spruce were included in the dominant cover type. Table 16 presents the acreage of proposed treatments in potential lynx habitat. Further analysis (Table 17) of stand phase revealed that a maximum of 248 acres of this potential lynx habitat existed in a stand phase that would provide current habitat for lynx (mature forest, stand initiation or stand regeneration), while 204 acres, in the stem exclusion phase, would not provide suitable habitat for snowshoe hare, the lynx' primary prey and did not currently offer lynx foraging or denning habitat.

Table 16: Acres of current dominant cover species in HTGs 4-6 within proposed CFF treatments by LAU.

Current Cover	Bear Creek LAU	Elk Creek LAU	Union Creek LAU	McElwain Complex LAU	Grand Total
HTG 4 (Total)	172.32	129.73	49.51	0.00	351.57
DF-AF	76.35	77.70	39.51	0.00	193.56
DF-ES	71.69	51.32	10.00	0.00	133.00
DF-LP-AF	9.11	0.00	0.00	0.00	9.11
LP-AF	15.17	0.72	0.00	0.00	15.89
HTG 5 (Total)	41.14	4.12	0.00	0.67	45.93
LP-AF	41.14	4.12	0.00	0.67	45.93
HTG 6 (Total)	37.39	2.92	0.00	14.18	54.49
DF-AF	37.39	2.92	0.00	14.18	54.49
Total current lynx habitat	250.85	136.78	49.51	14.85	**451.98**
Not current lynx habitat (matrix habitat)	910.65	306.21	724.78	76.91	2,018.55

Table 17. Acres of potential lynx habitat and treatments proposed in each stand phase within affected LAUs.

LAU name	**Total acres**	**Total potential lynx habitat within LAU**	**Stand initiation[1] phase (%)**	**Early stand initiation[2] acres (%)**	**Multi-story[3] (%)**	**Other[4]/Stem exclusion (%)**
Bear Creek	50,856	561	3 (0.5%)	0 (0.0%)	112 (20.0%)	136 (24.2%)
Elk Creek	36,736	1371	0 (0.0%)	0 (0.0%)	64 (4.7%)	68 (5.0%)
McElwain Creek	76,061	4827	0 (0.0%)	0 (0.0%)	15 (0.3%)	0 (0.0%)

Union Creek	26,416	89	0 (0.0%)	0 (0.0%)	49 (55.1%)	0 (0.0%)
Grand Total	**190,069**	**6848**	**3 (0.04%)**	**0 (0.0%)**	**240 (3.5%)**	**204 (3.0%)**

[1]Stand initiation structural stage that currently provides year-round snowshoe hare habitat because the trees have grown tall enough to protrude above the snow in winter.
[2]Stand initiation structural stage where the trees have not grown tall enough to protrude above the snow in winter but can provide snowshoe hare habitat during the non-winter months and is typically moving toward year-round snowshoe hare habitat.
[3] multi-story structural stage with many age classes and vegetation layers that provide year-round snowshoe hare habitat via dense horizontal cover.
[4]Other –Closed canopy lacking dense horizontal cover; does not provide snowshoe hare habitat due to lack of dense horizontal cover; e.g. Stem Exclusion Structural Stage**.**

Canada Lynx Critical Habitat:

The analysis area for lynx critical habitat is the entire area of the 4 LAUs that overlap the CFF planning area, totaling 190,066 acres. In 2009, the USFWS designated critical habitat for lynx (Federal Register Vol. 74 No. 36 pp. 8616–8701), with a revision in 2014 (USDI-FWS 2014). The Primary Constituent Element (PCE) of lynx habitat is defined as (1) boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:

- 1(a). Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multi-story stands with conifer boughs touching the snow surface;
- 1(b). Winter snow conditions that are generally deep and fluffy for extended periods of time;
- 1(c). Sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and
- 1(d). Matrix habitat (e.g., hardwood forest, dry forest, non-forest) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

The Lynx Analysis Area contains a mix of habitats including 26,729 acres of habitat classified as HTGs 4, 5 or 6 which could offer PCE 1a, 1b and/or 1c. Of those, 2471 acres in HTG 4-6 were within a proposed treatment unit. As described above, 452 of those acres included Engelmann spruce or subalpine fir in the dominant cover type, and a maximum of 248 of those acres existed in a stand phase that could provide current lynx foraging or denning habitat. All of those 248 acres of current lynx habitat were located in the functional WUI or Fire Management Zone 1 (within 1 mile of the WUI). The remaining acres proposed for treatment in LAUs overlapping the lynx analysis area would constitute potential matrix habitat providing landcape connectivity to support lynx population (PCE 1d).

However, as shown in Table 17, above, 204 of those acres are currently in the Other (stem exclusion) stand phase and do not provide the resources necessary for snowshoe hare at present. Thus, treatments are proposed for approximately 248 acres of current lynx habitat offering PCEs

1a, 1b, or 1c.

North American Wolverine:

A search of data compiled by the Montana Natural Heritage Program and Swan Valley Connection's Southwest Crown Continent rare carnivore monitoring program identified 5 wolverine detections in the planning area, the most recent in 2009. Two hundred fifteen wolverine detections have been recorded within 20 miles of the planning area, 149 of which were made within the past 10 years.

ESA Listing History and Threats
In February 2013, USFWS published a proposal to list the contiguous U.S. DPS of the North American wolverine (*Gulu gulo luscus*) as Threatened under the Endangered Species Act, except where it was listed as an experimental population (USDI Fish and Wildlife Service 2013). Climate change and inadequacy of existing mechanisms to regulate climate change were considered primary threats, with small population size and harvesting/trapping deemed secondary threats. The following year, the FWS withdrew the proposed rule. After legal challenges, the District Court for the District of Montana vacated the withdrawal of the proposed rule, the FWS reopened comment and initiated a new status Species Status Assessment (USDI Fish and Wildlife Service 2018). In 2020, the agency again withdrew their 2013 proposed rule to list the DPS as threatened. Additional litigation followed, and the FWS requested a voluntary remand of that decision in spring 2022. In May, 2022, the District Court for the District of Montana vacated the withdrawal of the proposed rule. The contiguous U.S. DPS of the North American wolverine is currently considered "proposed threatened" under the ESA.

In analysis for the 2013 proposed rule, USFWS did not find land management activities to substantially threaten the wolverine DPS:

"Land management activities (principally timber harvest, wildland firefighting, prescribed fire, and silviculture) can modify wolverine habitat, but this generalist species appears to be little affected by changes to the vegetative characteristics of its habitat. In addition, most wolverine habitat occurs at high elevations in rugged terrain that is not conducive to intensive forms of silviculture and timber harvest. Therefore, we anticipate that habitat modifications resulting from these types of land management activities would not significantly affect the conservation of the DPS, as we described above"

Wolverine in the contiguous US have been found to avoid high quality habitats in the presence of both motorized and non-motorized, and both off-road and on-road winter recreation (Heinemeyer et al., 2019; Lofroth and Krebs, 2007). The strength of avoidance increased with increased recreation; was greater for dispersed off-trail activities; was greater for motorized than non-motorized recreation; and females showed greater avoidance than male wolverine. In a meta-analysis, Fisher et al. (2022) found that, as human pressures for recreational space mount, impacts will increase to wolverines in protected areas as last bastions of habitat, adding to the multiple stressors impacting wolverine populations. Multiple studies have found substantial negative impacts to wolverine occurrence or density associated with anthropogenic linear features (including roads and petroleum exploration lines), road density, industrial footprint, and industrial disturbance (Fisher et al., 2013). Numerous studies have found Nearctic wolverines to be dependent on snow cover or persistent late-season snow especially for denning (discussion in Fisher et al., 2022), although mechanisms are still debated. Predicted declines in snowpack and spring snow persistence may pose the greatest threat to the contiguous U.S. wolverine DPS.

Wolverine in the contiguous U.S. represent a metapopulation, restricted to mountain environments and fragmented especially by developed private lands in valley bottoms. As snowpack decreases through the 21st century, contiguous U.S. wolverine populations are expected to become more fragmented and isolated (McKelvey et al., 2011). Inman et al. (2013) estimated a population size of 318 wolverines in the currently known breeding range.

Metapopulation modeling (Inman et al. 2013) identified the wolverine habitat within the Clark Fork Face Project Area to be part of the "Central Linkage Region". The authors described this region as, "an area of great importance for metapopulation function, thus warranting collaborative strategies for maintaining high survival rates, high reproductive rates, and dispersal capabilities."

Wolverine primary habitat and maternal denning habitat primarily occurs at higher elevations and with relatively low road densities compared to dispersal habitat, which occupies lower elevation areas with higher levels of human access. Year-round habitat for the wolverine is found at high elevations centered near the tree line: in conifer forests below tree line, rocky alpine habitat above tree line, cirque basins, and avalanche chutes that have food sources (USDI Fish and Wildlife Service 2013 and 2018)

> *Wolverine are known for large home range sizes, high intrasexual territoriality, and their ability to disperse long distances, sometimes hundreds of miles in straight-line distance (Packila et al., 2017; Vangen et al., 2001). Studies on wolverines in the northern Rocky Mountain states documented adult male home ranges of 521 to 1,582 km2 and adult female home ranges of 139 to 384 km2 (USDI Fish and Wildlife Service 2018). Within the contiguous U.S., the wolverine's physical and ecological needs have been found to include large territories in relatively inaccessible landscapes; at high elevations (1,800 to 3,500 meters (5,906 to 11,483 feet); access to a variety of food resources that varies with seasons; and physical/structural features (e.g., talus slopes, rugged terrain) linked to reproductive behavioral patterns (USDI Fish and Wildlife Service 2018).Environmental Effects—No Action Alternative*

The No Action alternative would result in no implementation of the proposed action. Direct, effects to grizzly bear, Canada lynx, Canada lynx critical habitat, and North American wolverine would not occur. With the No Action Alternative, there would be no reduction in the forest's present risk of catastrophic wildfire. Indirect effects could occur as a result of forage, cover, and secure habitat loss from a high severity fire. The extent and severity of these impacts would be dependent on the nature of a fire event.

Current human uses in the project area would continue, including road use, land development and habitation, recreation, hunting, and roadside weed treatments. These activities could continue to disturb or displace grizzly bear, Canada lynx, and North American wolverine individuals present in the area, to some degree. Under the No Action alternative, these human uses would likely gradually increase over time.

3.4.1.1 Reasonably Foreseeable Actions

Reasonably Foreseeable actions are described in Section 3.2.2.1. See Appendix H for a complete list of reasonably foreseeable actions in the planning area in the next two decades.

Energy or mineral development could occur, and no substantial projects are known to be currently planned. Formerly clearcut industrial timberlands can be expected to continue to regenerate and to produce dense stands of young trees where other forest treatments don't occur. Many of the existing human structures (2629 total structures recorded as of year 2020) are now surrounded by dense, young forest, leading to fire risk. We expect the number of structures to increase over coming decades, especially due to the sale of private timber company lands to individuals. Recreational uses and human presence may be expected to continue gradually increasing. Light to moderate cattle grazing is not expected to change in the foreseeable future.

3.4.2 Environmental Effects—Alternative 2

Direct, indirect and cumulative effects to grizzly bear and their habitat, Canada lynx, and Canada lynx critical habitat are described in more detail, with specific data and tables to support the following summary, in the Biological Assessments and supplements in the project record. Direct, indirect and cumulative effects to the wolverine DPS are described in the Clark Fork Face BA Wolverine Supplement in the project record.

Grizzly Bear

Forest treatments and associated activities will have minimal short-term adverse effects to grizzly bears, chiefly disturbance and displacement due to temporary increased human presence and heavy equipment use. Adverse effects may slightly increase energy expenditure, decrease fat deposition and resultant reproductive success, and increase risk of grizzly/human conflict. Effects would be minimized by spatial and temporal factors limiting the disturbance footprint within any season, and allowing a bear to displace into nearby habitats which are primarily areas of similar forest type.

Project implementation would occur within limited treatment blocks over a 5-15 year period. The proposed treatment area comprises 7.7% percent (19,147 acres) of the overall 247,191-acre planning area. Treatments would take place within only a portion of that area in any one season. If like-sized areas were treated each season for 10 years, 1915 acres would be treated each year (less than 1% of the planning area). Some areas would be visited in a subsequent season for prescribed burning or tree planting causing the project to cover a maximum of 15 years, while the proposed vegetation treatments would likely be completed within a shorter 5 – 10-year timeframe.

For treatment areas without prescribed burning, shrub cover would remain and offer cover and forage for grizzlies upon the cessation of disturbing activities within the same season. Where prescribed burning is used, herbaceous and shrub cover can be expected to begin regenerating within 1-2 years, providing grizzly forage plants likely to also attract ungulate prey.

Much of the non-BLM lands in the planning area could offer grizzly displacement habitat. Non-

BLM planning area lands are managed by The Nature Conservancy, Montana DNRC, USDA Forest Service and other private landowners. These lands offer forest cover and non-forested grasslands that could provide habitat and resources for displaced grizzly bears. Over 205,000 acres of the planning area contain forest or non-forested grassland habitat types. Private lands and Stimson Lumber Company lands comprise 56.1% (138,564 acres) of the planning area, while the BLM manages 9.5% of the planning area (23,666 acres). Stimson Lumber Company is no longer actively managing timber in this area and has been gradually selling parcels to other private ownership. The Nature Conservancy manages 11.8% of the planning area (29,242 acres) and the remaining 22.5% of the planning area (55,719 acres) are managed as State of Montana and US Forest Service lands (Table 1).

No new open motorized roads would be constructed. The newly constructed roads would be for administrative use only. New road construction would occur overwhelmingly in areas already dominated by structures and roads, Specifically, 95.5% of new road construction in NCDE zones would occur within 500 m of current roads and structures. Due to the proximity of the proposed new roads to existing roads and structures, and the fact that these roads would be closed to public motorized use, the proposed roads would not functionally decrease secure grizzly bear habitat. The new closed roads are not expected to substantially alter grizzly bear use of the area because the limited mileage of roads will not substantially change the current character of the area (frequent human use, roads, dwellings). While disturbance could cause short-term impacts to individual bear energy expenditure and fat deposition, secure grizzly habitat would be minimally affected by this project. The Missoula Field Office food storage strategy for conservation of the grizzly bear and other wildlife (BLM 2006) would be implemented and followed by all parties, minimizing the risk of human-bear conflict.

Grizzlies could be beneficially impacted by the decreased risk of high-severity fire after treatment implementation. Implementation of the proposed treatments, through burning, thinning and harvest, would remove ladder fuels, fragment continuous crowns, reduce basal area, and reduce excessive fuel loads. These actions would help to restore heterogeneous landscape structures that create a diversity of habitats and foods valuable to grizzly bears. Shifting forest communities towards the NRV and reduction of risk of stand-replacing, high severity fire could benefit grizzlies by supporting habitat resiliency and maintaining suitable, diverse habitats and resources within the 30-year analysis timeframe.

Overall Adverse Effects to Grizzly bear and habitat would be reduced and minimized by the following:

- The acreage of total proposed vegetation treatments (19,147 acres) is less than an average grizzly bear’s home range and is spread across a 247,191-acre planning area.
- Only a small portion of the planning area would be impacted in any season because implementation would occur over a 5-15-year period.
- In NCDE Zone 1, 98% of treatments, and in NCDE Zone 2, 95% of treatments would occur in areas that already experience substantial human disturbance and would not increase impacts to secure grizzly habitat.

- In NCDE Zone 1, 97.5% of new permanent roads, and in NCDE Zone 2, 95.2% of new permanent roads would occur within 500 m of current roads and structures, and not impact secure habitat.
- All new roads would be physically closed to motorized use for the public.
- In NCDE Zone 1, 93.0% of temporary roads, and in Zone 2, 95.7% of temporary roads would occur within 500m of existing roads and structures.
- All temporary roads would be removed within 36 months of their construction.
- Long-term impacts would be largely beneficial. As the planning area faces increased development in the next decades, the forest health, habitat diversity and resiliency of BLM lands would become of greater importance to maintaining a healthy grizzly population.
- Conservation measures for grizzly bears have been incorporated into the Proposed Action. These included closing all roads to the public permanently; constructing temporary roads wherever feasible; spatially and temporally distributing treatments; and prescribed burning to increase grizzly bear food sources.

Canada Lynx

Disturbance, displacement and increased energy expenditure could occur due to increased human presence and heavy equipment use during treatment implementation. Lynx could displace to secure areas on adjacent public lands (43.9% of the planning area) and negative impacts would be minimal. Lynx that displace to surrounding private lands (56.1% of the planning area) could encounter human activities that would likely cause them to displace further. Extremely low densities of lynx in the planning area minimize the potential of these effects.

Disturbance and displacement impacts, including potential reproductive success effects, would be minimized by spatial and temporal factors. Project implementation would occur within distinct treatment blocks over a 5-15 year period. Only a portion of the 16,284 acres of proposed treatments in the Lynx Analysis Area (covering 8.5% of the Lynx Analysis Area) would take place in any one season. Treatments in any season would impact only a portion of any lynx's home range, having minimal effects. Potential short-term impacts of disturbance, displacement, and energy expenditure resulting from the proposed vegetation treatments would have minimal short-term adverse effects to Canada lynx in the planning area.

In the long-term, treatments could benefit lynx energetic balance, reproductive outputs and numbers. Proposed treatments would increase pulses of disturbance that regenerate into snowshoe hare foraging habitat and provide connectivity to mature multi-story habitat. As treatment units reach advanced regeneration, snowshoe hare population densities could increase in the 2471 acres of proposed treatments in HTG 4-6. Current acreages in the stem exclusion stand phase do not provide snowshoe hare habitat needed by lynx for foraging. The proposed action would open these areas and increase their value for lynx and snowshoe hare.

Canada Lynx Critical Habitat

Short-term adverse effects to lynx critical habitat would occur from ground disturbance and habitat modification during treatment implementation. Effects would be minimized by spatial and temporal factors, limiting the disturbance footprint affecting any PCE. Project implementation would occur within small treatment blocks over a 5-15 year period. Treatments in the 248 acres offering current lynx foraging and/or denning habitat would result in a temporary reduction in horizontal cover that would reestablish likely within 5-10 years. Current lynx habitat constitutes 0.001% of the lynx analysis area and planning area.

. To preserve horizontal cover, prescribed burning would not be used within the 248 acres of current lynx habitat. In these habitat acres, irregular thinning techniques such as VDT or ACT would be employed to minimize loss of dense understories by emulating natural stand structure. Where stands are converted to an early stand initiation phase, the habitat will become valuable to lynx, typically within 5 years, providing PCA 1a, snowshoe hare prey, and providing increasing value PCA 1a habitat through stand development.

The Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) states that management-induced change of lynx habitat on federal lands that creates the early stand initiation structural stage should not exceed 30% of an LAU. Treatments proposed in current lynx habitat total between 0.18% and 0.23% of each of the 4 LAUs. Matrix habitat (PCA 1d) would be altered in a mosaic pattern across treatment units and on a small scale across all LAUs acres.

Treatments in lynx foraging habitat could cause short-term adverse effects leading to disturbance and displacement of snowshoe hare (PCE 1a). Effects are minimized by the limited spatial footprint of disturbance in any one year and snowshoe hare habitat availability outside of treatment areas. Project design features for maintaining biological legacies and improving snags and large woody debris (including blowdown, deadfalls and root wads) would further minimize effects to denning habitat (PCA 1b). Wildlife buffers along ridges, saddles and riparian areas would maintain travel corridors and linkages in lynx critical habitat.

Long-term, vegetation treatments would create dense horizontal cover within regenerating stands. Regenerating and mature multistory foraging and denning habitat would benefit from the removal of ladder fuels, opening of closed forest canopy, and resulting enhancement of the shrub community. The treatments would create and enhance a mosaic pattern of habitats across the landscape over space and time, with the goal of restoring NRV (USDI-BLM 2021). The project would create more suitable lynx critical habitat than currently exists, while increasing resiliency of this habitat structure, and reducing the risk of severe, stand replacing fire that could slow the rate of eventual regeneration.

Overall Adverse Effects to Canada lynx and Canada lynx critical habitat would be minimized by the following:

- The lynx analysis area covers 190.066 acres and the proposed treatments that fall within LAUs cover 16,283 acres. Only 248 acres (0.1% of the 4 LAUs impacted) proposed for treatment include currently suitable lynx habitat.
- Treatments would occur in different areas over a 5-15 year period, minimizing impacts to habitat and within any individual lynx home range in space and time.

- Prescribed burning would not occur in current lynx habitat to conserve horizontal cover.
- Thinning and timber harvest within current lynx habitat would be implemented to specifically conserve lynx habitat values including PCE 1a and PCE 1c (e.g. alternative thinning prescriptions, not removing shrub cover)
- Treatments would follow guidelines provided in the Northern Region Snag Management Protocol (USDA 2000) and Trees and Logs Important to Wildlife in the Interior Columbia River Basin (Bull et. Al 1997) to maintain and/or improve snag or large woody debris habitat (PCE 1c).
- Retaining biological legacies, such as large healthy trees, large decadent trees, snags, logs, and other coarse woody debris on the forest floor (PCE 1c).

North American Wolverine:

Table 19 displays acreages of the 4 types of wolverine habitat identified by the model described by Inman et al. (2013) in the Clark Fork Face planning area and in the proposed treatments. No maternal denning habitat was identified in the planning area. The model identified 48 acres of primary wolverine habitat in the planning area (0.02% of the planning area) and none within the proposed treatments. The entire planning area and all proposed treatments constituted male wolverine dispersal habitat. Female wolverine dispersal habitat was identified in 64,183 planning area acres (26.0% of planning area), and 10,508 acres (54.9%) of the proposed treatment area (see Appendix D Map 9.11).

Table 19. Wolverine habitat acres within the Clark Fork Face planning area and proposed treatments.

Habitat Type	Planning Area		Proposed Treatments	
	Acres	%	Acres	%
Female dispersal	64,183	26.0%	10,508	54.9%
Male dispersal	247,190	100.0%	19,147	100.0%
Maternal denning	0	0.0%	0	0.0%
Primary	48	0.02%	0	0%

No effects are expected to wolverine maternal denning habitats or primary wolverine habitat within or near the planning area due to project activities. The 48 acres of primary habitat in the planning area are located a minimum of 7.1 miles from the nearest haul route; 2.7 miles from the nearest proposed treatment area (10.2 acres of proposed fuels management on either side of I-90), and 5.1 miles to the next nearest treatment area, (71.3 acres of proposed prescribed burning, 0.3 miles south of (across) I-90. Disturbance from project activities would be distant enough to have no or negligible impact on the small island of primary habitat in the planning area.

Disturbance to male and female wolverine dispersal habitat would be temporary and occur at a scale much smaller than a wolverine home range or dispersal movement. While dispersal activities could be affected to some degree, these habitats are not suitable for the establishment of home ranges and reproduction. Wolverine do not generally use dispersal habitats for foraging (USDI Fish and Wildlife Service 2013).

Project activities would take place over a 5- to 15-year period, including pre-treatment planning visits, post-treatment monitoring and potential tree planting if regeneration did not prove sufficient. Treatments would occur over several weeks within one season in any given treatment block and would affect the development of forest structure during the following decades. Thinning and prescribed burning would lower the risk of severe stand-replacing fire while aiding the development of multi-story, mature forest. Timber management would leave shrub cover and some mature trees, while converting stands to the stand initiation phase and reducing the incidence of insect infestation and risk of stand-replacing fire. All constructed roads would be permanently closed to public motorized use, and temporary roads would be removed within 36 months of their construction.

Potential disruption of wolverine dispersal or other exploratory movements would be temporary and would occur at a small scale when compared to the large home range size of wolverines. Heinemeyer et al. (2012) suggested that wolverine are able to adjust their use within home ranges to avoid disturbance.

Impacts to wolverine and their habitat due to this project would not approach the level of threatening the contiguous U.S. wolverine DPS for the following reasons:

- Only 48 acres of primary wolverine habitat exist in the planning area and are distant enough from planned project activities to experience no or negligible impact.
- No wolverine maternal denning habitat exists in the planning area.
- The proposed action and cumulative effects will not create barriers to dispersing individuals.
- The individual project activities and cumulative actions will result in relatively small-scale disturbances spatially and temporally in relation to the large wolverine home range size.
- Wolverine have been found to adjust to moderate levels of disturbance.

3.4.2.1 Cumulative Effects.

The grizzly bear, lynx, and wolverine analysis areas can be expected to experience increasing human activity, recreation and habitation in the next 3 decades. These increases may cause grizzlies to avoid areas of human disturbance, but also increase the risk of human/grizzly bear conflict. Avoidance of otherwise quality habitats and increased potential for conflict could reduce the value of grizzly bear habitat in the planning area. This could diminish fitness of grizzly bears that otherwise could occupy this area over the next 3 decades. Secure habitat is already minimal in the planning area due to high road density, levels of human activity and number of structures. The proposed action would impact around 1% of the grizzly bear analysis area (the planning area) in a given season and may benefit grizzly bear habitats by promoting preferred foraging and diminished risk of high-severity fire impacts. The proposed action unlikely to substantially exacerbate this diminishment of habitat quality from increasing human presence.

Likewise, increased human habitation, activity and recreation may negatively impact lynx by diminishing interior, secure habitat, presenting opportunities for conflicts with humans and pets, and by causing lynx to avoid areas or travel further to obtain needed resources. Avoidance of otherwise quality habitats due to human activities could reduce the value of habitats in the lynx analysis area and lead to increased energy expenditure and diminished fitness of lynx that might occupy this area over the next 3 decades. The proposed action would not appreciably exacerbate these effects. Only 0.001% of current lynx habitat in the lynx analysis area would be impacted over the 10-15 year duration of the project, and more lynx habitat would be created long-term.

Increased human use is not expected to affect the landscape heavily enough to significantly alter critical lynx habitat. However, an increasing number of privately held parcels, road development to reach those parcels, and a rising number of structures and residences may continue to cause gradual fragmentation of lynx habitat in the lynx analysis area.

Increasing human presence and activities in the planning area may cause wolverine to avoid areas of human disturbance, and may increase the risk of human conflict. Interstate highway US-90 runs through the planning area and may already present a barrier to wolverine metapopulation connectivity and female dispersal. These stressors combined with predicted decreases in snowpack needed for denning could negatively impact the wolverine metapopulation in a broader area over the coming decades, but denning habitat does not exist in the planning area. The proposed action is not expected to change levels of recreational use or create further barriers to dispersal. Wolverine foraging and denning would not likely be impacted by this project. Project activities would increase existing disturbance in male and female wolverine dispersal habitat for short durations (a few weeks in one season with infrequent visits before and after).

Other timber and fuels treatments may occur within the species' analysis areas within the next 3 decades, and could be expected to disturb and displace grizzlies, lynx and wolverine in the short-term. In the short-term, such projects could exacerbate the disturbance and displacement impacts of this project on these species in the immediate area where the treatments would occur within a given season. However, timber and fuels treatments other than the proposed action could improve habitat for grizzly, lynx and wolverine within 5-10 years following treatment as understory vegetation establishes. Such treatments in addition to the proposed action could decrease the risk of severe, stand-replacing fire and could positively impact habitats surrounding the treatments, conserving or increasing habitat and prey source diversity.

Timber management and prescribed burning on lands in the lynx analysis area may have negative impacts on lynx critical habitat if multi-story forest structure and horizontal cover is removed. These projects could diminish suitable lynx habitat for a period of years depending on the amount and type of understory that would be removed. Understory and horizontal cover would be expected to initially reestablish within 5-10 years post-treatment, and snowshoe hare populations could be expected to rise when stands reach the advanced regeneration phase. Such projects on federal land would be limited by existing lynx habitat protections.

Depending on implementation other timber harvest, thinning or prescribed burning in the species' analysis areas, grizzlies, lynx and wolverine could benefit long-term by opening canopies to allow shrub community development, restoring heterogeneous forest structures, restoring the Natural Range of Variation, decreasing the risk of high-severity fire, and creating a mosaic of habitats across the landscape.

Impacts of small-scale mining or exploration have been minimal and are not expected to change in the foreseeable future. Climate fluctuations may affect grizzly bears, lynx and wolverine such as through reduction in snowpack levels causing shifts in denning habitats or season, shifts in the abundance and distribution of some natural food sources causing habitat use changes or range shifts, and changes in fire regimes especially associated with summer drought.

Light to moderate cattle grazing on public and private land is not expected to change substantially in the foreseeable future and is not thought to substantially impact lynx and wolverine, in part because cattle do not tend to frequent mature boreal forest and other habitat patches favored by these species. Grazing could impact grizzlies if bear depredated on cattle and were reactively exterminated. However, this has not occurred in recent years in the area.

Overall, the cumulative effects of the proposed action could exacerbate short-term disturbance or displacement to limited grizzly, lynx or wolverine individuals in particular circumstances. However, populations and critical habitat resources would be maintained. In the long-term this project could be expected to improve habitat quality and resiliency for the 3 species.

4 Consultation and Coordination

4.0 Summary of Consultation and Coordination

The issue identification section 1.5 identifies those issues analyzed in detail in Chapter 3. Section 1.6 provides the rationale for issues that were considered but not analyzed further. Issues were identified through the public and agency involvement process described in Section 4.1.1

Name	**Purpose & Authorities for Consultation or Coordination**	**Findings & Conclusions**
USFWS	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	See 4.0.1
Montana State Historic Preservation Office	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	BLM would consult with State Historic Preservation Office prior to implementation of project level activities via Class III Cultural Resource Inventories. If cultural resources are located during the inventory mitigation measures would be applied to reduce or eliminate adverse effects.
Confederated Salish & Kootenai Tribes	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	BLM consulted via mail/conference call with the Confederated Salish and Kootenai tribes in April 2021. No issues or concerns were brought forward in those discussions.

The Nature Conservancy	Large adjacent landowner	Discussed and met with TNC staff on many occasions throughout planning process.
MT DNRC	Large adjacent landowner	Discussed and met with DNRC staff on many occasions throughout planning process

Table 20: List of Person, Agencies and Organizations Consulted

4.0.1 Consultation and Coordination with U.S. Fish and Wildlife Service (USFWS) on Threatened and Endangered Species

The Missoula Field Office submitted a Biological Assessment (BA) to the US Fish and Wildlife Service on April 28, 2022. Supplemental documents were submitted on June 6, 2022, August 19, 2022, September 24, 2022, and Oct. 20, 2022. The BA disclosed the Effects of the Proposed Action on grizzly bear, Canada lynx, Canada lynx Designated Critical Habitat, and North American wolverine.

The BLM determined the proposed action would not affect the western yellow-billed cuckoo (threatened) or whitebark pine (proposed) because those species and habitat are not present within the action area. Bull trout (threatened) and bull trout designated critical habitat would not be affected due to factors associated with design features and conservation measures incorporated into the proposed action and distant proximity and local topography of vegetation treatments and haul routes to occupied bull trout habitat and bull trout designated critical habitat.

The Proposed Action, potential effects, Section 7 consultation, and determinations were discussed during a formal consultation process with the USFWS. On November 8, 2022 the FWS concurred with the BLM's determination of *may affect and likely to adversely affect* grizzly bears (*Ursus arctos horribilis*), Canada lynx (*Lynx canadensis*), and lynx designated critical habitat. The BLM also determined that the Project will have *no effect* on western yellow-billed cuckoo (*Coccyzus americanus*), bull trout (*Salvelinus confluentus*), or designated bull trout critical habitat, and is *not likely to jeopardize the continued existence* of wolverine (*Gulo gulo luscus*) or whitebark pine (*Pinus albicaulis).* The FWS responded with a Biological Opinion (BO) and Amended Incidental Take Statement (ITS) for the Missoula Field Office 2020 RMP. The BO included conservation recommendations designed to minimize or avoid effects to the extent possible. The conservation recommendations were incorporated into the proposed action as design features. The BA, supplements and BO as well as the Amended ITS are incorporated by reference into this NEPA analysis, which summarizes the effects to these species and their habitat as described in the BA.

4.1 Summary of Public Participation

On March 15, 2021 the BLM issued a press release announcing two public meetings to share information about the proposed project and solicit feedback from the public during project development. At this same time, the BLM also announced the public meetings on our MT/DK BLM social media sites. Additionally, emails announcing the meetings were sent to local organizations to spread awareness. Organizations emailed included the Montana Department of

Natural Resources (MT DNRC), the Natural Resources Conservation Service (NRCS), Missoula County, Powell County, Granite County, The Nature Conservancy (TNC), The Town of Drummond, Valley Fire Dept. (Drummond, MT) Missoula Rural Fire Dept., The Blackfoot Challenge, The Clark Fork Coalition, and the University of Montana. Flyers announcing the meetings were also posted at the gas stations and convenience stores in Drummond, MT and Clinton, MT.

The first open house was held March 23, 2021 from 4 to 6 p.m. at the Clinton Rural Fire Dept. The second meeting was March 25, 2021 also from 4 to 6 p.m., at the Eastside park in Drummond. Both meetings were held outdoors due to the COVID-19 pandemic.

The meeting on 3/23/21 was attended by 9 individuals, and the meeting on 3/25/21 was attended by 5 individuals (plus BLM personnel in both cases). A Missoulian article was published on March 24, 2021 which mentioned the Public Meetings and the proposed project (Chaney, 2021).

An informal comment period followed the public meetings in 2020, and 4 written comments were received at that time. These comments are summarized in the next section 4.1.1. The BLM has posted this DRAFT Environmental Assessment to ePlanning on December 5, of 2022. A Press Release and Social Media postings announced the two-week comment period which concludes on December 16, 2022. Public comments received following the open houses and the draft EA posting to ePlanning (if received) are listed in section 4.1.1.

4.1.1 Public Comments Analysis

Clark Fork Face Forest Health and Fuels Reduction Summary of public comments received during scoping.			
comment number	topic	sender	date received
1	Coordination on forest management	Michael Schaedel, The Nature Conservancy	Wed 3/10/21
	Thanks for sharing this with us. I am excited to see that you all are looking to do some fuels reduction and restoration work on the Clark Fork Face. The portion of that area in Missoula County Definitely pops out as high needs in the Missoula County CWPP and clearly the needs continue into Granite County as well. The TNC lands in that area are bright red in the CWPP but I have not had the time to engage much with those lands. It would be interested to talk with you to see how you are going to look at and analyze those lands and with what data sets. Perhaps there is a way we can create some synergies between the two ownerships.		
Comment number	topic	sender	date received
2	Prescribed fire, smoke	Theresa Blazicevich	Thu 3/18/2021

Dear Mr. Johnson:
I want to comment on the forest restoration and fuels reduction treatments along the Clark Fork River corridor. I am opposed to any prescribed burning because it causes air pollution. There are other treatments, for example, cutting and chipping, grazing and mowing that also achieve fuels reduction without causing smoke and air pollution. It would be great for the young, the elderly, the asthmatics, the heart and lungs, if foresters would quit suggesting that burning is the only solution.
I worked my entire career for natural resource and environmental health organizations and I know the damage air pollution has on our health. I also know there are alternatives that achieve similar goals. A recent sign reminded me of one of those treatments, "Grazing, not Blazing". And, for years, we have known that logging debris can be chipped instead of burned. We all know that especially in narrow mountain valleys like the Bonner to Drummond corridor, air pollution can linger for hours and days. There is really no good time to burn here without impacting air quality. Even on a windy day, you risk a runaway fire. Many years ago, I fought fires for BLM and state lands and there was never a controlled fire. The risk to our health is not worth the little gain you think might happen by burning. And, the expense of burning is certainly not worth the taxpayers money. And, far more wildlife species are damaged by fire than benefit from it, especially endangered species. My experience with wildlife habitat restoration and reclamation tells a different story than the foresters claims of creating wildlife habitat by burning.
Please remove all burning from this plan.

Comment number	topic	sender	date received
3	Timber Harvest, Wildfire Risk	Bev Yelczyn	Sat 3/20/2021

Since you aren't having an open house in Missoula, just in Clinton and Drummond, are there maps online for this project? I support maximum harvest to cover the costs of the treatments. No harvest buffers exacerbate the risk/hazard to stand replacement fire and hope you can follow the Montana Streamside Act guidelines. Please, no diameter limits. If a Douglas for is competing with Ponderosa pine or Western larch, cut the DF! Even if 2 PP or 2 WL have inter-crown competition, harvest one.
Thanks for your service as a government employee.

Comment number	topic	sender	date received
4	Wildfire Risk, Forest Health	Craig Blubaugh, Sun Mountain Lumber	Mon 3/29/2021

	Kyle, thanks for having the open house discussions. Dave Krueger went to the one in Drummond last week and I was not able to attend. I work for Sun Mountain as well and I work predominantly with private landowners across the state. My input into this plan for work to be completed in the Clark Fork drainage are is a "get er done" in agreement with the BLM working with the private and other landowners in the area to get forest management done out there. I am seeing a lot of budworm defoliation and the DF bark beetle taking hold, not to mention other pathogens attaching other species. Private landowners are very concerned about the overall health of our forests and the real threat of stand replacement wildfire in their backyards. I would like to be included in emails etc. on the progress and know of plans on geographic areas of intent so maybe I can pursue landowners in the area to join on board to strengthen cross boundary work. However, as you know, these projects take a lot of time and effort so the more heads up the better. Thanks much and we and I are in favor of your proposal. Let me know if I can be of assistance to you and your crew.

5 List of Appendices

Appendix A—List of Preparers

Appendix B—Acronyms and Abbreviations

Appendix C—List of References

Appendix D—Maps

Appendix E—Figures

Appendix F—Design Features for the Proposed Action.

Appendix G—Natural Range of Variability Tables by HTG

Appendix H—Reasonably Foreseeable Actions

Appendix I— Wildlife Issues Considered but Not Analyzed in Detail

6 Appendix A: List of Preparers

Name	Title	Responsible for the Following Section(s) of this EA
Kyle Johnson	Forester	ID Team Leader, Forestry
Ernie McKenzie	Fisheries Biologist	Aquatic Species and Habitat
Maria Craig	Outdoor Recreation Planner	Recreation, Visual Resources, TTM, Special Designations
Anne Orlando PhD.	Wildlife Biologist	Federally Threatened or Endangered Wildlife and Wildlife Habitat
Michael Albritton	Fire Management Specialist	Fuels Management
Jodi Wetzstein	Supervisory Forester	Forest Vegetation and Silviculture
Claire Romanko	Hydrologist	Soils, Water, Riparian
Chris Rye	Geologist	Minerals, Abandoned Mine Lands
Jody Miller	Archaeologist	Cultural Resources
Ken Cook	Noxious Weed Specialist	Noxious Weeds
Steve Bell	Rangeland Management Specialist	Rangeland Vegetation/Livestock Grazing
Lonna Sandau	Realty Specialist	Land status, roads
Maggie Ward	Planning and Environmental Coordinator	Document Review / NEPA compliance.
Lester Maas	Cartographer	GIS support and analysis
Kathie Marks	Civil Engineer	Roads and transportation
Greta Brom-Palkowski	Biological Technician	Terrestrial Wildlife and Wildlife Habitat

7 Appendix B: Acronyms and Abbreviations

BLM	Bureau of Land Management
BA	Biological Assessment
BO	Biological Opinion
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DR	Decision Record
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FLPMA	Federal Land Policy Management Act of 1976, as amended
FONSI	Finding of No Significant Impact
GIS	Geographic Information Systems
IDT	Interdisciplinary Team
MBTA	Migratory Bird Treaty Act of 1918
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHT	National Historic Trails
NPS	National Park Service
NRCS	Natural Resources Conservation Service
RFFA	Reasonably Foreseeable Future Action
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-way
SHPO	State Historic Preservation Office
T&E	Threatened and Endangered
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WUI	Wildland Urban Interface

8 Appendix C: List of References

Agee, J. K., 1993. Fire Ecology of Pacific Northwest Forests. Island Press, Washington DC, 493 pp.

Agee, J.K., 1998. The Landscape Ecology of Western Forest Fire Regimes. Northwest Science. Vol 71. 153-157.

Arno, S.F. 1980. Forest Fire History in the Northern Rockies. Journal of Forestry Vol. 78. 460-465.

Arno, S. F., H.Y. Smith, and M.A. Krebs. 1997. Old growth ponderosa pine and western larch stand structures: Influences of pre-1900 fires and fire exclusion. USDA Forest Service, Research Paper.

Barrett, S.W., Arno, S.F., and Menakis, J.P. 1997. Fire episodes in the inland Northwest (1540–1940) based on fire history data: Odgen, Utah, USDA-Forest Service, Intermountain Research Station, General Technical Report INT-GTR-370, 17 p.

Aronsson, M., and J. Persson. 2018. Female breeding dispersal in wolverines, a solitary carnivore with high territorial fidelity. Eur. J. Wildl. Res. 64, 1–10.

Aubry, K.B., McKelvey, K.S., Copeland, J.P., 2007. Distribution and broadscale habitat relations of the wolverine in the contiguous United States. J. Wildl. Manag. 71, 2147–2158.

Aubry, K.B., G.M. Koehler, J.R. Squires. 2000. Ecology of Canada Lynx in Southern Boreal Forests. In: Ruggiero, L.F., K.B Aubry, S.W. Buskirk, Et Al., Eds. The Scientific Basis for Lynx Conservation in the Contiguous United States. General Technical Report.

Barrett, S.W. 2004. Fire Regimes in the Northern Rockies. Fire Management Today Vol. 64-2. 32-38.

Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

Bull, E. L.; C.G. Parks, and T.R. Torgersen. 1997. Trees and logs important to wildlife in the interior Columbia River basin. Gen. Tech. Rep. PNW-GTR-391. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 55pp.

Byler, James W., Michael A. Marsden, Susan K. Hagle. 1990. The probability of root disease on the Lolo National Forest, Montana. Canadian Journal of Forest Research, 1990, Vol. 20, No. 7 : pp. 987-994.

Carlson, C.E. & Wulf, N.W. 1989. Silvicultural Strategies to Reduce Stand and Forest Susceptibility to the Western Spruce Budworm. Agric. Hbk. 676. USDA Forest Service and Cooperative State Research Service, Washington, DC.

Chaney, Rob. 2021. BLM readies Garnet forest work amid agency changes. Missoulian, March 24, 2021.

Churchill, Derek J.; Larson, Andrew J.; Dahlgreen, Matthew C.; Franklin, Jerry F.; Hessburg, Paul F.; Lutz, James A. 2013. Restoring forest resilience: From reference spatial patterns to silvicultural prescriptions and monitoring, Forest Ecology and Management, Volume 291, Pages 442-457.

Clevenger, A.P. 2013.Mitigating highways for a ghost: data collection challenges and implications for managing wolverines and transportation corridors. Northwest Sci., 87, 257-264

Davis, D.H., 1980. Fire history of western redcedar/hemlock forests in northern Idaho. In *Proceedings of the Fire History Workshop,* October 20-24, 1980, Tucson, Arizona (Vol. 81, p. 21). The Station.

Duncan, S.L.; McComb, B.C.; Johnson, K.N. 2010. Integrating ecological and social ranges of variability in conservation of biodiversity: past, present, and future. Ecology and Society. 15(1): article 5. http://www.ecologyandsociety.org/vol15/iss1/art5/.

Executive Order 13112. 1999. 64 FR 6183, pages 6183-6186.

Fahey, Robert T.; Alveshere, Brandon C.; Burton, Julia I.; D'Amato, Anthony W.; Dickinson, Yvette L.; Keeton, William S.; Kern, Christel C.; Larson, Andrew J.; Palik, Brian J.; Puettmann, Klaus J.; Saunders, Michael R.; Webster, Christopher R.; Atkins, Jeff W.; Gough, Christopher M.; Hardiman, Brady S. 2018. Shifting conceptions of complexity in forest management and silviculture, Forest Ecology and Management, Volume 421, Pages 59-71.

Flower, A.; Gavin, D.G.; Heyerdahl, E.K.; Parsons, R.A.; Cohn, G.M. 2014. Drought-triggered western spruce budworm outbreaks in the interior Pacific Northwest: A multi-century dendrochronological record. Forest Ecology and Management Volume 324, pages 16–27.

Fiedler, Carl E.; Keegan, Charles E., III; Woodall, Christopher W.; Morgan, Todd A. 2004. A strategic assessment of crown fire hazard in Montana: potential effectiveness and costs of hazard reduction treatments. Gen. Tech. Rep. PNWGTR-622. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 48 p.

Fischer, W. C. and Bradley, A. F. 1987. Fire Ecology of Western Montana Forest Habitat Types. USDA, FS, Intermountain Research Station, Gen. Tech. Rep. INT-GTR-223, Ogden, UT. 95 pp.

Fisher, J.T., Bradbury, S., Anholt, B., Nolan, L., Roy, L., Volpe, J., and M. Wheatley. 2013. Wolverines (Gulo gulo luscus) on the Rocky Mountain slopes: natural heterogeneity and landscape alteration as predictors of distribution. Can. J. Zool., 91, 706-716.

Fisher, J.T., Murray, S., Barrueto, M., Carroll, K., Clevenger, A.P., Hausleitner, D., Harrower, W., Heim, N., Heinemeyer, K., Jacob, A.L. and Jung, T.S., 2022. Wolverines (Gulo gulo) in a changing landscape and warming climate: a decadal synthesis of global conservation ecology research. Global Ecology and Conservation, p.e02019.

Gibson, K. E. 2004. Mountain Pine Beetle Management. Chapter 4.2. Forest insect and disease management guide for the northern and central Rocky Mountains. USDA Forest Service, Northern Region, State and Private Forestry. 16 pp

Graham, E. 2017. Personal Communication on snowshoe hare and lynx, Forest Carnivore Monitoring Crew.

Graham, Russell T.; Harvey, Alan E.; Jurgensen, Martin F.; Jain, Theresa B.; Tonn, Jonalea R.; Page-Dumroese, Deborah S. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Res. Pap. INT-RP-477. Ogden, UT: U.S. Department of Agriculture, Forest Service, lntermountain Research Station. 12 p.

Graham, R.T., A.E. Harvey, T.B. Jain, AND J.R. Tonn. 1999. The effects of thinning and similar stand treatments on fire behavior in Western forests. USDA Forest Service, General Technical Report PNW-GTR-463.

Graham, R.T., S. McCaffery, and T.B. Jain. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. USDA Forest Service, General Technical Report RMRS-GTR-120.

Gruell GE. 1983. Fire and vegetative trends in the Northern Rockies: interpretations from 1871–1982 photographs. USDA Forest Service, General Technical Report RMRS-GTR-115.

Haavik, L.; Costanza, K. 2020. Insect and disease assessment on the Clark Fork Face Project Area. FHP Trip Report MFO-TR-20-06. Missoula, MT: U.S. Dept. of Agriculture, Forest Service, Northern Region, Forest Health Protection. 14 p.

Harrington, Constance A. 2009. Variable-Density Thinning - What the heck is it, and why should I care? TimberWest Magazine, TimberWest Publications, Edmonds, WA.

Haufler, J.B. 1999. Strategies for conserving terrestrial biological diversity. P. 17-30. *In*: Baydack, R.K., Campa, H., Haufler, J.B. editors. Practical approaches to the conservation of biological diversity. Island Press, San Diego, CA.

Heinemeyer, K.S. 2012. Central Idaho wolverine and winter recreation study: February 2012 update. Rocky Mountain Research Station, Missoula, Montana. 4 pp.

Heinemeyer, K., J. Squires, M. Hebblewhite, J. J. O'Keefe, J. D. Holbrook, and J. Copeland. 2019. Wolverines in winter: indirect habitat loss and functional responses to backcountry recreation. Ecosphere 10:1-23.

Hessburg, Paul F., et al. 2005. Dry Forests and wildland fires of the inland Northwest USA: Contrasting the landscape ecology of the pre-settlement and modern eras. Journal of Forest Ecology and Management 211 pp 117-139.

Hillis, M. and V. Applegate. (1998). Shrub response from prescribed burns on the Lolo National Forest: net changes in ungulate forage production, relationship to residual conifer density and fire severity, and strategies for successful burning. Unpublished report on file, Lolo National Forest, Missoula, Montana.

Hodges, K.E. 2000. Ecology of snowshoe hares in southern boreal and montane forests. In: Ruggiero, L.F., K.B Aubry, S.W. Buskirk, et al., eds. The scientific basis for lynx conservation in the contiguous United States. General Technical Report RMRS-GTR-30. University Press of Colorado, Niwot, CO. U.S. Department of Agriculture, U.S. Forest Service, and the Rocky Mountain Research Station.

Hood, S., Baker, S. & Sala, A. 2016. Fortifying the Forest: Thinning and Burning Increase Resistance to a Bark Beetle Outbreak and Promote Forest Resilience. Ecological Applications, 26, 1984–2000.

Hornocker, M. G. and H. S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Can. J. Zool. 59:1286-1301.

Inman, R.M., B.L. Brock, K.H. Inman, S.S. Sartorius, B.C. Aber, and B. Giddings. 2013. Developing priorities for metapopulation conservation at the landscape scale: Wolverines in the Western United States. Biological Conservation 166:276– 286.

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Johnson, C. G., Jr.; Clausnitzer, R.R.; Mehringer, P.J., Jr.; Oliver, C.D. 1994. Biotic and abiotic processes of the eastside ecosystems: the effects of management on plant and community ecology, and on stand and landscape vegetation dynamics. Gen. Tech. Rep. PNW-GTR-322. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 66 p.

Keane, R.E., Ryan, K.C., Veblen, T.T., Allen, C.D., Logan, J., Hawkes, B., 2002. Cascading effects of fire exclusion in Rocky Mountain Ecosystems: a literature review. USDA Forest Service Rocky Mountain Research Station General Technical Report GTR-91.

Kegley, Sandra. 2011. Douglas-fir beetle management. Chapter 4.5 Forest insect and disease management guide for the northern and central Rocky Mountains. USDA Forest Service, Northern Region, State and Private Forestry. 10 pp

Koehler, G.M. and K.B. Aubry. 1994. Lynx. In: Ruggiero, L. F., K.B. Aubrey, S.W. Buskirk, L.J. Lyon and W.J. Zielinski, eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the western United States. pp. 74-98. U.S. Forest Service General Technical Report RM-254.

Kolb, T.E., Holmberg, K.M., Wagner, M.R., Stone, J.E., 1998. Regulation of ponderosa pine foliar physiology and insect resistance mechanisms by basal area treatments. Tree Physiol. 18, 375–381.

Kortello, A., D. Hausleitner, and G. Mowat. 2019. Mechanisms influencing the winter distribution of wolverine Gulo gulo luscus in the southern Columbia Mountains, Canada. Wildlife Biology, 2019(1):1-13.

Kosterman, M. K., Squires, J. R., Holbrook, J. D., Pletscher, D. H., & Hebblewhite, M. 2018. Forest structure provides the income for reproductive success in a southern population of Canada lynx. Ecological Applications. doi:10.1002/eap.1707

Laliberte, A.S., Ripple, W.J. 2004. Range contractions of North American carnivores and ungulates. BioScience 54, 123–138.

Landres, Peter B., et al. 1999. "Overview of the Use of Natural Variability Concepts in Managing Ecological Systems." Ecological Applications, vol. 9, no. 4, 1999, pp. 1179–1188., www.jstor.org/stable/2641389.

Livingston, Ladd. 2010. Management Guide for Pine Engraver. USDA Forest Service, Northern Region, State and Private Forestry. 6 pp

Lloyd, Rebecca A.; Lohse, Kathleen A.; 2013. Influence of road reclamation techniques on forest ecosystem recovery. Frontiers in Ecology and the Environment. Vol. 11 Issue 2, pp. 75 – 81.

Lockman, I. Blakey; Kearns, Holly S.J., eds. 2016. Forest root diseases across the United States. Gen. Tech. Rep. RMRS-GTR-342. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 55 p.

Lofroth, E.C. and J. Krebs. 2007. The abundance and distribution of wolverines in British Columbia, Canada. Journal of Wildlife Management, 71, 2159-2169.

Losensky. B. John. 1987. An evaluation of Noxious Weed on the Lolo and Flathead Forests with Recommendations for Implementing a Weed Control Program. USDA Forest Service Lolo National Forest Building 24. Fort Missoula. Missoula MT 59801 January 1987. Revised April 1987.

Losensky, B.J. 1997. Historical Vegetation of Montana. Montana Department of Natural Resources, Missoula, MT, Contract No. DNRC-970900.

Luce, Charles H.; 1997. Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads. Restoration Ecology Vol. 5 No. 3, pp. 265–270

MBTA. 1918. Migratory Bird Treaty Act. Chapter 128, Approved July 3, 1918, 40 Stat. 703. As Amended Through Public Law 107–136, Jan. 24, 2002.

MBEWG (Montana Bald Eagle Working Group). 1994. Montana bald eagle management plan. 2nd edition. Bureau of Reclamation. 104 pp. http://www.fws.gov/montanafieldoffice/Endangered_Species/Recovery_and_Mgmt_Plans/Montana_Bald_Eagle_mgmt_plan.pdf

MWEWG (Montana Bald Eagle Working Group). 2010. Montana Bald Eagle Management Guidelines: An Addendum to Montana Bald Eagle Management Plan, 1994, Montana Fish, Wildlife and Parks, Helena, Montana.

MBEWG (Montana Bald Eagle Working Group). 2016. Bald eagle nesting populations and nest monitoring, 1980-2014. Final Report. Montana Fish, Wildlife & Parks. 27 pp.

Mckelvey, K.S., Aubry, K.B., Anderson, N.J., Clevenger, A.P., Copeland, J.P., Heinemeyer, K.S., Inman, R.M., Squires, J.R., Waller, J.S., and K.L. Pilgrim. 2014. Recovery of wolverines in the Western United States: recent extirpation and recolonization or range retraction and expansion? J. Wildl. Manag. 78, 325–334.

McKelvey, K.S., Copeland, J.P., Schwartz, M.K., Littell, J.S., Aubry, K.B., Squires, J.R., Parks, S.A., Elsner, M.M., and G.S. Mauger. 2011. Climate change predicted to shift wolverine distributions, connectivity, and dispersal corridors. Ecol. Appl. 21, 2882–2897.

MNHP. 2020a. Montana Natural Heritage Program. Montana Field Guide. Available at http://fielduide.mt.gov. [2022, July].

MNHP. 2020b. Montana Natural Heritage Program. Natural Heritage Map Viewer. Available at http://mtnhp.org/mapviewer/. [2022, July].

MT-DNRC. 2006. Montana Guide to the Streamside Management Zone Law and Rules 2006. Montana Department of Natural Resources and Conservation. Missoula, MT.

MT-DNRC. 2015. Montana Forestry Best Management Practices. Montana Department of Natural Resources and Conservation – Forestry Division.

Montana Fish, Wildlife and Parks . (2004). Montana statewide elk management plan 2004. Retrieved from Helena, MT: http://fwp.mt.gov/fishAndWildlife/management/elk/managementPlan.html

Morgan, P., et al. 1994. Historical Range of Variability: A Useful Tool for Evaluating Ecosystem Change. Journal of Sustainable Forestry, Vol. 2, Nos. 1 & 2, 1994.

Morgan, Todd A.; Niccolucci, Michael J.; Polzin, Paul E. 2018. Montana's Forest Industry Employment and Income Trends. Forest Industry Technical Report Number 8. Bureau of Business and Economic Research, University of Montana. Missoula, MT.

Mutch, R.W., Arno, S.F., Brown, J.K., Carlson, C.E., Ottmar, R.D., Peterson, J.L., 1993. Forest health in the blue mountains a management strategy for fire adapted ecosystems. U S Forest

Service General Technical Report PNW , 1-14.

NAHB. 2015. The economic impact of home building in a typical local area. National Association of Home Builders, Housing Policy Department, Washington, DC.

NatureServe. 2022. NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.103092/Gulo_gulo (Accessed: Sept. 15, 2022).

Omi, P., E.J. Martinson, G.W. Chong. 2006. Effectiveness of Pre-Fire Fuel Treatments. Joint Fire Science Program: Colorado State University, US Geological Survey. JFSP Project 03-2-1-07. 29 pp.

Packila, M.L., Riley, M.D., Spence, R.S., and R.M. Inman. 2017. Long-distance wolverine dispersal from Wyoming to historic range in Colorado. Northwest Sci. 91, 399–407.

Pederson, L., N. Sturdevant, D. Blackford. 2011. Western spruce budworm management. Chapter 6.1 Forest insect and disease management guide for the northern and central Rocky Mountains. USDA Forest Service, Northern Region, State and Private Forestry. 10 pp.

Peterson, D.L., M.C.Johnson, J.K.Agee, T.B.Jain, D. McKenzie and E.D. Reinhardt. 2005. Forest Structure and Fire Hazard in Dry Forests of the Western United States. USDA Pacific Northwest Research Station, Gen. Tech. Rep., PNW-GTR-628, Portland, Or.

Pfister, R, et al. 1977. Forest Habitat Types of Montana. USDA, FS, Intermountain Research Station, Gen. Tech. Rep., INT-GTR-34, Ogden, UT.

Pollet, J. and Omi P.N. 2002. Effect of thinning and prescribed burning on crown fire severity in ponderosa pine forests. *International Journal of Wildland Fire* 11, 1-10.

Proffitt, K. M., B. Jimenez, C. Jourdonnais, J. A. Gude, M. Thompson, M. Hebblewhite, and D. R. Eacker. 2015. The Bitterroot elk study: Evaluating bottom-up and top down effects on elk survival and recruitment in the southern Bitterroot Valley, Montana. Final Report, Montana Fish Wildlife and Parks, Helena, USA. Available online at http://fwp.mt.gov/fwpDoc.html?id¼73152

Pyne, S.J., 1982. Fire in America: A Cultural History of Wildland and Rural Fire. Princeton University Press, Princeton, NJ.

Pyne, S. J., 2001. *Fire: A Brief History*. Seattle, WA: University of Washington Press 65 Vol 50-1.

Sawaya, M.A., Clevenger, A.P., and M.K. Schwartz. 2019. Demographic fragmentation of a protected wolverine population bisected by a major transportation corridor. Biol. Conserv. 236, 616–625.

Schwandt, John; Kearns, Holly; Byler, James; 2013. White pine blister rust general ecology and management. Chapter 14.2 Insect and Disease Management Series. USDA Forest Service, Northern Region, State and Private Forestry. 25 pp.

Smith, D. M., et.al., 1997. The Practice of Silviculture: Applied Forest Ecology (Ninth Ed.). John Wiley & Sons. 537 pp.

Smith, Dorian; Hayes, Steven; Marcille, Kate 2018. The State of Montana Forestry. Montana Business Quarterly. 13 pp.

Squires, J. R. and T. Laurion. 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. Pages 337-349 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires, editors. Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, Colorado, USA.

Squires, J. R., N. J. Decesare, J. A. Kolbe, and L. F. Ruggiero. 2008. Hierarchical den selection of Canada lynx in western Montana. Journal of Wildlife Management 72:1497–1506.

Stephens, S. L. and Ruth, L. W. 2005. Federal forest-fire policy in the United States. Ecological Applications, 15: 532–542. Doi:10.1890/04-0545.

Summary: Wildland fire research. 2013. Headwaters Economics. Bozeman, MT. 5 pp.

Swanson. F. J., J. A. Jones, D. 0. Wallin, and J. H. Cissel. 1994. Natural variability-implications for ecosystem management. Pages 80-94 in M. E. Jensen and P. S. Bourgeron. Technical coordinators. Ecosystem management: principles and applications, volume 11. Eastside forest ecosystem health assessment. U.S. Forest Service. General Technical Report PNW-GTR-318, Pacific Northwest Research Station, Portland, Oregon, USA**.**

Taylor, Daniel A. R.; Perry, Roger W.; Miller, Darren A.; Ford, W. Mark. 2020. Forest management and bats. Hadley, MA: White-nose Syndrome Response Team. 23 p.

Thomas, J. W., et al. 1993. Viability assessments and management considerations for species associated with late successional and old growth forests of the Pacific Northwest. The report of the Scientific Analysis Team. U.S.D.A. Forest Service, Spotted Owl EIS Team, Portland, Oregon. 530 pp.

USDA-FS. 2000. Northern Region Snag Management Protocol. Prepared by the Snag Protocol Team for the USDA Forest Service, Northern Region, Missoula, Montana.

USDI-BLM. 1976. The Federal Land Policy and Management Act, as amended. U.S. Department of the Interior, Bureau of Land Management Office of Public Affairs, Washington, D.C. 69 pp.

USDI-BLM. 2006 Missoula Field Office Food/Attractant Storage Provisions for Contracts and Permits. Missoula Field Office. Missoula, Montana.

USDI-BLM 2008. Special Status Species Management. Manual 6840. Department of the Interior, Bureau of Land Management, Washington, D.C. 48 pp.

USDI-BLM. 2021 Missoula Resource Management Plan. Missoula Field Office. Missoula, Montana.

USDI-FWS. 1993. Grizzly bear recovery plan. U.S. Fish and Wildlife Service, Bethesda, MD. 181 pp.

USDI-FWS. 2005. Recovery outline: contiguous United States Distinct Population Segment of Canada lynx. U.S. Fish and Wildlife Service Region 6. Montana Field Office, Helena, Montana, USA 21 pp.

USDI-FWS. 2012. Amended incidental take statement for the biological opinion on the effects of the Missoula BLM RMP on grizzly bears. U.S. Fish and Wildlife Service, Helena, MT. 12 pp.
USDI-FWS. 2013. NCDE Grizzly Bear Conservation Strategy. 148 pp.

USDI-FWS. 2013. Draft NCDE Grizzly Bear Conservation Strategy. U.S. Fish and Wildlife Service, Montana Field Office, Helena, MT. 276 pp.

USDI-FWS. 2013. Federal Register Part II: Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico; Proposed Rules. Federal Register Vol. 78, No. 23, Monday, February 4, 2013, pages 7864 – 7890.

USDI-FWS. 2014. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. Federal Register. 64 pp.

USDI-FWS. 2014. Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico; Proposed Rule. Federal Register 50 CFR Part 17. Vol. 79, No. 156. August 13, 2014. Docket Nos. FWS–R6–ES–2012–0107 and FWS–R6–ES–2012–0106; 4500030113.

USDI-FWS. 2014. 50 CFR, Part 17, Endangered and threatened wildlife and plants; revised designation of critical habitat for the Contiguous United States distinct population segment of the Canada lynx; final rule. U.S. Fish and Wildlife Service. Pages 54782-54846.

USDI-FWS 2020. Biological Opinion on the Effects of the Bureau of Land Management, Missoula Field Office Revised Resource Management Plan on Grizzly Bears, Canada Lynx, and Designated Lynx Critical Habitat. US Department of the Interior Fish and Wildlife Service, Montana Ecological Services Office. 06E11000-2020-F-0439 MiFO BLM revised RM.

USDI-FWS. 2016. Endangered and Threatened Wildlife and Plants; Proposed Rule for the North American Wolverine. Federal Register 50 CFR Part 17. Vol. 81, No. 201. October 18, 2016. Docket No. FWS-R6-ES-2016-0106; 4500030114.

USDI Fish and Wildlife Service. 2018. Species status assessment report for the North American wolverine (Gulo gulo luscus). Version 1.2. March 2018. U.S. Fish and Wildlife Service, Mountain-Prairie Region, Lakewood, CO.

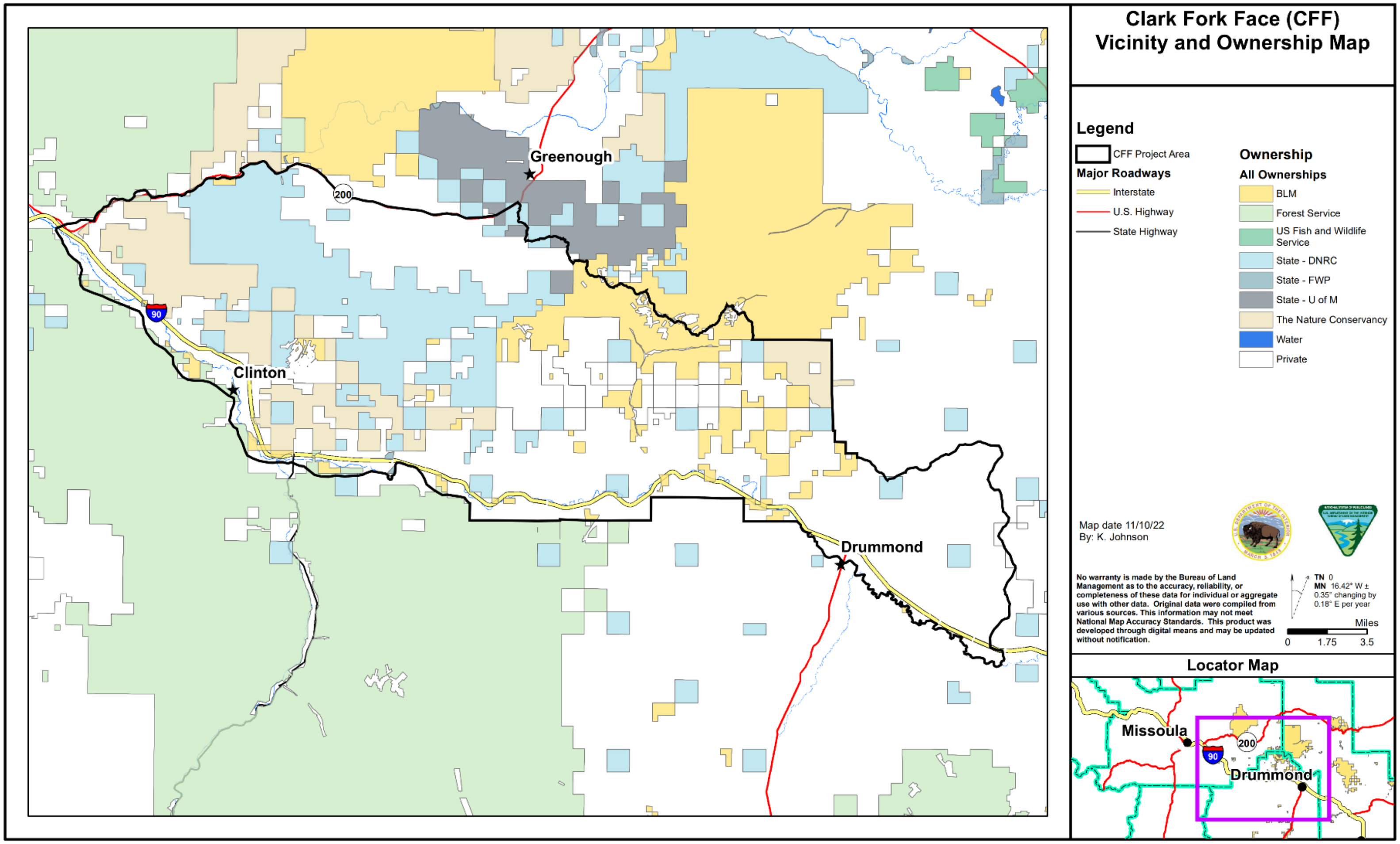
Vangen, K.M., Persson, J., Landa, A., Andersen, R., and P. Segerstrom. 2001. Characteristics of dispersal in wolverines. Can. J. Zool. 79, 1641–1649.

Wellner, C.A. 1970. Fire history in the northern Rocky Mountains. In *Role of Fire in the Intermountain West*, *Symposium Proceedings* pp. 27-29.

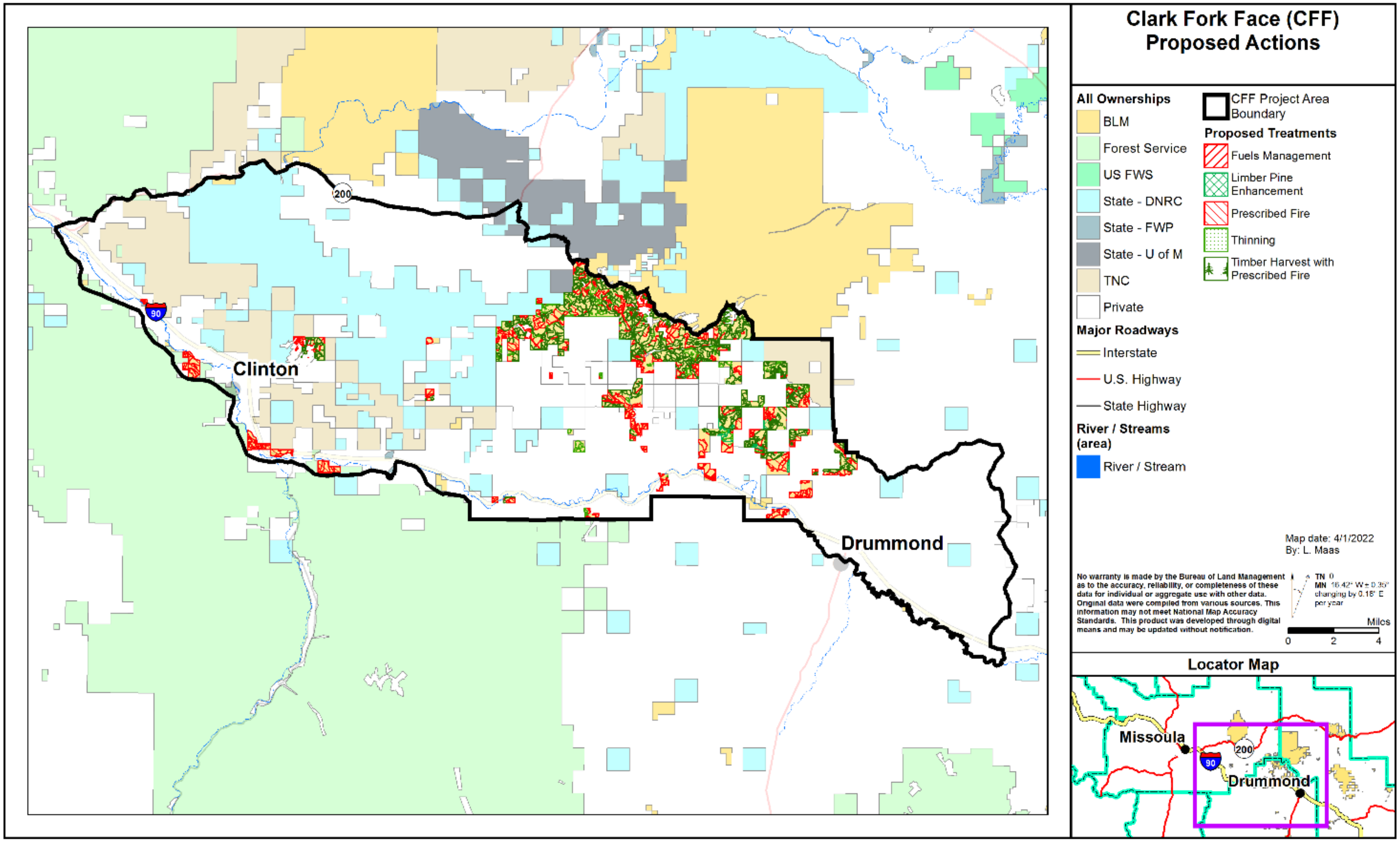
Yates, R.E., Copeland, J.P., and J.R. Squires. 2017. Wolverine reproductive den habitat in Glacier National Park, Montana. Intermt. J. Sci. 23, 95.

9 Appendix D: Maps

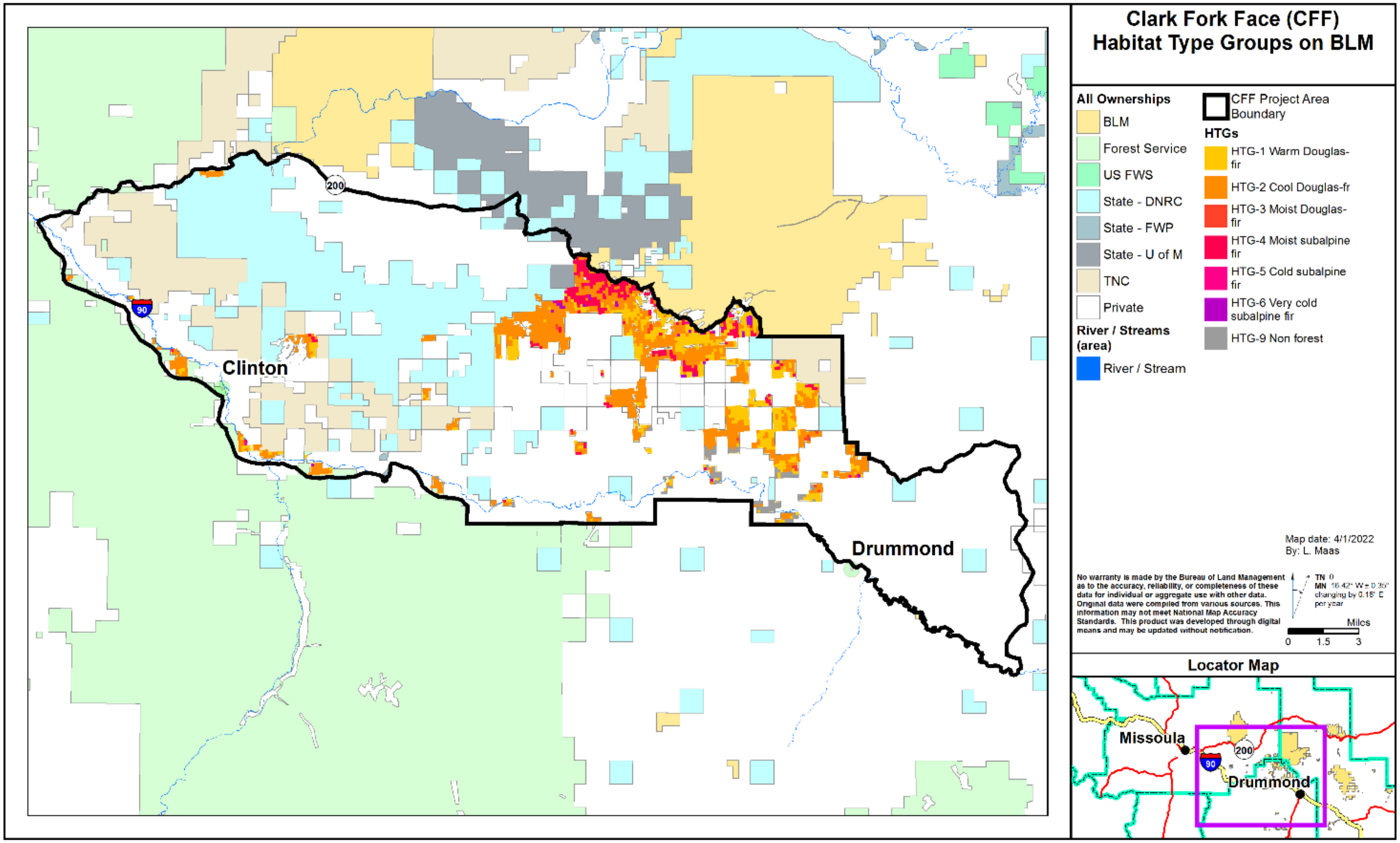
9.0 Clark Fork Face Planning Area, Vicinity and Ownership map.



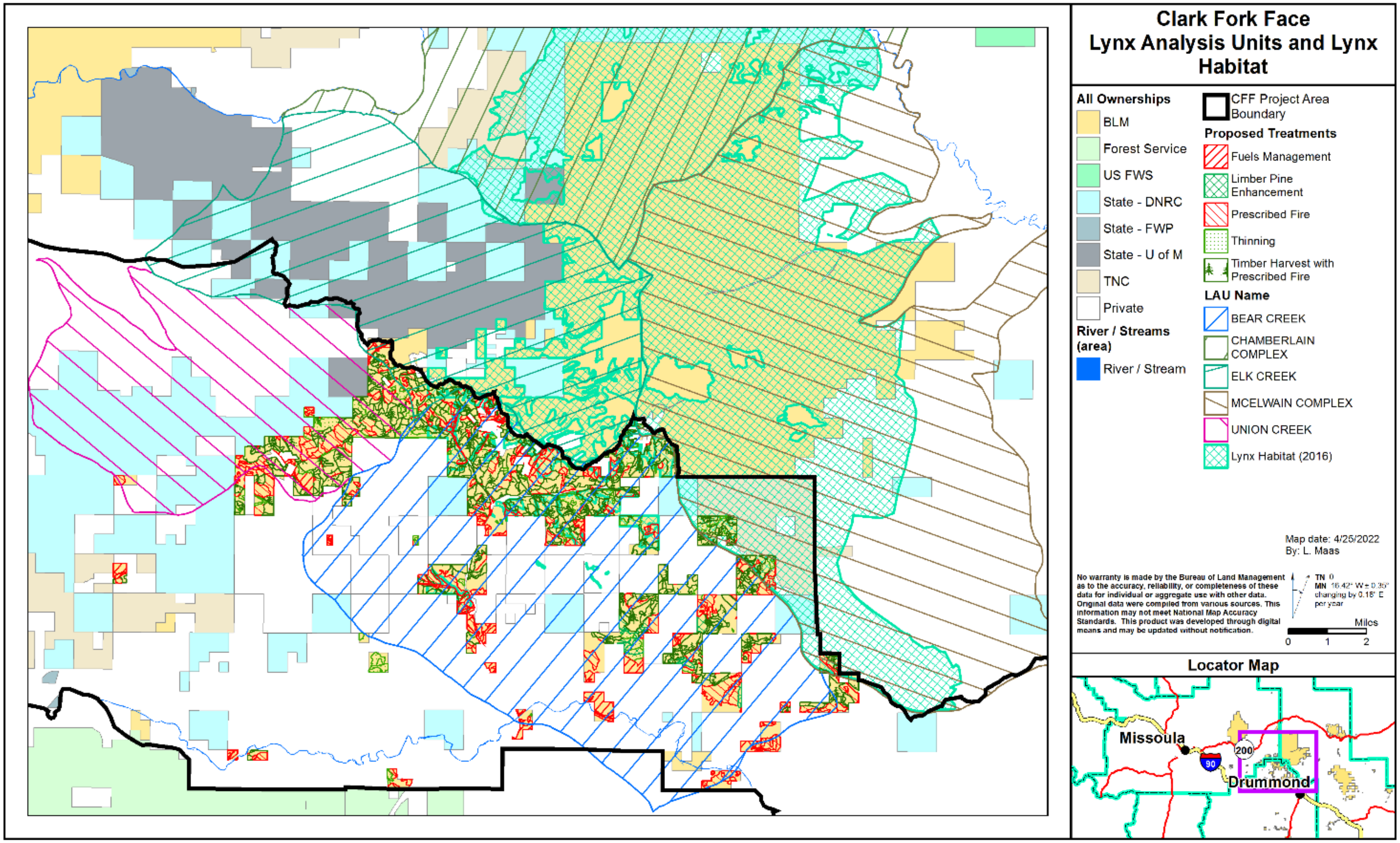
9.1 Proposed Actions map.



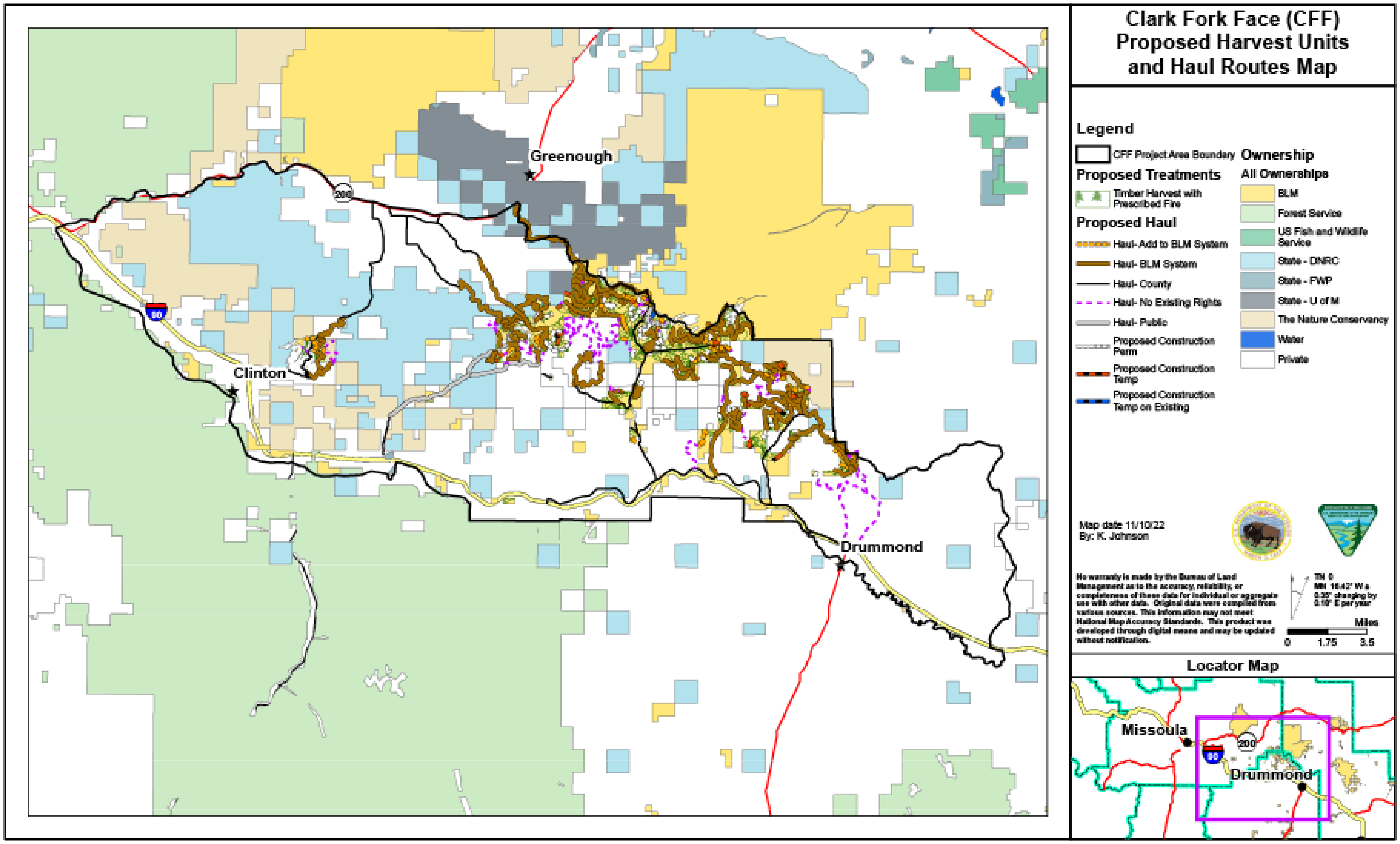
9.2 Habitat Type Groups on BLM lands within the planning area.



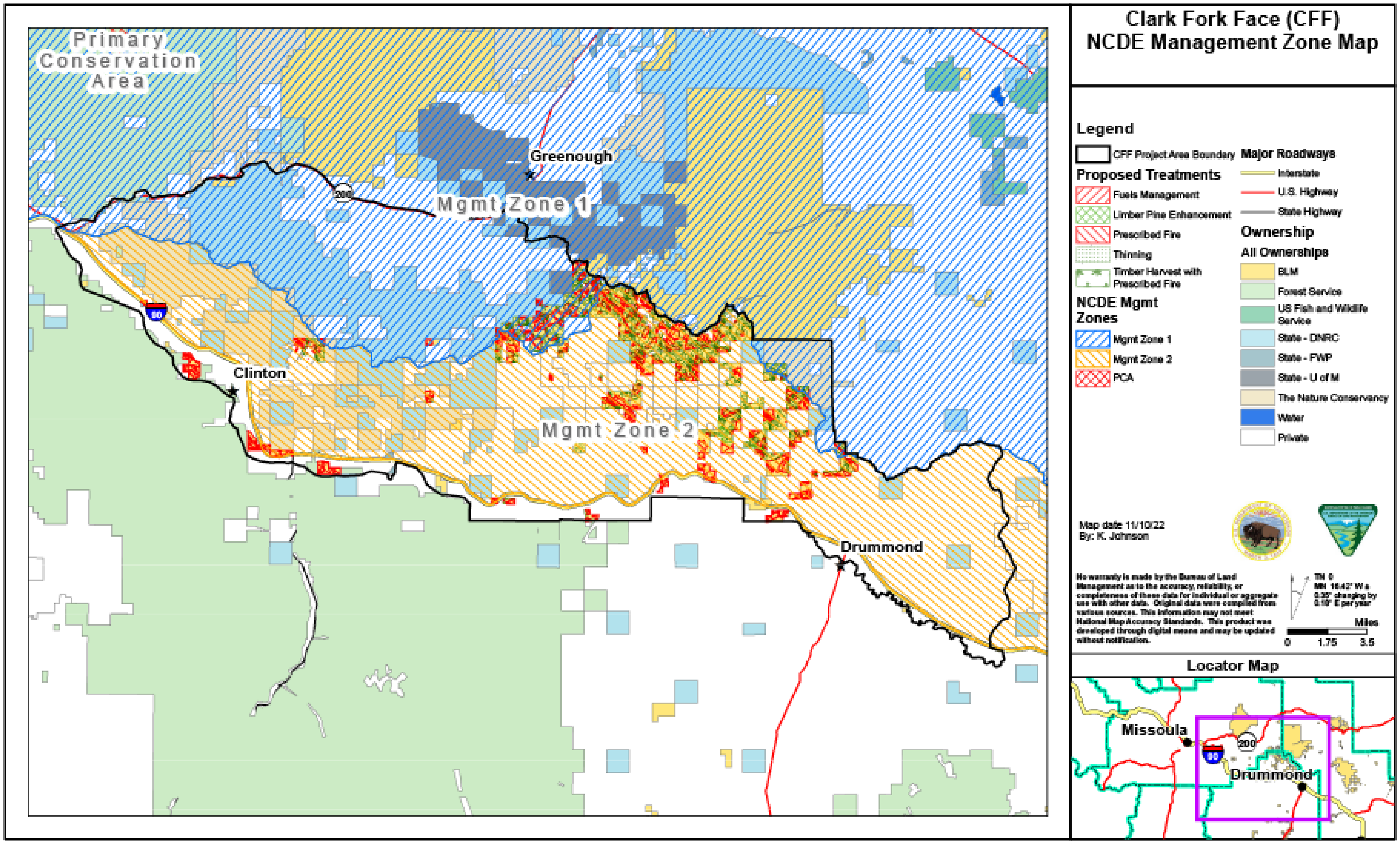
9.3 Lynx Analysis Units (LAUs) and Lynx Habitat map.



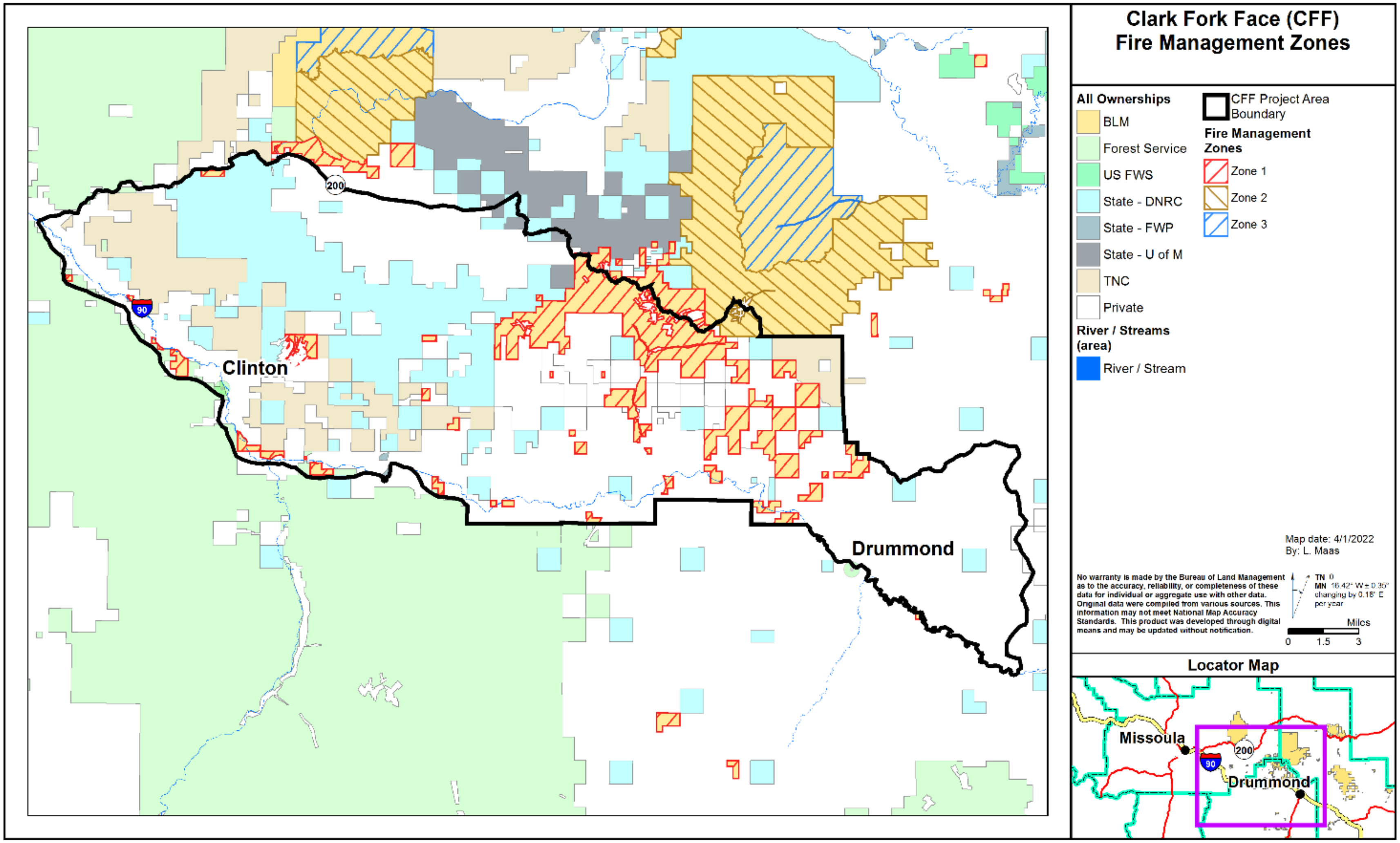
9.4 Harvest Units and Haul Routes map.



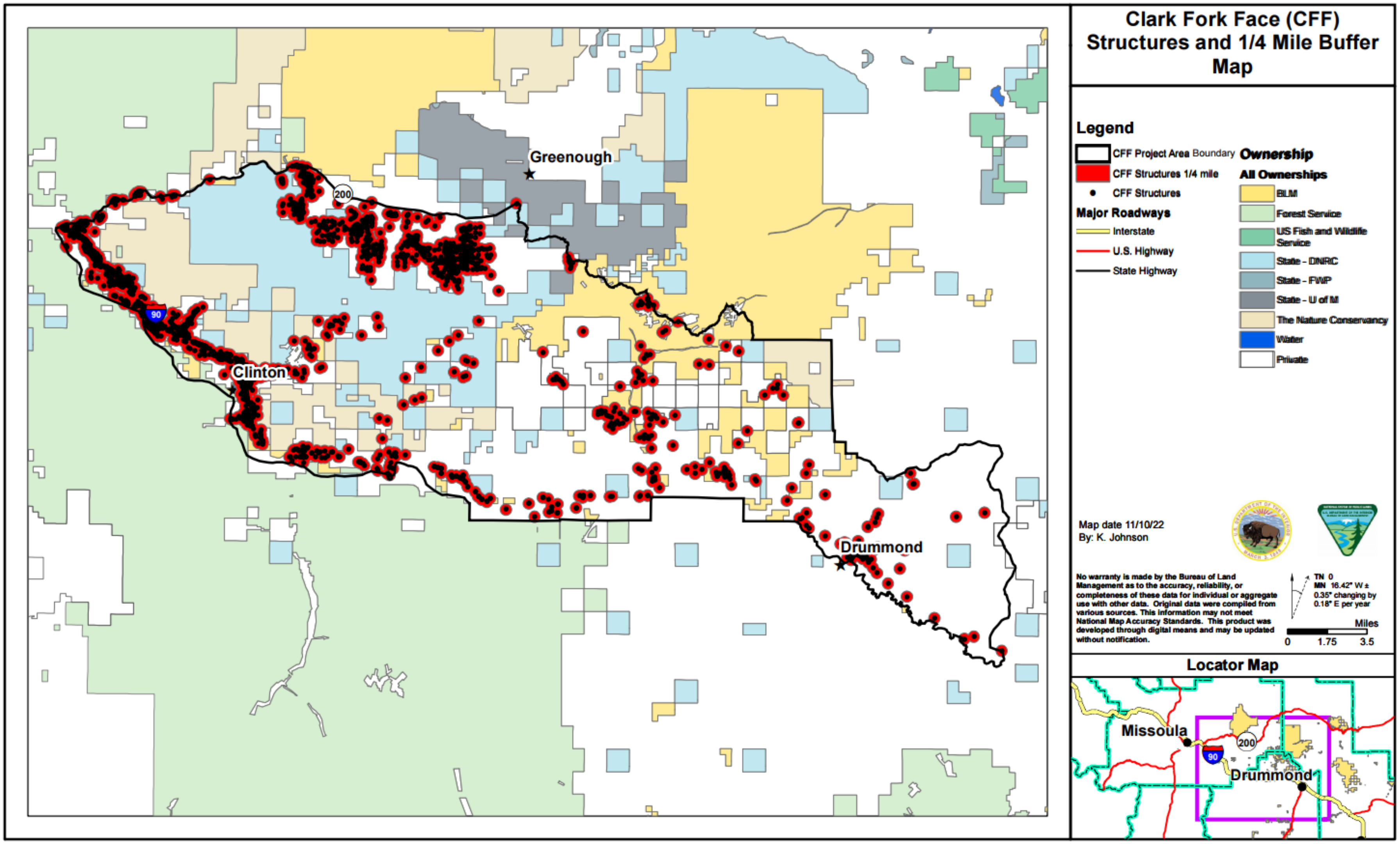
9.5 NCDE Management Zones map.



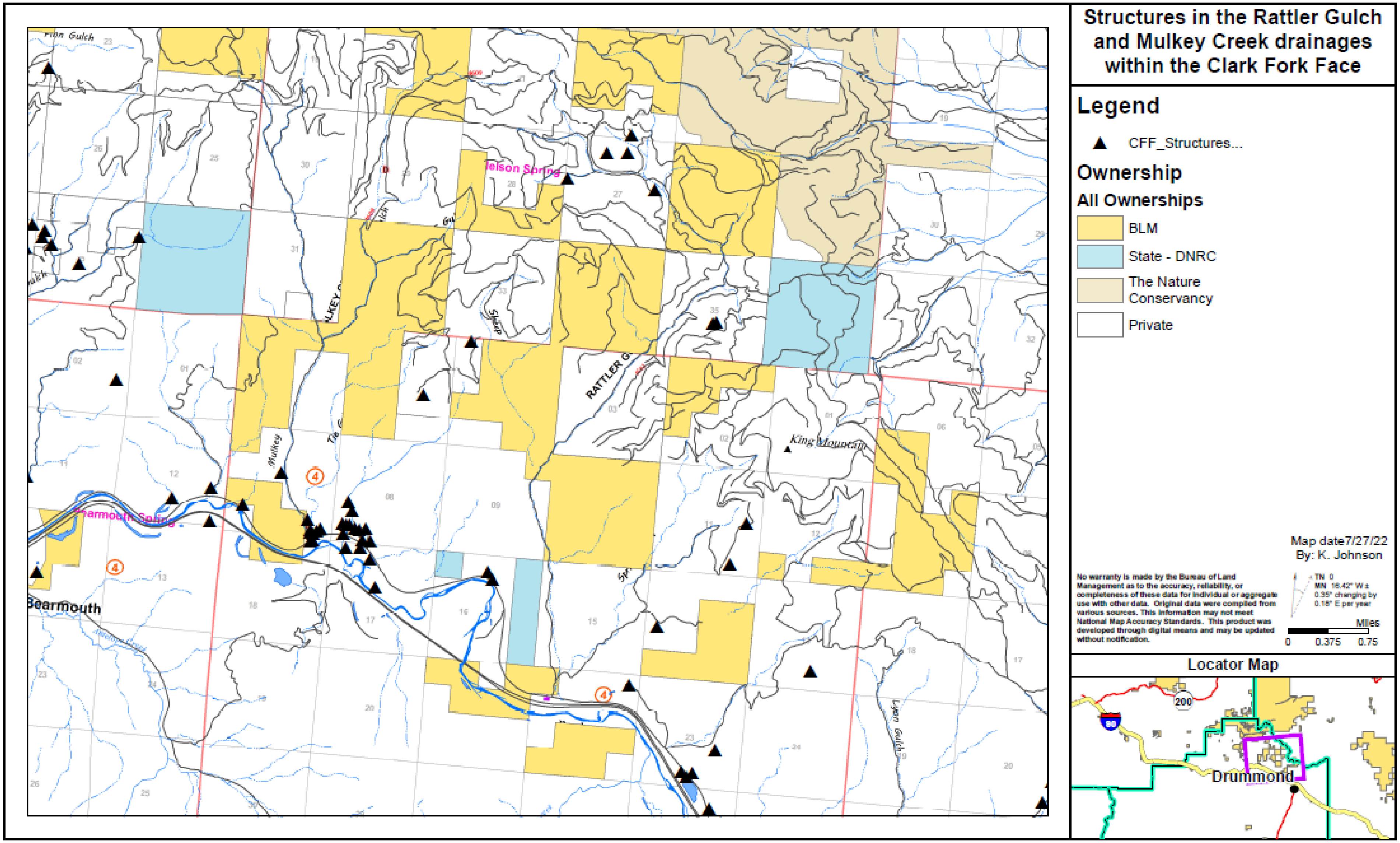
9.6 Fire Management Zones map.



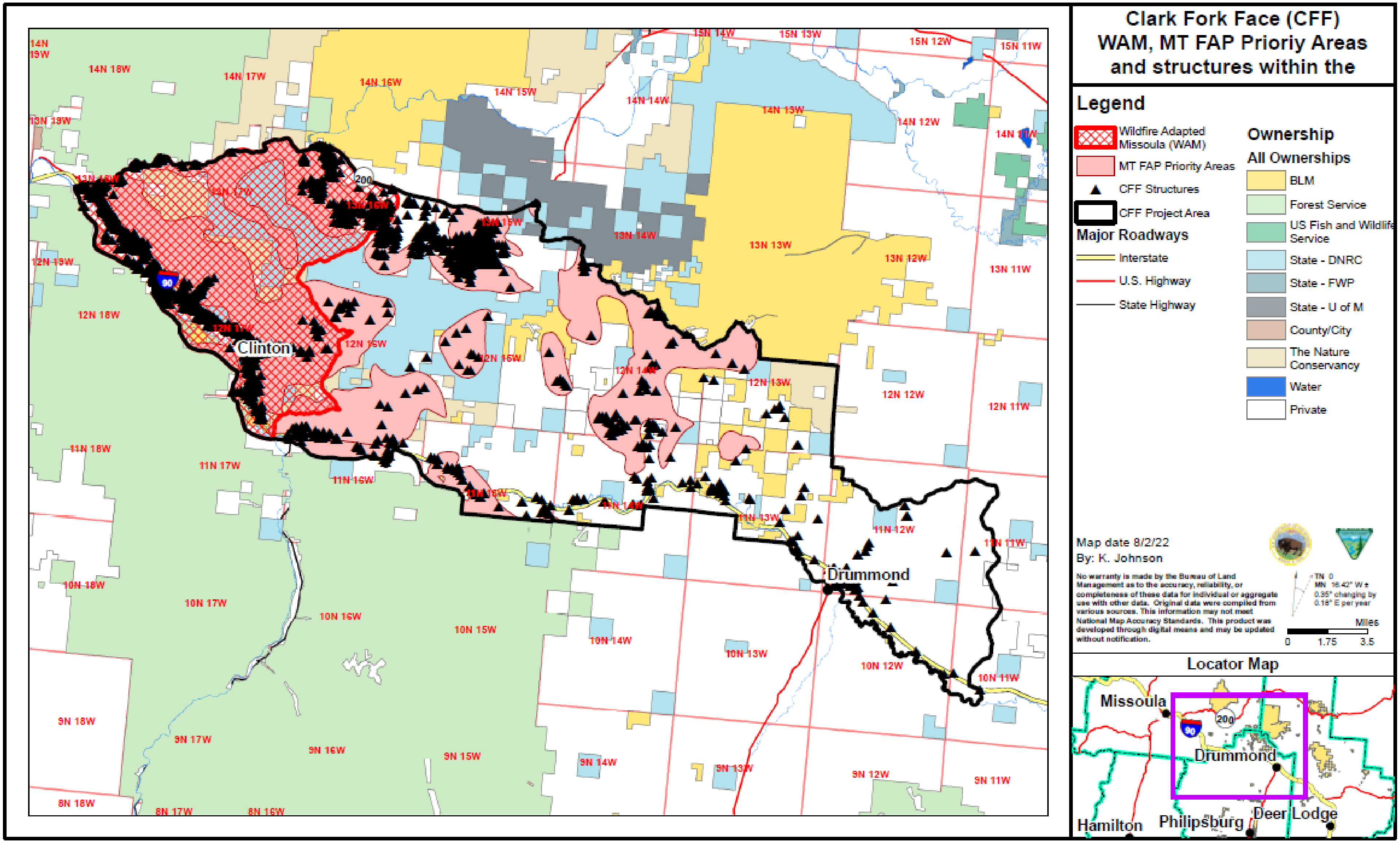
9.7 Structures and ¼ mile buffer map.



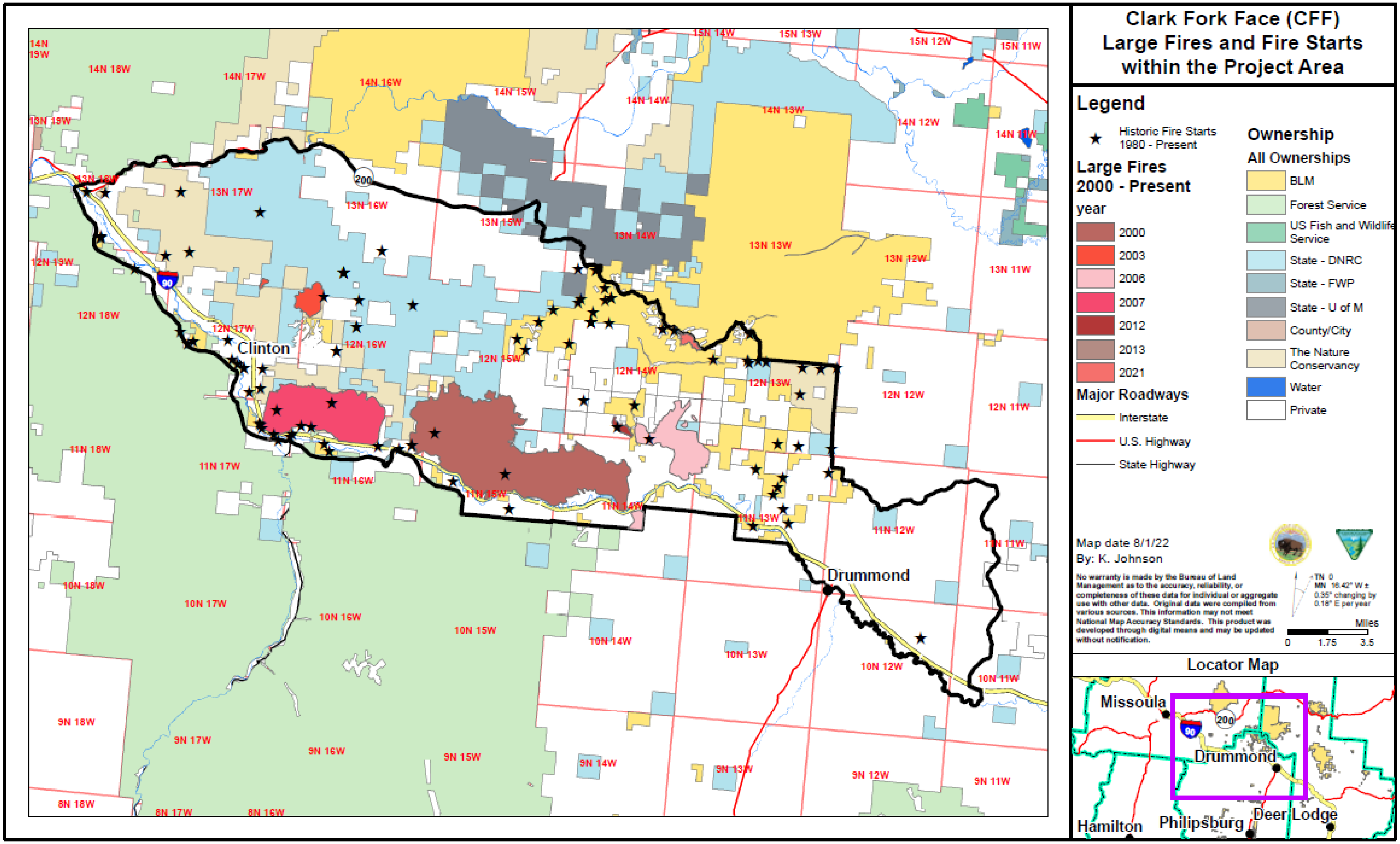
9.8 Structures in the Rattler Gulch and Mulkey Gulch drainages.



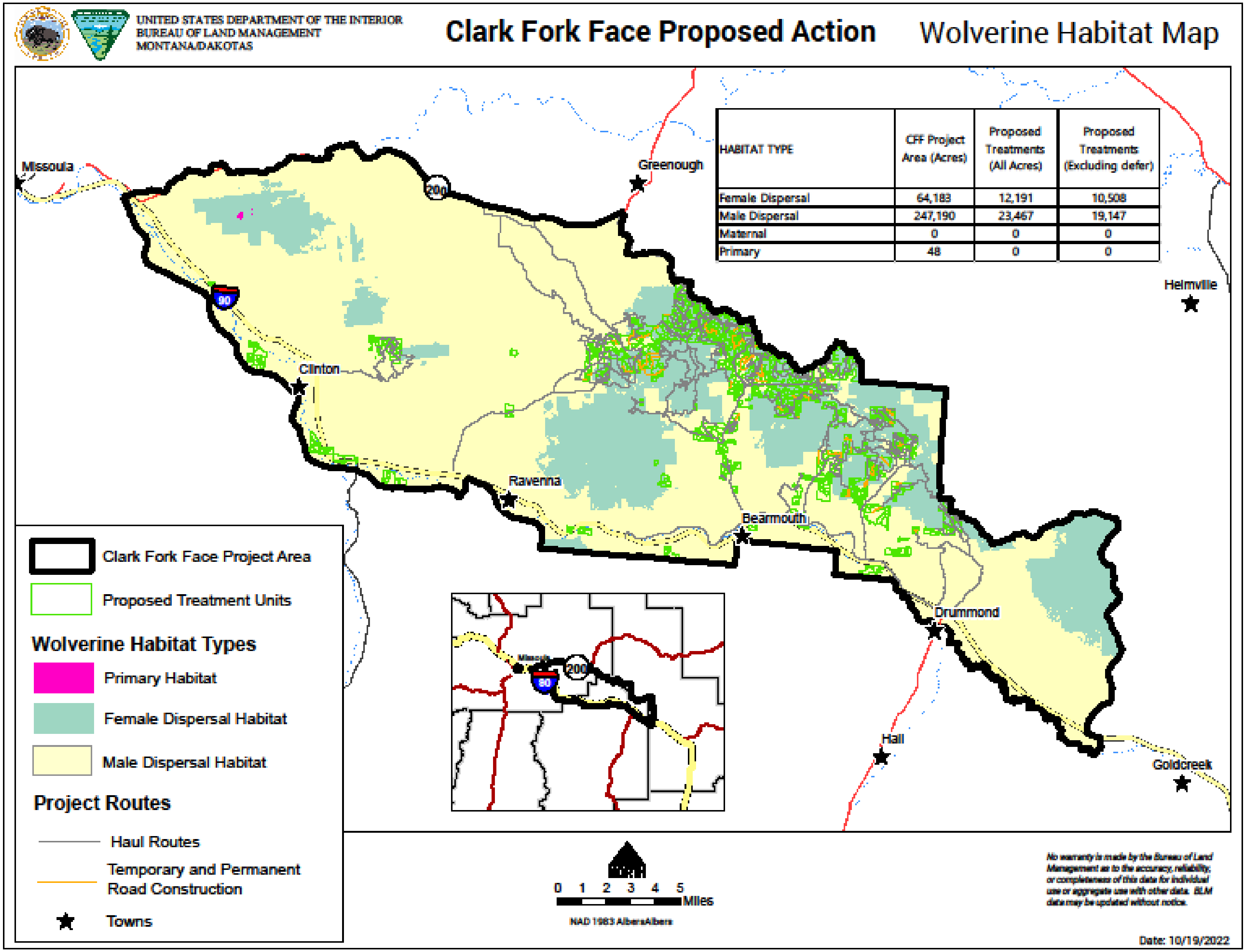
9.9 Wildfire Adapted Missoula (WAM), Montana Forest Action Plan (MT FAP) Priority Areas and Structures Map.



9.10 Large Fires and Fire Starts Map.



9.11Wolverine habitat and Clark Fork Face Proposed Action.



HABITAT TYPE	CFF Project Area (Acres)	Proposed Treatments (All Acres)	Proposed Treatments (Excluding defer)
Female Dispersal	64,183	12,191	10,508
Male Dispersal	247,190	23,467	19,147
Maternal	0	0	0
Primary	48	0	0

10 Appendix E: Figures

Figure 1: Limber pine (*Pinus Flexilus)* within the CFF planning area exhibiting damage from white pine blister rust. This stand is proposed for Limber Pine Enhancement Treatment. Photo by K. Johnson 2018.

Figure 2: Stand #2054 of the CFF planning area exhibiting a densely stocked, single storied stand condition. This stand is proposed for Timber Harvest with Prescribed Burn treatment and is within HTG-2. BLM photo 2014.

Figure 3: Stand 1235 of the CFF planning area exhibiting a densely stocked, single storied stand condition. This stand is proposed for Timber Harvest with Prescribed Burn treatment and is within HTG-1. BLM photo 2014.

Figure 4: Stand 1521 of the CFF planning area exhibiting a densely stocked, multi storied stand condition, heavily impacted by Western spruce budworm. This stand is proposed for Timber Harvest with Prescribed Burn treatment and is within HTG-1. BLM photo 2014.

Figure 5: Stand 1548 of the CFF planning area exhibiting a densely stocked, small diameter stand condition. This stand is proposed for Thinning treatment and is within HTG-1. BLM photo 2014.

Figure 6: Stand 1556 of the CFF planning area exhibiting a well-stocked large diameter stand condition. This stand is proposed for Prescribed Burning treatment and is within HTG-1. BLM photo 2014.

Figure 7: Stand 1739 of the CFF planning area. No immediate treatment need was identified d for this stand within HTG-1.

Figure 8: Stand 1189 of the CFF planning area. Fuels Management treatment is proposed for this stand is which is within the WUI and HTG-2.

Figure 9: Stand 662 of the CFF planning area exhibiting a densely stocked, small diameter stand condition, with Western spruce budworm damage (defoliation). This stand is proposed for Thinning treatment and is within HTG-4. BLM photo 2014.

Figure 10: Stand 1156 of the CFF planning area exhibiting a single storied stand with noticeable MPB induced mortality. This stand is proposed for Timber Harvest with Prescribed Burn treatment and is within HTG-6. BLM photo 2014.

Figure 11: A completed Fuels Management Treatment consisting of thinning and chipping. BLM Photo.

Figure 12: Completed commercial thinning in ponderosa pine stand (HTG-1 – HGT-3). BLM Photo.


Figure 13: Completed Single Tree Selection in ponderosa pine stand (HTG-1 – HGT-3). BLM Photo.


Figure 14: Completed regeneration harvest in LP-WL stand (HTG-4 – HTG-6). BLM Photo.


Figure 15: Completed group selection harvest in WL-DF stand (HTG-1 - HTG-3). BLM Photo.


Figure 16: Completed salvage / sanitation harvest in LP - WL stand (HTG-4 - HTG-6). BLM Photo.


Figure 17: Completed salvage utilizing winter conditions to protect a sensitive site. BLM Photo.

Figure 18: Controlled burn in PP- WL stand. BLM Photo.

Figure 19: Controlled burn on sparsely forested or non-forested site. BLM Photo.

Figure 20: Adaptive Complexity Thinning (ACT) in WL stand. BLM Photo.

Figure 21: Variable Density Thinning (VDT) in ponderosa pine stand. BLM Photo.


Figure 22: Fully obliterated temporary road. BLM Photo.

11 Appendix F: Design Features for Proposed Action

The following design features would be used to design and implement the Proposed Action. Design features are developed to mitigate or avoid potential adverse impacts. Some features are required by law, regulation, or policy.

If, during project layout or implementation, the BLM determines that one or more design features should be modified to address a site-specific condition, the modification will conform to the extent of environmental effect(s) described in this assessment. If modification to a design feature were expected to exceed the effects discussed in this EA, a new EA would be prepared and circulated for public review and comment.

11.0.1 Soil

1. When found in the planning area, biological soil crusts will be protected through exclusion. This includes all mechanical and non-mechanical treatments.
2. Low intensity prescribed fire may burn into areas with biological soil crusts, but direct ignitions in these features should be avoided.
3. Areas with planned road construction that intersect with geologically unstable soils will be avoided to the maximum extent possible. Where necessary, additional review from soil scientist and geologist is needed.
4. Follow project design features and best management practices, as identified in the Missoula RMP (USDI-BLM 2021), Appendix P. DF-36, DF-29.

11.0.2 Soil and Organic Matter

1. Where warm and dry ecological sites are lacking in woody material (less than 2 tons/acre), large woody debris, (defined as tree boles >8 inches and > 6 feet long) will be left to achieve 2-5 tons/acre.

11.0.3 Riparian and Water Quality

1. Riparian Conservation Areas (RCAs) for all lotic and lentic features were evaluated to determine appropriate Riparian Management Objectives (RMOs) and assess site specific Riparian Conservation Area (RCA) widths to protect streams and wetlands. These site-specific RCAs and RMOs are available in the Clark Fork Face project record.

11.0.4 Riparian

1. Design prescribed burns to contribute to the attainment of RMOs. Avoid placing wildland fire operations within RHCAs to the extent practicable. Missoula RMP, (USDI-BLM 2021) Appendix P, Design Feature – 24.
2. New permanent roads would be designed to meet Montana Best Management Practices for forested roads.
3. The Missoula RMP (USDI-BLM 2021), Appendix P provides the standard project design features for road building: DF-21, DF-22, DF-36.
4. Temporary roads are subject to meeting Montana Best Management Practices and design standards from the Missoula RMP (USDI-BLM 2021) DF-34, DF-21, DF-22, DF-36
5. Temporary roads would be rehabilitated immediately following completion of proposed

project activities with the following road closure mitigations:

a. During new construction, topsoil and slash would be stored adjacent to the temporary road to the greatest extent possible and pulled back over the road surface during decommissioning.

b. Installed culverts would be removed and stream crossings would be repaired to simulate undisturbed conditions from an appropriate reference reach. These treatments could include grade control structures, removal of road fill materials, and slash filter windrows. During project implementation, site specific stream crossing standards would be developed for road closures.

c. The temporary road surface would have site preparation to a depth of at least 6 inches. Site preparation may include full recontouring on steep roads or scarification on flat road conditions.

d. Road prisms would be seeded using a BLM approved native seed mix.

e. Slash of mixed sizes (at least 50% <6 inches diameter) would be placed over temporary roads and excaline trails to prevent erosion in units. Slash would cover approximately 65−70% of the road or trail to a depth of approximately 2−3 inches where available (approximately 10-15 t/a).

11.0.5 Cultural / Archeological

1. All proposed mechanical or prescribed burn treatment areas would be surveyed 100% prior to project implementation.
2. Historic properties would be avoided during implementation either through project monitors, flagging, etc
3. Consider requiring winter-only harvest or removal of acres from implementation based on results of survey.

11.0.6 Special Status Plants

1. Likely habitats would be surveyed prior to implementation.
2. SS Plant populations would be avoided where possible during implementation either through project monitors, flagging, etc.
3. Consider timing restrictions when appropriate, or designate areas for no heavy equipment travel (veg. treatments allowed).
4. For Howell’s gumweed, collect seeds and replant after implementation.
5. During Noxious weed control, avoid spraying herbicide on SS plants. Consider biocontrol methods for noxious weed control where SS plants exist.

11.0.7 Solid mineral development

1. At the time of implementation, identify existing solid mineral operations for avoidance/coordination.
2. If there are areas of moderate-high development potential with active mineral projects in the vicinity, vegetation treatment types could be adjusted to improve/increase mineral development.

11.0.8 Abandoned mine lands

1. Use AMSCM and local AML.gdb (GIS data) to identify areas of avoidance; or change of

treatment type to reduce people on the ground.

11.0.9 Visual characteristics

1. Follow the Missoula RMP (USDI-BLM 2021), Appendix P. DF-43.
2. In VRM Class IV -Every attempt should be made to minimize impact of activities through careful location, minimal disturbance and repeating the basic elements of form, line, color and texture found in the predominant landscape (i.e. roads should follow the landform and blend in as much as possible).

11.0.10 Recreational Traffic

1. Consider a reader board for the bottom of Garnet Range Road (GRR) during active hauling.
2. Log hauling restrictions on the GRR will be evaluated and implemented on a case-by-case basis.
3. Written authorization by the BLM must be granted prior to log hauling on the GRR during weekends or between 11 AM – 4 PM on weekdays during peak summer recreation season (generally Memorial Day – Labor Day).
4. Alternate haul routes may be utilized to avoid log hauling on the GRR. Alternate haul routes will be evaluated by the BLM on a case-by-case basis. Written authorization by the BLM must be granted prior to use of alternate haul routes.

11.0.11 The National Winter Recreation Trail/Garnet Winter Backcountry Byway

1. Written authorization by the BLM must be granted prior to plowing of the GRR, Dec. 15 - March 15 of any given year. Requests to plow the GRR during this period will be evaluated on a case-by-case basis.
2. Written authorization by the BLM must be granted prior to wheeled vehicle operation on the GRR, Jan. 1 – March 15 of any given year. Requests to operate wheeled vehicles on the GRR during this period will be evaluated on a case-by-case basis.
3. From March 15 – Dec. 15 of any given year, contract purchasers / awardees or subcontractors may plow the full width of the GRR including turnouts, unless otherwise suspended during periods of high soil moisture, runoff, or heavy rainfall.
4. Hauling and commercial vehicles may use the GRR unrestricted March 15 – Dec. 15 unless otherwise suspended during periods of high soil moisture, runoff, or heavy rainfall.
5. During the GRR established season of closure (Jan 1 – April 30), all gates must remain closed except when vehicles are physically pass through them.
6. Alternate haul routes may be utilized to avoid log hauling on the GRR. Alternate haul routes will be evaluated by the BLM on a case-by-case basis. Written authorization by the BLM must be granted prior to use of alternate haul routes.

11.0.12 Fisheries habitat including SSS species and designated critical habitat.

1. Follow Best Management Practices for Forestry in Montana, as revised (Montana DNRC, 2015).
2. Follow the Missoula RMP (USDI-BLM 2021), Appendix B: Aquatic and riparian habitat conservation strategy.

3. Follow the Missoula RMP (USDI-BLM 2021), Appendix P. DF-20, DF-21, DF-23, DF-24.

11.0.13 Western toad habitat.

1. Follow Best Management Practices for Forestry in Montana, as revised (Montana DNRC, 2015).
1. Follow the Missoula RMP (USDI-BLM 2021), Appendix B: Aquatic and riparian habitat conservation strategy.

11.0.14 Terrestrial wildlife: Big Game, Sensitive species

1. Follow the Missoula RMP (USDI-BLM 2021), Appendix P. DF-27 – DF-31.
2. Treatments would follow guidelines provided in the Northern Region Snag Management Protocol (USDA-FS. 2000) and Trees and Logs Important to Wildlife in the Interior Columbia River Basin (Bull et al. 1997) to maintain and/or improve snag or large woody debris habitat.
3. The Missoula Field Office food/attractant storage strategy for conservation of the grizzly bear and other wildlife (USDI-BLM 2006) would be followed during project implementation to reduce potential human/wildlife conflicts.
4. Treatments would be designed to maintain wildlife corridors within home ranges, between seasonal home ranges, and for dispersal. Wildlife travel corridors typically follow ridges, saddles, and riparian corridors.
5. Vegetation treatments would discontinue and potentially be modified in areas were an active eagle, goshawk, great gray owl, or flammulated owl nest is discovered and resume after the nesting season
6. A mixture of spring and fall burns would be prescribed to mitigate potential adverse effects to migratory birds, grizzly and black bears, elk, and other big game.
7. Where feasible, improve forage quantity and quality through low to moderate severity prescribed burning post-harvest.
8. Retain biological legacies, such as large healthy trees, large decadent trees, snags, logs, and other coarse woody debris on the forest floor.
9. Limit timber sale activity in big game winter range to as short a period as possible to minimize disturbance.

11.0.15 Migratory Birds

1. Follow the Missoula RMP (USDI-BLM 2021), Appendix P. DF-32.
2. On a case-by-case basis, considering habitat dependent variables, a timing restriction may be implemented to protect migratory bird nesting in specified areas as determined by the wildlife biologist.

11.0.16 Forest Products

1. Follow the Missoula RMP (USDI-BLM 2021), Appendix P. DF-7, DF-8.

11.0.17 Temporary and Permanent Road Construction

1. Follow the Missoula RMP (USDI-BLM 2021), Appendix P. DF-15, DF-19, DF-20, DF-

21, DF-22.

12 Appendix G: Natural Range of Variability Tables by HTG

12.0.1 HTG 1

Habitat Type Groups Tables				
HTG 1 - WARM DOUGLAS-FIR				
Habitat Type Codes: 110, 130, 140, 141, 142, 160, 161, 162, 210, 220, 230, 311, 321, 340, 350 (SIMPPLLE HTG Groups A2, B1) Historic Cover Type: PP and Grass / Shrub Ecotone, PP(DF) Acres: 40,963.60 Fire Group 4: Nonlethal Fire Regime Ownership: BLM 15%, Private 40%, DNRC 17%, Stimson Lumber Company 14%, TNC 13%	**Natural Variability**	**Current Condition All Ownerships 40,963.60 acres**	**Current Condition BLM ONLY: 6,084.72 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Nonlethal severity	5-25 years	>50 years	>50 years	10-15 years
Primary Structural Component: % total acres				
Grass / Forb / Shrub		8	4	
Seedling - Sapling (0-5" dbh)	<1	17	6	<1
Pole (5 - 9" dbh)	<1 - 13	0	6	<1 - 13
Two-Storied	<1 - 12	1	5	<1 - 12
Multi-Storied			1	
Medium (9-15" dbh)				
Single-Storied	<1 - 9	5	7	<1 - 9
Two-Storied		16	23	
Multi-Storied		2	8	
Large (15 - 21" dbh)				
Single-Storied	9 - 19	11	1	9 - 19
Two-Storied		32	10	
Multi-Storied		3	19	
Very Large				
Two-Storied		3	3	
Multi-Storied	67 - 87	1	7	67 - 87
Cover Type: Dominant Species % total acres				
Grass / Shrub / Forb			5	
PP	85 - 89	38	11	85 - 89
DF	6 - 9	47	73	6 - 9
WL	4 - 7	7	1	4 - 7
AF			3	
LP	1	0	8	1
Patch Size (% total acres):				
< 50	< 5%	Not available	74%	< 5%
50 - 150	5 - 10%		23%	5 - 10%
150 - 250	10 - 25%		3%	10 - 25%
250 - 500	25 - 40%		0%	25 - 40%
>500	30 - 45%		0%	30 - 45%
(Av. Patch size over 500 acres)	(800 acres)			(600 acres)

12.0.2 HTG 2

Habitat Type Groups Tables				
HTG 2 - COOL DOUGLAS-FIR				
Habitat Type Codes: 260, 262, 282, 312, 313, 322, 324 (SIMPPLLE HTG Code B2) Historic Cover Type: PP, DF (WL, LP = *minor components*) Acres: 128,471.53 Fire Group 4 and 6: Nonlethal and Mixed Fire Regimes Ownership: BLM 10%, USFS 2%, Private 38% DNRC 28% U of M 1% Stimson Lumber Company 7% TNC 14%	**Natural Variability**	**Current Condition All Ownerships 128,471.53 acres**	**Current Condition BLM ONLY 13,191.13 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Nonlethal and Mixed Severity	10 - 50 years	> 50 years	> 50 years	10 - 30 years
Primary Structural Component: % total acres				
Grass / Forb / Shrub	< 1	7	3	< 1
Seedling - Sapling (0-5" dbh)	< 1 - 9	10	6	< 1 - 9
Pole (5 - 9" dbh)	< 1 - 9	0	9	< 1 - 9
Two-Storied		1	5	
Multi-Storied			1	
Medium (9-15" dbh)	< 1 - 7			< 1 - 7
Single-Storied		6	3	
Two-Storied		14	20	
Multi-Storied		4	9	
Large (15 - 21" dbh)	7 - 14			7 - 14
Single-Storied		12	1	
Two-Storied		34	13	
Multi-Storied		6	21	
Very Large	50 - 65	1		50 - 65
Two-Storied		5	3	
Multi-Storied		0	6	
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			3	
AF/ ES			1	
PP	63 - 66	47	1	63 - 66
DF	4 - 7	32	78	4 - 7
WL	3 - 5	11	1	3 - 5
LP	< 1	3	10	< 1
Patch Size (% total acres):				
< 50	<5		65%	5-10%
50 - 150	5-10%		31%	5-10%
150 - 250	10-25%	Not available	4%	10-20%
250 - 500	25-40%		0%	10-20%
>500	30-45%		0%	55-65%
(Av. Patch size over 500 acres)	(800 acres)			(600 acres)

12.0.3 HTG 3

Habitat Type Groups Tables				
HTG 3 - MOIST DOUGLAS-FIR				
Habitat Type Codes: 220, 260, 261, 281, 283, 292, 360, 323, 330, 370 (SIMPPLLE HTG Groups B3, C1, D2) Historic Cover Type: DF, WL, LP, PP Acres: 2,367.97 Fire Group 6: Mixed Fire Regime Ownership: BLM 10%, Private 69%, DNRC 7%, U of M 1%, Stimson Lumber Company 5%, TNC 9%	**Natural Variability**	**Current Condition All Ownerships 2,367.97 acres**	**Current Condition BLM ONLY 229.53 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Mixed severity	25 - 125 years	> 50 years	> 50 years	50 - 100 years
Primary Structural Component: % total acres				
Grass / Forb / Shrub		1		
Seedling - Sapling (0-5" dbh)	< 1	8	23	< 1
Pole (5 - 9" dbh)	2 - 17			2 - 17
Single-Storied	4 - 17	0	2	4 - 17
Two-Storied		1		
Medium (9-15" dbh)				
Single-Storied	4 - 13	21	1	4 - 13
Two-Storied		11	9	
Multi-Storied		2	10	
Large (15 - 21" dbh)				
Single-Storied	40 - 53	35	4	40 - 53
Two-Storied		11	9	
Multi-Storied		1	10	
Very Large		3		
Two-Storied	23 - 34	5	5	23 - 34
Multi-Storied		0	17	
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			3	
PP	12 - 17	2	10	12 - 17
DF	10 - 15	96	82	10 - 15
WL	52 - 58	1	1	52 - 58
LP	10 - 20		4	10 - 20
Populus Spp.	1 - 5	0	0	1 - 5
Patch Size (% total acres):				
< 50	5-10%		57%	5-10%
50 - 150	5-10%		33%	5-10%
150 - 250	10-20%	Not available	8%	10-20%
250 - 500	10-20%		2%	10-20%
>500	55-65%		0%	55-65%
(Av. Patch size over 500 acres)	(900 acres)			(600 acres)

12.0.4 HTG 4

Habitat Type Groups Tables				
HTG 4 - MOIST SUBALPINE FIR				
Habitat Type Codes: 620, 621, 624, 625, 660, 661, 662, 670, 740 (SIMPPLLE HTG Groups D3, E2) Historic Cover Type: DF, LP, WL (AF, ES) Acres: 18,155.15 Fire Group 9: Lethal and Mixed Fire Regimes Ownership: BLM 14%, Private 25%, DNRC 29%, Stimson Lumber Company 22%, TNC 9%	**Natural Variability**	**Current Condition All Ownerships 18,155.15 acres**	**Current Condition BLM ONLY 2,587.53 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Mixed Severity Lethal Severity	50 - 80 years (flood & fire) 150 - 200 years (fire)	50 years (Logging / Mining) 100 Years (Mining)	50 years (Logging / Mining) 100 Years (Mining)	50 - 100 years (flood / fire)
Primary Structural Component: % total acres				
Grass / Forb / Shrub	4 - 36	1	1	4 - 36
Seedling - Sapling (0-5" dbh)	<1 - 54	21	7	<1 - 54
Pole (5 - 9" dbh)	<1 - 27			<1 - 27
Single-Storied		0	8	
Two-Storied		2	10	
Medium (9-15" dbh)	<1 - 29			<1 - 29
Single-Storied		3	4	
Two-Storied		23	12	
Multi-Storied			12	
Large (15 - 21" dbh)	11 - 54			11 - 54
Single-Storied		5	1	
Two-Storied		32	11	
Multi-Storied		4	18	
Very Large	5 - 51	0		5 - 51
Two-Storied		1	3	
Multi-Storied		1	13	
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			1	
DF	34 - 77	53	70	34 - 77
pp			1	
WL	1 - 20	12	0	1 - 20
LP	< 1 - 28	8	22	< 1 - 28
AF / ES and / or Populus spp.	< 1 - 26	2	6	< 1 - 26
Patch Size (% total acres):				
< 50	28 - 100%	Not available	68 - 100%	28 - 100%
50 - 150	0 - 25%		0 - 32%	0 - 25%
150 - 250	0 - 25%		0%	0 - 25%
250 - 500	0 - 11%		0%	0 - 11%
>500	0 - 11%		0%	0 - 11%

(Av. Patch size over 500 acres)	N/A			N/A

12.0.5 HTG 5

Habitat Type Groups Tables				
HTG 5 - COLD SUBALPINE FIR				
Habitat Type Codes: 663 640, 690, 691, 720 (SIMPPLLE HTG Groups F1) Historic Cover Type: WL, LP, DF (AF, ES) Acres: 726.12 Fire Group 9: Lethal and Mixed Fire Regimes Ownership: BLM 11%, Private 28%, DNRC 23%, Stimson Lumber Company 10%, TNC 29%	**Natural Variability**	**Current Condition All Ownerships 726.12 acres**	**Current Condition BLM Only 79.73 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Mixed Severity Lethal Severity	50 - 100 years 100 - 200 + years	> 75 years	> 75 years	75 - 125 years
Primary Structural Component: % total acres				
Grass / Forb / Shrub			15	
Seedling - Sapling (0-5" dbh)	<1 - 2	45	1	<1 - 2
Pole (5 - 9" dbh)	6 - 25			6 - 25
Single-Storied	11 - 27	3	5	
Two-Storied		3	31	
Medium (9-15" dbh)				
Single-Storied	7 - 19	4		7 - 19
Two-Storied		1	29	
Multi-Storied		18		
Large (15 - 21" dbh)				
Single-Storied	40 - 54	12	5	40 - 54
Two-Storied		0	5	
Multi-Storied		12	7	
Very Large (>21")		0		
Two-Storied	5 - 12		2	5 - 12
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			15	
PP	0	0	8	0
DF	20- 30	0	23	20 - 30
WL	38 - 42	19	2	38 - 42
LP	28 - 39	78	53	28 - 39
AF and ES	1 - 4	0	0	1 - 4
Patch Size (% total acres):				
< 50	5-10%		68%	5-10%
50 - 150	5-10%		32%	5-10%
150 - 250	10-15%	Not available	0%	10-15%
250 - 500	15-25%		0%	15-25%
>500	50-60%		0%	50-60%
(Av. Patch size over 500 acres)	(600)			(600)

12.0.6 HTG 6

Habitat Type Groups Tables				
HTG 6 - VERY COLD SUBALPINE FIR				
Habitat Type Codes: 820, 830, 831, 832, 860 850, 870 Historic Cover Type: AF, ES Acres: 3,502.82 Fire Goup 10: Fire is a secondary disturbance Ownership: BLM 10%, Private 25%, DNRC 35%, Stimson Lumber Company 9%, TNC 20%	**Natural Variability**	**Current Condition All Ownerships 3,502.82 acres**	**Current Condition BLM Only 355.45 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Mixed Severity Lethal Severity	50 - 100 years >100 years	> 75 years	> 75 years	50 - 100 years
Primary Structural Component: % total acres				
Grass / Forb / Shrub		12	1	
Seedling - Sapling (0-5" dbh)	< 1	37	4	< 1
Pole (5 - 9" dbh)	2 - 17	1		2 - 17
Single-Storied	4 - 17		5	4 - 17
Two-Storied			10	
Medium (9-15" dbh)				
Single-Storied	4 - 13	4	1	4 - 13
Two-Storied		7	21	
Multi-Storied		1	15	
Large (15 - 21" dbh)				
Single-Storied	40 - 53	7	2	40 - 53
Two-Storied		27	4	
Multi-Storied		4	22	
Very Large (>21")		0	1	
Two-Storied			6	
Multi-Storied	23 - 34	0	8	23 - 34
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			1	
PP	----	0	1	5 - 10
DF	> 75	45	83	> 50
WL	----	0	0	10 - 15
LP	< 25	43	15	10 - 20
AF and ES	----	0	0	<5
Patch Size (% total acres):				
Fire disturbance is generally secondary to site factors (climate and soil) relative to forest development on these sites. Vegetation recovery and succession is slow following disturbance events.				

12.0.7 HTG 9

Habitat Type Groups Tables				
HTG 9 - Grass / Forb / Shrub				
Habitat Type Codes: NF1 (grasslands), NF2 (shrublands), NF4 (Riparian) Historic Cover Type: Grass / Shrub / Riparian Acres: 28,675.54 Fire Group: N/A Ownership: BLM 4%, Private 92%, DNRC 3% TNC 1%	**Natural Variability**	**Current Condition All Ownerships 28,675.54 acres**	**Current Condition BLM ONLY 1,056.19 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ Lethal severity				
Primary Structural Component: % total acres				
Grass / Forb / Shrub	100	100	87	100
Seedling - Sapling (0-5" dbh)			0	
Pole (5 - 9" dbh)			0	
Two-Storied			0	
Medium (9-15" dbh)				
Single-Storied			0	
Two-Storied			1	
Large (15 - 21" dbh)				
Single-Storied				
Two-Storied			3	
Multi-Storied			1	
Very Large			2	
Two-Storied			1	
Multi-Storied			2	
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			89	
QA, CW			1	
PP		0	7	
DF		0	4	
WL		0	0	
LP		0	0	
Patch Size (% total acres):				
< 50	N/A	N/A	N/A	N/A
50 - 150	N/A	N/A	N/A	N/A
150 - 250	N/A	N/A	N/A	N/A
250 - 500	N/A	N/A	N/A	N/A
>500	N/A	N/A	N/A	N/A
(Av. Patch size over 500 acres)	N/A	N/A	N/A	N/A

12.0.8 HTG N/A

Habitat Type Groups Tables				
HTG - Not Applicable				
Habitat Type Codes: XX3 (urban / rural), XX4 (barren), XX5 (water), XX1 (Agriculture) Historic Cover Type: Unknown Acres: 62.63 Fire Group : N/A Ownership: BLM 91%, Private 4%, DNRC 4%	**Natural Variability**	**Current Condition All Onwerships 62.63 acres**	**Current Condition BLM ONLY 57.20 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ N/A				
Primary Structural Component: % total acres				
Non Forest		32	8	
URBAN		48	46	
WATER		20	17	
Agriculture			5	
Medium			4	
two-story			5	
multi-story				
Large			8	
two-story				
multi-story				
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			83	
QA, CW			2	
PP		0	10	
DF		0	5	
WL		0	0	
LP		0	0	
Patch Size (% total acres):				
< 50	N/A	N/A	N/A	N/A
50 - 150	N/A	N/A	N/A	N/A
150 - 250	N/A	N/A	N/A	N/A
250 - 500	N/A	N/A	N/A	N/A
>500	N/A	N/A	N/A	N/A
(Av. Patch size over 500 acres)	N/A	N/A	N/A	N/A

12.0.9 HTG Blank

Habitat Type Groups Tables
HTG - Blank

Habitat Type Codes: XX1 (Agriculture), XX3 (urban / rural), XX4 (barren), XX5 (water) Historic Cover Type: Unknown Acres : 24,266.54 Fire Group : N/A Ownership: USFS 1%, Private 83%, DNRC 6%, Stimson 1%, TNC 9%	**Natural Variability**	**Current Condition All Ownerships 24,266.54 acres**	**Current Condition BLM Only 24.51 acres**	**Desired Condition**
Mean Disturbance Interval (yrs) 1/ N/A				
Primary Structural Component: % total acres				
Agriculture		13	3	
Nonforest		4	22	
Urban		7	28	
Water		3	6	
Blank		74		
Pole			0	
Medium			13	
two-story			0	
Large				
two-story			6	
Very Large				
two-story			3	
multi-story			3	
Cover Type: Dominant Species % total acres				
Grass / Shrub / NF			62	
QA, CW			9	
PP		0	8	
DF		0	19	
WL		0	2	
LP		0	0	
Patch Size (% total acres):				
< 50	N/A	N/A	N/A	N/A
50 - 150	N/A	N/A	N/A	N/A
150 - 250	N/A	N/A	N/A	N/A
250 - 500	N/A	N/A	N/A	N/A
>500	N/A	N/A	N/A	N/A
(Av. Patch size over 500 acres)	N/A	N/A	N/A	N/A

13 Appendix H: Reasonably Foreseeable Actions

Reasonably Foreseeable Actions Within the CFF planning area.					
Agency / Org.	**Project**	**Legal / Location**	**Treatment type**	**Timeframe**	**Est. Acres**
DNRC	All Don	Sec 2,4,10 T12N R17W & Sec 36 T13N R17W	Harvest	Current	502
DNRC	Bybee Carriage	Sec 16 T12N R16W	Harvest	Current	68
DNRC	Trappin Shack	Sec 15 & 22 T12N R16W	Harvest	Current	362
DNRC	36 Game	Sec 2 T12N R17W, Sec 31 T13N R16W, Sec 36 T13N R17W	Harvest	Sells 2022	480
DNRC	Game Changer	Sec 5 & 6 T12N R16W Section 31 T13N R16W	Harvest	Current	196
DNRC	Top Secret	Sec 16 T12N R14W	Harvest	Sells 2022	340
DNRC	GoldiLogs	Sec 36 T14N R17W	Harvest	Sells 2022	570
DNRC	Arkansas	Sec 31 T13N R16W	Hand Thin	Sold	167
DNRC	TickLish	Sec 13,14 T12N R16W	Hand Thin	Sold	180
DNRC	Ash-B	Sec 4,5 T12N R16W & Sec 33,34 T13N R16W	Hand Thin	Bid 2022	248
DNRC	Phase 2	Sec 28 & 33 T13N R16W	Hand Thin	Sold	98
DNRC	Camas Hump	Sec 4, 5 T12N R15W & Sec 33 T13N R15W	Hand Thin	Bid 2022/2023	400
DNRC	WashYa Doin	Section 36 T12N R16W	Hand Thin	Bid 2022/2023	174
DNRC	Blixit Once	Section 29 T13N R16W	Hand Thin	Bid 2022	124
Missoula County	Wallace Creek	Wallace Creek, adjacent to BLM. 46.79694, -113.64951	Fuels reduction with harvest	complete before 1/23	16
Missoula County	Ashby Creek	Ashby Creek, 46.81487, -113.62270.	Fuels reduction with harvest	Late 2023 into 2024	31
Missoula County	Turah	Turah, 46.79901, -113.79055.	Fuels reduction with harvest	2024	30
USFS	Wildfire Adapted Missoula (WAM)	Lands South of I-90, within CFF planning area	small tree thinning and burning, cut pile burning, and thinning and burning	Within the next 20 years	1000
Grand total					**4,986**

14 Appendix I: Wildlife Issues Considered but Not Analyzed in Detail

How would the Proposed Action affect BLM Special Status terrestrial wildlife species and their habitat?

Terrestrial Wildlife Special Status Species

This section contains a narrative of habitat requirements, potential effects, and conservation measures used to evaluate terrestrial wildlife Special Status Species (SSS) (BLM sensitive species are considered SSS). In-depth descriptions of habitat requirements and population trends for SSS can be found in the Analysis of the Management Situation (AMS) on pages 111-146 (USDI-BLM 2016). For a complete list of design features, see Appendix H: Design Features for Proposed Action.

Treatments associated with the proposed action are expected to result in short-term adverse effects with long-term beneficial effects to terrestrial wildlife, including BLM (SSS) considered. SSS are impacted at a minimal level, largely because short-term adverse effects would be tempered by spatial and temporal factors, limiting the disturbance footprint within any season, and allowing species to displace into nearby habitats which are primarily areas of similar forest type. Project implementation would occur within limited treatment blocks over a 5-15 year period. The proposed treatment area comprises 7.7% percent of the overall 247,191-acre planning area, and proposed treatments would take place within only a portion of that 19,147-acre area in any one season. Thus, if treatments were spread evenly across 10 years, 1915 acres would be treated each year. Some areas would be visited in a subsequent season for prescribed burning or tree planting causing the project to cover a maximum of 15 years. Post-treatment tree planting and prescribed burning would have a reduced temporal scale compared to the original treatments. For all species considered, the long- term benefits of habitat diversity, fire resiliency, and forest conditions shifting towards their Natural Range of Variability (NRV) outweigh short-term adverse effects.

Table 1: Special Status Species Occurrence and Habitat Potentially Affected by the Proposed Action.

Species	**Status**	**Observations within planning area (MNHP2022b, Swan Valley Connections survey data)**	**Habitat (AMS, MNHP2022a)**
Mammals			
Fisher *(Pekania pennanti)*	Sensitive	No observations in Planning area. Swan Valley Connections carnivore monitoring surveys from 2012-2022 in areas north of the planning area detected no fishers. Suitable habitat in planning area.	Upland and lowland forests, including mature conifer, mixed conifer/deciduous forests characterized by dense canopies and abundant large trees snags and logs. May use hardwood stands in summer but prefer coniferous or mixed forests in winter Often associated with moist forests and riparian areas. Dens in tree hollows and large snags. HTG 1, 2, 3, 4, and 7.
Fringed Myotis *(Myotis thysanodes)*	Sensitive	Several observations in 1 site on BLM in using bat call detectors. One observation site 6 miles east of planning area.	Variety of habitats from low- to mid-elevation grass, woodland, and desert shrubland regions, up to and including spruce-fir forests. Forage along open water/riparian. Most observed during migratory season with few hibernating in Montana. Roosts in protected sites such as caves, mines and rock crevices.
Gray Wolf *(Canis lupus)*	Sensitive	Several observations in planning Area (2002-2022). No observations on BLM. Union,	Forest and shrubland habitats with adequate prey base of big game animals.

		Elevation, and Potomac packs adjacent to planning area.	
Hoary Bat (Lasiurus cinereus)	Sensitive	Migratory species confirmed occupancy within the planning area. Several observations on 3 BLM sites using bat call detectors.	Forested areas, roosting primarily in trees. Most day roosts in deciduous species, 3-5 m above ground. Forage over open water sources within conifer/hardwood forested terrain, along riparian corridors.
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	Sensitive	Resident species. 4 observations on 1 BLM site using bat call detectors, 1997.	Roosts and hibernates in caves and mines. Forage in tall brush and forest understory, over open areas within wetlands and riparian communities.
Birds			
Bald Eagle (*Haliaeetus leucocephalus*)	Sensitive	Residency and nesting throughout the planning area. Nest sites, nesting and foraging habitat documented on BLM along Clark Fork River.	Nesting and perching trees near water with primary prey species (fish and waterfowl) present. Upland sites are also used to feed, especially in the winter. Nesting sites are the most sensitive to disturbance and are generally located within larger forested areas near large lakes and rivers where nests are usually built in the tallest, oldest, large diameter trees. Nests are also commonly found in cottonwoods along rivers.
Black-backed Woodpecker *(Picoides arcticus)*	Sensitive	Residency and nesting throughout the planning area. No nest sites documented on BLM.	Early successional or burned coniferous forests. Foraging and nesting habitats in conifer forests that have insect infestations associated with fire and disease. Forages by drilling into trees. Dead trees are used for nest cavities HTG 1, 2, 3, 4, 5, 6, and 7
Flammulated Owl *(Psioscops flammeolus)*	Sensitive	Migratory, 3 observations documented in planning area (2 on BLM). Indirect evidence of breeding.	Montane forests, usually mature, open conifer forests containing ponderosa pine and Douglas-fir with large snags. Nests primarily in tree cavities in mature trees or snags with DBH > 15. HTG 1, 2.
Golden Eagle (*Aquila chrysaetos*)	Sensitive	Migration, residency, and nesting in the planning area. No known nesting sites on BLM.	Open and semi-open habitats, such as prairie and sagebrush. Nesting habitat generally occurs on cliffs, or in large trees associated with sagebrush/grassland. Open areas are also important prey habitat where eagle foraging occurs.
Lewis's Woodpecker *(Melanerpes lewis)*	Sensitive	Migratory and nesting in planning area. 2 nest sites documented on BLM along Clark Fork River	Local in low elevation open ponderosa pine forests and recent burn areas. River bottom woods and forest edges. Forages on flying insects. Important habitat features include open tree canopy, a brushy understory with ground cover, dead trees for nest cavities, dead or downed woody debris, perch sites, and abundant insects.

Narrative of Potential Impacts

Fisher

Fisher do not appear to regularly inhabit the planning area, but fisher habitat does exist within the planning area. If fisher are present, temporary disturbance/displacement would occur from vegetation treatments associated with the proposed action. The main potential effects include increased noise, human presence, motorized traffic, and habitat manipulation. Approximately 1915 acres would be treated annually across the planning area over 10-15 years; surrounding untreated forest, as well as reserve areas (riparian areas, wildlife corridors and retention patches) would provide secure habitat for fishers to move through/around treatment areas offsetting potential adverse effects. Following treatments, a temporary loss of hiding cover and understory forage, as well as reduction in prey species would occur. Cover and prey impacts are short lived and abated once understory trees and deciduous shrub species re-establish. The opening of forest stands and prescribed burn treatments would likely increase forage quantity and understory plant species diversity in the long-term. This could be a positive effect to the fisher by providing habitat for prey species. Design features used to maintain and improve snags and large woody debris would maintain denning habitat for fishers in the long-term. Utilizing site specific Riparian Management Objectives (RMOs) and Riparian Conservation Areas (RCAs) to improve or maintain riparian habitat would have a beneficial effect to fishers and their habitat. Over the long-term, forest treatments that restore complex forest structure would be beneficial to fishers.

Fringed Myotis, Hoary Bat, Townsend's Big-eared Bat

Forest treatments and associated activities would have short-term adverse effects to SSS bats. During project implementation, conifer removal and burning operations near roost sites could cause disturbance/displacement. Removal of understory herbaceous and shrub cover during prescribed burns may alter foraging and roosting sites. Where prescribed burning is used, herbaceous and shrub cover can be expected to begin regenerating within 1-2 years. The minimal annual temporal and spatial scale of the vegetation treatments would minimize disturbance/displacement of these species. The abundance of adjacent untreated forest and riparian habitat would minimize direct adverse effects. Cave, mine and talus roosting and hibernation habitat used by Townsend's big eared bats and fringed myositis would not be altered. Deciduous trees used by hoary bats for day roosts would not be removed during commercial harvest or thinning. In the long-term, bats may benefit from small overstory canopy gaps created during treatments by allowing a more diverse herbaceous understory to develop, which provides a diversity of insect prey for foraging. Gaps also allow the boles of snags to receive more sunlight, warming them to temperatures high enough for roosting. Edges created along unit boundaries following treatment could also enhance foraging (Taylor et al. 2020). Prescribed burns may provide short-term increases in insect availability for foraging and long-term snag recruitment. Design features used to maintain and improve snags would maintain roosting habitat and have a beneficial effect. Utilizing site specific RMOs and RCAs to improve or maintain riparian condition would be beneficial to foraging and watering resources for bat species.

Gray Wolf

Wolves in Montana are managed under the Montana FWP Gray Wolf Management Plan. There are no resident packs documented in the planning area, but wolves from adjacent packs have been documented in the planning area. Gray wolves would be disturbed or displaced from noise and human activities associated with vegetation treatments (mastication, chainsaw thinning, timber harvest, road construction, tree planting and prescribed burning). The minimal annual temporal and spatial scale of the vegetation treatments would minimize disturbance/displacement of wolves. Adverse effects from disturbance would be negligible; wolves have no habitat preference and large home ranges (150 /mi^2) and can travel 10-20 miles per day, easily avoiding the relatively small treatment areas. The long-term effects of the proposed treatments would be largely beneficial to gray wolves as vegetation treatments improve forage quantity and quality for ungulate prey, increasing prey quantity.

Bald Eagle

Bald eagles in Montana were down listed from Endangered to Threatened in 1995 and removed from USFWS list of Threatened and Endangered Species in 2007. The Montana Bald Eagle Management Plan and addendum (MBEWG 1994, MBEWG 2010) directs management of this species in the state and bald eagles continue to receive protection from the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA 1918). There are currently documented eagle nests, and nesting and foraging habitat on BLM along the Clark Fork River. One of these nests occurs in a fuels management treatment unit. Following the Montana Bald Eagle Management Plan and addendum and design features for nesting bald eagles would eliminate potential adverse effects to this nest and any other nests discovered. Site specific RMOs and RCAs in riparian areas would provide further benefit to eagle nesting and foraging habitat along the Clark Fork River.

Black-backed Woodpecker and Lewis's Woodpecker

Effects to black-backed and Lewis's woodpecker would not occur during treatment implementation since this species prefers burned forest habitat and mature cottonwood habitat for nesting and foraging. Indirectly in the short-term, thinning treatments and commercial timber harvests targeting forests with insect and disease outbreaks would reduce future potential insect outbreaks and foraging habitat for these woodpeckers. However, BLM treatment units are only a small percentage of forested habitat affected; forest habitat availability outside of the treatment areas would minimize this effect. Woodpeckers would benefit from some level of large tree mortality in burned areas as forage and nesting habitat would increase. Prescribed burns also create high concentrations of wood-boring insects invading dead trees increasing foraging habitat. Creating newly burned forest habitat on a landscape where past and future fire suppression modifies forest ecosystems is an important positive effect to Lewis's and black-backed woodpeckers. Design features used to maintain and improve snags and large woody debris would maintain nesting habitat and benefit these woodpeckers in the long-term. Site specific RMOs and RCAs in riparian areas would provide further benefit to Lewis's woodpecker foraging and nesting habitat along the Clark Fork River.

Flammulated Owl

Effects associated with the proposed action would impact flammulated owls inhabiting the planning area from May until September. Effects to nesting owls would occur from thinning, timber harvest, and mastication. The timing of prescribed burns would not impact flammulated owl nesting season. Activities during nesting season would disturb flammulated owls potentially causing nest abandonment. Following wildlife design features to protect flammulated owl nests would offset adverse effects. Indirect effects from forest treatments could reduce foraging habitat. The minimal annual temporal and spatial scale of the vegetation treatments and abundance of adjacent untreated forest would provide foraging habitat, minimizing adverse effects. Design features used to maintain and improve snags and large woody debris would maintain nesting habitat for flammulated owls in the long-term. Vegetation treatments in preferred flammulated owl habitat (HTG 1-2) favor the retention of large, healthy ponderosa pine and larch trees. Removal of small diameter trees through prescribed fire, harvest and thinning would maintain large-diameter, open stands with open understories. This would allow for increased quantity and diversity of understory plants, providing habitat for flammulated owl food sources. In the long-term, stands are expected to move towards conditions that would have existed had fire played a natural role on the landscape resulting in benefits for flammulated owls.

Golden Eagle

Golden eagles receive protection from the BGEPA and the Migratory Bird Treaty Act. Nesting golden eagles would not be impacted during treatment implementation as there are no known golden eagle nests on BLM lands within the planning area. If a golden eagle nest were discovered in a treatment unit, vegetation treatments would discontinue until after nesting season. Implementing these protections would eliminate adverse effects to nesting golden eagles. Indirect effects from prescribed burning would be beneficial to golden eagles by enhancing post-burn vegetation, which would enhance small mammal population foraging opportunities. Long-term effects from commercial harvest and thinning treatments are expected to benefit golden eagles by creating stands with open understories that maintain open native shrub and grassland habitats where golden eagles forage for prey species. Site specific RMOs and RCAs in riparian areas would provide further benefit to eagle nesting and foraging habitat along the Clark Fork River.

Given the temporary, minor disturbance and displacement potential impacts for SSS, this issue was considered but will not be further analyzed in detail.

How would the Proposed Action impact migratory birds and their habitat?

Migratory Birds

Various avian species, including those listed as BLM sensitive or Threatened and Endangered , are protected under the *Migratory Bird Treaty Act* (MBTA 1918). At least 40 migratory bird species inhabit the planning area during the nesting season (MNHP 2022b). Typical species found in the planning area include: Cassin's finch, Clark's nutcracker, red-breasted nuthatch, evening grosbeak, northern goshawk, pileated, American three-toed, hairy, and downy woodpeckers, American kestrel, American robin, brown-headed cowbird, chipping sparrow, mountain bluebird, Lincoln’s sparrow, song sparrow, Swainson’s thrush, mountain chickadee, Hammond’s and olive-sided flycathers, pine siskin, Stellar’s jay, and Canada jay.

Because migratory birds are a large and diverse group of species, it is difficult to make precise predictions about possible effects, though some assumptions can be made to cover the majority of species. The no action and proposed actions could have minor effects on the relative abundance and habitat availability of migratory birds, increasing populations of some species while decreasing populations of others. By shifting forest conditions toward the natural range of variability, the existing bird assemblage and population would adjust appropriately. Existing regulations and application of appropriate design features in treatment areas would minimize negative effects to migratory bird species while improving habitat, having beneficial effects to the populations.

Specific effects to migratory birds in treatment areas would be similar to those described for special status bird species. Effects from vegetation treatments could cause temporary displacement of birds into adjacent untreated areas. If activities occur within nesting season, nests, eggs, and nestlings would be unable to move into secure habitat. Proposed treatments are unlikely to have population-level effects because: 1) The majority of migratory bird species populations in the treatment area are believed to be secure enough that loss of some reproduction in a year is not relevant at the population scale (AMS 2016) 2) The proposed treatment area comprises 7.7% percent of the overall 247,191-acre planning area, and proposed treatments would take place within only a portion (1000-2000 acres) of that 19,147-acre area in any one season 3) most species reproduce relatively quickly enabling them to repopulate a small area easily; and, 4) many migratory bird species are known to re-nest after nest failure.

Design features developed for migratory birds, soil conservation, riparian function, water quality, fisheries resources and terrestrial wildlife would also benefit migratory birds by reducing potential adverse effects (See Appendix H: Design Features for Proposed Action). These design features include avoidance of treatments in riparian areas and wetlands, critical big game forage areas as well as retention of snags important for cavity nesters and timing restrictions for sensitive species.

In the long-term, treatments would shift forest species composition towards the NRV, improving forest resiliency and species diversity and reducing the risk of stand-replacing, high severity fire. The long-term benefit of habitat diversification and fire resiliency outweigh the potential short-term negative effects to individual nesting birds.

Given the potential effects to migratory birds are temporary and occur on a small scale across the planning area, this issue was considered but will not be further analyzed in detail.

How would the Proposed Action affect big game species and their habitat, specifically winter range, disturbance/displacement, and forage availability?

Moose, elk, mule deer, white-tailed deer, mountain lion, and black bear occur in the planning area throughout the year. The Missoula RMP identifies elk as a habitat generalist focal species used to gauge impacts on all big game species. The RMP also categorizes travel corridors, adequate security habitat and forage availability (with a focus on winter range) as important factors in maintaining elk populations.

Big game species populations in Montana are managed by the MTFWP. The planning area is located within Elk Management Unit 292. The 2004 MTFWP elk management report identified maintaining current levels of elk habitat and maintaining at least 80% of existing levels of elk habitat security as goals for district 292 (MTFWP 2004). The 2021 MTFWP elk count indicates that population numbers in this district were at the objective level (https://fwp.mt.gov/binaries/content/assets/fwp/conservation/elk/2021-montana-elk-count-completed.pdf).

Of the 19,147 proposed treatment acres, approximately 3,416 acres are considered elk winter range habitat and 15,472 are general habitat. Table 1 summarizes proposed treatments in winter range habitat. Timber sale activity in big game winter range would be limited to as short a period as possible. Open motorized road densities would be maintained in winter range at 2011 baseline (1.70 mi/mi^2). Fall burning would reduce winter forage, which generally does not recover until the following spring green-up. Utilizing a mix of spring and fall burning would minimize effects to forage availability in winter range. Low severity prescribed burning proposed in winter range would not convert forested stands to open stands but would reduce conifer encroachment and increase grass and shrubby forage plants, benefitting elk and other species (Hillis and Applegate 1998).

Table 2: Proposed Treatment Acres within winter range

Treat Group	Acres
Fuels Management	249
Limber Pine Enhancement	241
Prescribed Fire	1625
Thinning	341
Timber Harvest with Prescribed Fire	960
Total	**3,416**

Potential adverse effects to elk and elk general habitat would be in the form of temporary disturbance and displacement due to increased levels of human activity, heavy equipment use, and new road construction during vegetation treatment implementation. Approximately 6 miles of temporary and 16 miles of permanent roads are proposed. The newly constructed roads would be for administrative use. All proposed roads would be permanently closed to public motorized use. Additional effects would result from a temporary reduction in cover, forage and calving habitat. Effects would be tempered by spatial and temporal factors (19,147 acres treated over 5-15 years) limiting the disturbance footprint in any given season. There is ample cover, forage and calving habitat in adjacent untreated areas for elk to utilize during and after treatment implementation. Application of design features used to maintain reserves (such as riparian areas, wildlife corridors and retention patches) and implementing timing restrictions would further minimize effects (See Appendix F: Design Features for Proposed Action). Temporary displacement would not lead to mortality or long-term adverse effects. Given the temporary, minor disturbance and displacement potential impacts, this issue was considered but will not be further analyzed in detail.

In the long-term, impacts from the proposed treatments would be largely beneficial for elk and other big game. Treatments would remove some cover for several years post-treatment (dependent on treatment type and original cover type), but herbaceous and low shrub cover can be expected to begin regenerating within 2-5 years. The opening of forest stands would likely cause an increase in forage plants and improve the cover-to-forage ratio. Recent research (Proffitt et al. 2015) suggests that in dense forest, openings for summer forage availability may represent an increasingly rare habitat component due to long-term fire suppression or secondarily, a decline in regeneration logging. Vegetation treatments that emulate natural disturbances to create a mosaic of forest conditions can be beneficial to elk by providing abundant food resources in close proximity to cover. Restoration of the NRV and reduction in risk of stand-replacing, high severity fire could also benefit elk and other big game by supporting habitat resiliency and maintaining suitable, diverse habitats within the 30-year analysis timeframe. The consideration of forage availability is beneficial albeit minor, so it will not be further analyzed in detail.