Beaver-to-Boyle Timber Sale Project
Environmental Assessment

Stillwater Unit
Northwest Land Office
Montana Department of Natural Resources and Conservation
December 2019

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DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
Northwestern Land Office - Stillwater Unit
STEVE BULLOCK, GOVERNOR
STATE OF MONTANA
PHONE: (406) 881-2371
FAX: (406) 881-2372
P.O. BOX 164
OLNEY, MT 59927

December 24, 2019

RE: Final Environmental Analysis for Beaver to Boyle Timber Sale Project

Dear interested member of the public,

I am pleased to announce the final Beaver to Boyle Timber Sale Environmental Analysis (EA) is ready for your review. This project is the first timber sale where the DNRC is managing the forest within and adjacent to the *Beaver Lakes Area Deed of Recreation Use Easement* since it was finalized in July of 2015.

This timber sale project is a good first step in demonstrating how good forest management and recreation can coincide with one another. In fact, it is imperative recreation and forest management continue to coincide to keep the local lumber infrastructure viable, deliver revenue for the Trust Beneficiaries, and provide quality wildlife habitat while continuing to provide the public recreational opportunities in this highly-used area.

The MEPA (Montana Environmental Policy Act) timeline for this project started with the scoping notice published in April of 2018. The public input process continued with a field tour for the public in May of 2018. Several additional field tours were conducted to discuss this project with City of Whitefish staff, Whitefish Legacy Staff, community members associated with Community Wildfire Prevention Plan, and local timber industry staff. From these conversations, the Inter-Disciplinary (ID) team determined the design, mitigations and how to successfully implement this project as presented in the EA. Although the comment period has closed for this project, you can still provide input to the Land Board in Helena. This project is scheduled to be submitted to the Land Board for review on February 18, 2020.

Please contact us with any questions you may have about this project. Once logging starts on the timber sale, we plan to offer some field tours for the public to continue the dialog of the how good forest management and recreation can coincide with one another going forward.

Sincerely,

Dave Ring
Stillwater Unit Manger
MT Dept. of Natural Resources & Conservation

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Beaver-to-Boyle Timber Sale Project Environmental Assessment

Table of Contents

Environmental Assessment

Project Name: Beaver-to-Boyle Timber Sale
Proposed Implementation Date: December 2019
Proponent: Stillwater Unit, Northwest Land Office, Montana DNRC
County: Flathead

Type and Purpose of Action

Description of Proposed Action:

The Stillwater Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing the Beaver-to-Boyle Timber Sale Project. The project is located 4 miles west-northwest of the City of Whitefish (refer to Attachment A-1 Beaver-to-Boyle Vicinity Map and Attachment A-2 Beaver-to-Boyle Project Map) and includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools			
Public Buildings	**T31N R22W Sec 18**	**637.3**	**250.9**
Montana State University 2nd Grant	**T31N R22W Sec 17, 19**	**1,266.9**	**193.7**
Montana State University Morrill			
Eastern College-MSU/Western College-U of M	**T31N R22W Sec 6,7,8**	**934.7**	**371.4**
Montana Tech	**T31N R22W Sec 20**	**486.7**	**146.9**
University of Montana			
School for the Deaf and Blind			
Pine Hills School			
Veterans Home			
Public Land Trust			
Acquired Land			

Objectives of the project include:

- Establish areas of regeneration of the desired species mix, improve vigor/tree growth, and meet the Forest Management Rules regarding biodiversity, wildlife, fisheries, and water quality.
- Reduce stocking densities and ladder fuels to reduce potential for large fire growth within the wildlife urban interface (WUI) as described in the 2009 City of Whitefish Community Wildfire Protection Plan (CWPP).
- Contribute to the DNRC and Northwestern Land Office's annual targets of timber-harvest volumes. DNRC is required by state law (77-5-221 through 223, MCA) to annually harvest approximately 56.9 million board-feet (MMbf) statewide.
- Apply appropriate Best Management Practices (BMPs) or meet design criteria that are necessary to promote long-term water quality during logging and road improvement operations.

- Assure that Streamside Management Zone (SMZ) law and Forest Management Rules are met when encountering the springs, streams and associated wetlands in proximity to potential harvest units and hauling roads in the project area.
- Design and implement the project to maintain existing recreational uses. Include provisions for any proposed future recreational uses that have been identified in the Beaver Lakes Area Deed of Public Recreation Use Easement (Recreation Use Easement).

Proposed activities include:

Action	Quantity
Proposed Harvest Activities	# Acres
Clearcut	0
Seed Tree w/ Reserves*	125
Shelterwood	0
Selection*	0
Commercial Thinning	0
Salvage	0
Overstory Removal*	133
Improvement Cut*	590
Old Growth Maintenance*	49
Total Treatment Acres	897
Proposed Forest Improvement Treatment	# Acres
Pre-commercial Thinning – Post Harvest	143
Pre-commercial Thinning only	66
Planting	199
Proposed Road Activities	# Miles
New permanent road construction	0
New temporary road construction	0.4
Road maintenance	15.6
Road reconstruction	0.76
Road abandoned	0
Temporary road reclaimed	0.4
Other Activities	# Acres
Pile/scarify	199
Pile only	673
Pile burning	1,105

*Definitions of Prescriptions and the Prescription Table for what is proposed by harvest unit is provided in Attachment B – Prescription Table

Duration of Activities:	Jan 2020 – Sep 2023
Implementation Period (roads):	May, Oct-Nov
Implementation Period (harvest):	Oct-Mar

The lands involved in this proposed project are held in trust by the State of Montana. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (Section 77-1-202, MCA).

The DNRC would manage lands involved in this project in accordance with:

- The State Forest Land Management Plan (DNRC, 1996),
- Administrative Rules for Forest Management (ARM 36.11.401 through 471),
- Beaver Lakes Area Deed of Public Recreation Use Easement (Recreation Use Easement), and
- all other applicable state and federal laws.

Project Development

SCOPING:

- DATE:
  - April 5, 2018 through May 10, 2018
- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: http://dnrc.mt.gov/public-interest/public-notices
  - Adjacent landowners, businesses and interested parties
  - Local industry professionals
  - Legals ad in Daily Interlake and Whitefish Pilot
  - Posted at the Olney Post Office (30 days)
- AGENCIES SCOPED:
  - MT Fish, Wildlife, and Parks
  - USFS – Tally Lake Ranger District
  - All Montana Tribal Organizations
- COMMENTS RECEIVED:
  - How many: Twelve (12) individuals or groups made comments.
  - Concerns:
    - Ensure the trees within the 16-foot Whitefish Trail corridor are not harvested;
    - Ensure the Recreation Use Easement values, eq. views, viewsheds, and recreational user experiences, are considered in the project design and mitigations;
    - Minimize road and trail closures during the highest active recreation season;
    - Ensure the safety of recreationists and landowners on the road system;
    - Share in the costs of dust abatement and consider the need for additional dust abatement;
    - Keep the public informed on status of the harvest activities and sign the area for public safety;
    - Keep stakeholders informed during project development;
    - Improve the condition of the road system;
    - Do not clearcut;
    - Provide wildlife corridors;
    - Consider the viewshed from the cabin sites around Beaver Lake & plan not to measurably alter those viewsheds;
    - Harvest would help with the supply of material for wood products manufacturing operations;
    - Harvest could reduce the fuel loading and help with wildfire control;
    - Harvest could improve forest health.
  - Results (how were concerns addressed): The public concerns were incorporated into project planning and design or have been explained in this document. Issue statements were

developed to facilitate the analyses of the various resources, and mitigations are listed by resource to describe the actions that would be taken to reduce some impacts.

OTHER PUBLIC INVOLVEMENT:

- Tours:
  - Public Tour - May 5, 2018
  - Whitefish Legacy Partner and City of Whitefish Tour - September 13, 2018
  - Whitefish Legacy Partner and City of Whitefish Tour – November 14, 2018
  - Timber Industry & Flathead Economic Development Council Tour – March 20, 2019
  - Whitefish Legacy Partners and City of Whitefish Tour – May 23, 2019

INTERDISCIPLINARY TEAM (ID Team):
As required by MEPA, DNRC assembled an ID Team to plan this project and analyze the potential environmental effects. The team is staffed by specialist with varying disciplines and skill sets to assure the project addresses the variety of issues and concerns related to this project. In the summer of 2018, the team began compiling issues, gathering additional information related to the existing environmental conditions, and further developing the proposal.

The ID Team consists of:

- Project Leaders: Mike McMahon, Matt Lufholm
- Archeologist: Patrick Rennie
- Wildlife Biologist: Chris Forristal
- Hydrologist, Fisheries, and Soils: Marc Vessar
- Real Estate Specialist engaged in Recreation: Nicole Stickney

PROJECT DESIGN CONCEPTS

Several key concepts were used in developing this timber sale project in the Beaver-to-Boyle project area. These key concepts included prioritizing timber stands for harvest, improving transportation/road system, and developing mitigations to reduce resource and recreational impacts. These impacts and mitigations are discussed in detail in each specific resource analysis.

STAND PRIORITIZATION

Stands were prioritized for treatment based on:

1. Stocking densities:
   - The number of trees per acre has created overcrowded stand conditions. Over time, the amount of live crown on individual trees has been reduced, making the stands less productive. The harvest and precommercial thinning prescriptions would focus on leaving trees with live crown ratios greater than 35 percent. Many stands or portions of stands would benefit with increased vigor and productivity from a reduction in competition for light, moisture, and nutrients.
   - Dense multi-storied stands are found throughout the project area but primarily in those areas that have not been harvested within the last 20 years. These stands contain ladder fuels where fire can easily spread from the smallest trees into the largest trees, which may increase fire intensity and activity. Also, under certain high fire danger conditions this could lead to crown fires. This proposal has harvest units situated from north to south. This strategic orientation would create a favorable fuel break approximately 4 miles long that could provide firefighting operations time to contain a wildfire and protect private property. Flathead County and Whitefish Community Wildfire Protection Plan (CWPP, 2009) have identified this area as a priority for treatment.
2. Insect and disease issues: Individual and small groups of all size classes of trees have been dying throughout the project area especially after the past couple years of drought. Root rots, drought, and various insects have been causing this mortality even in the vigorous trees.

3. Opportunities to implement the final stage of the prescription for previously harvested and regenerated stands: Several areas that were seedtree harvested between 2000 and 2006 are set to have the larger overstory trees removed to allow the 12 to 20-year old trees more available space, water, light, and nutrients to grow. These areas would also be pre-commercially thinned.
4. Opportunities to modify the current timber cover type to the desired future condition (DFC). In 92% of the harvest unit acres, the current cover type matches the DFC. The treatments proposed would bring the remaining 8% into alignment with the DFC.

ROAD IMPROVEMENTS AND USE

Access to the DNRC's Beaver Lake Area road system is over the Beaver Lake County Road and access to the Boyle Lake area is over the Lupfer County Road and then across private property. The Boyle Lake area is only legally accessible to motorized access for DNRC resource management purposes. Additionally, only DNRC authorized operations may utilize motorized vehicles in the Boyle Lake area.

None of the roads on state land meet 'all season' road specifications. Vehicle traffic will deteriorate these roads when the road bed is wet and saturated (spring time) or during extremely dry, dusty conditions. Over time, particularly heavy traffic can exacerbate road surface deterioration regardless of soil moisture level. For this timber sale project proposal, DNRC's timber sale would reshape the roads shown on Attachment A-3 Beaver-to-Boyle Road Maintenance Map to the original road standards.

Log hauling would be planned for fall and winter conditions. This project is designed to haul logs when visitor use is less (Headwaters, 2018) and there is less potential to create dust.

DNRC also reviewed cost estimates to bring segments of road up to 'all season' standards by surfacing the road with gravel. It was determined that adding gravel to the South Beaver Road and several segments of the North Beaver Road would cost about $148,000. Unless additional sources of funding become available this project does not intend to provide that level of road improvement.

AESTHETICS AND RECREATION

Project Leaders worked with the City of Whitefish, holders of the Recreation Use Easement which covers 1,178 acres of the project area, as well as Whitefish Legacy Partners (WLP) to develop mitigations in order to minimize disturbance to the trail system and disruption to trail users and other recreationists. Through various meetings and field tours, mitigations in project design and contract stipulations were developed. Several specifics included:

- developing a method to buffer the trail system from the main harvest units,
- requiring logging/hauling tributary to the South Beaver Road to be completed in one year, and
- requiring logging equipment to operate during frozen or snow-covered conditions in certain areas; this would minimize disturbance to visitors as well as reduce disturbance to the forest floor.

Additional mitigations for recreation can be viewed in Appendix G - Stipulations and Specifications.

The Project Leaders also considered viewpoints where prominent areas proposed to be harvested would be visible. Unit A has a northeast exposure facing towards the East Lakeshore Drive and Delrey Road. This drew the ID Team to consider modifying the original harvest plan for a seedtree harvest treatment. There is also a proposed trail associated with the Close the Loop project that would traverse through Unit A. The ID Team proposes that an improvement harvest (defined in Attachment B – Prescription Table), would vary the retention of trees across the hillside, thereby reducing some negative aesthetic effects. Seedtree areas would be irregularly shaped and trees would be retained in groups within the harvest area. More densely stocked intermediate harvest areas would be mixed in with the seedtree areas and retain a diversity of tree species, tree sizes, and densities. All this would create a mosaic of trees of all sizes and densities.

PROCESSES RELATED TO PUBLIC INVOLVEMENT

An Action Alternative was developed that incorporated project design concepts with information collected during the project development phase. The project leaders and ID Team members carefully considered comments and recommendations for mitigations. This alternative was determined to be effective at reducing the effects of the proposed action while meeting the trust mandate and objectives listed above. Therefore, one Action Alternative and the No-Action Alternative will be analyzed for this project.

The Action Alternative provides mitigations to minimize trail damage and interruption of trail users, repairs roads, further implements timber stand management to increase stand resilience, and addresses wildland fire hazards.

ALTERNATIVES CONSIDERED:

No-Action Alternative: Under this alternative, no timber would be harvested and therefore no revenue would be generated from the project area at this time for the following trusts: Public Buildings, Montana State University (MSU), Eastern College – MSU, Western College – University of Montana, and Montana Technical College. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and ongoing management requests may still occur. Natural events, such as plant succession, tree mortality due to insects and diseases, windthrow, down fuel accumulation, in-growth of ladder fuels, and wildfires, would continue to occur.

Action Alternative: A commercial timber harvest would take place to remove between 5.5 and 6.5 MMbf of timber using ground-based methods on 897 acres. Specific harvest unit data and definitions of proposed harvest treatments are provided in *Attachment B – Beaver-to-Boyle Timber Sale Project Prescription Table*. Using this table with *Attachment A-2 Beaver-to-Boyle Project Map* will provide additional detail for this project.

New stands of trees would be regenerated on 125 acres through seed tree with reserves treatment.

Approximately 590 acres would be treated with an improvement cut prescription which is an intermediate harvest treatment with small openings; the small openings are designed to regenerate a new age class within the larger stand.

Old-growth maintenance treatments would take place on 49 acres to maintain old-growth status and characteristics.

133 acres of successfully regenerated stands from the 2001 to 2012 harvests would have the seed trees removed, retaining 2 snags and 2 snag recruits per acre for wildlife considerations (this is also known as an overstory removal treatment).

Mechanical site preparation would occur on 199 acres. Site preparation would facilitate the establishment of natural regeneration and the process of planting when natural regeneration is not likely to occur or doesn't occur.

Depending on natural regeneration that occurs, up to 199 acres would be planted post-harvest. Additional post-harvest acres may be included dependent on the successful establishment of natural regeneration.

Concentrations of logging slash would be piled and burned or trampled with heavy equipment to help incorporate the slash into the soil. This would occur on most areas with exception of the overstory removal treatments.

Pre-commercial thinning would occur on 210 acres. This is broken down to 144 acres of pre-commercial thinning within harvest units, and 66 acres outside harvest units.

Known existing noxious weed populations would be treated with herbicide and monitored to determine treatment effectiveness.

Road maintenance and BMP improvements would be performed on approximately 15.6 miles of existing road. Road reconstruction and re-alignment would be performed on approximately 0.76 miles of existing roads. Approximately 0.40 miles of temporary roads would be constructed which would be reclaimed post-harvest.

OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

(Conservation Easements, Army Corps of Engineers, road use permits, etc.)

- **Montana Department of Environmental Quality (DEQ) –** DNRC is classified as a major open burner by DEQ and is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

  A short-term Exemption from Montana's Surface Water Quality Standards (318 Authorization), issued by the Department of Environmental Quality, may be required if temporary activities, such as removing a culvert in a stream, would introduce sediment above natural levels into streams and if Montana DFWP recommends it.

- **Montana/Idaho Airshed Group-** The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006). As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit.

- **Montana Department of Fish, Wildlife and Parks (DFWP)-** A Stream Protection Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries. Such activities include the installation and removal of a temporary bridge within Unit E.

- **City of Whitefish, Montana –** In 2015, The City of Whitefish, acting in conjunction with WLP, purchased a permanent public recreation easement called the Beaver Lakes Deed of Public Recreation Use Easement (Recreation Use Easement) from the DNRC on approximately 1,520 acres of state trust land (DNRC 2015). DNRC actions included authorization of the easement and construction of three trailheads and six miles of new trail on the existing trail system. The easement:
  - Permanently secures a public right of non-motorized access throughout the easement area, and on current and future trails (see Attachment A-4 *Recreation Map* displaying location of easement area);
  - Allows continued forest management by DNRC;
  - Provides compensation to DNRC for the restriction on residential and commercial development within the Recreation Use Easement area (this restricts the State's right to subdivide the land); and

  - Allows for the future establishment of non-commercial recreation facilities (trailheads, day use sites, and similar uses).

- **Flathead County –** Flathead County has an air quality program and their authority supersedes any decision regarding burning from the Airshed Group and MT DEQ. This project area falls under county airshed regulations and DNRC would comply with the regulations by contacting the County ventilation hotline prior to burning logging slash.

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

Whitefish Area Trust Lands Neighborhood Plan (WNP)
In 2004, the Montana DNRC and the Whitefish Area Trust Lands Advisory Committee collaborated in the design of a land use plan encompassing 13,000 acres of State School Trust Lands surrounding the community of Whitefish in Flathead County, Montana. This plan is known as the Whitefish Area Trust Lands Neighborhood Plan (WNP). The WNP defines future land uses for these acres in cooperation with the Whitefish City Master Plan adopted in 1996, and the Flathead County Master Plan of 1987. All or portions of sections 7, 8, 17, 18, 19, and 20 are within the Beaver Lake/Skyles Subarea of the WNP and portions of sections 6 and 7 are within the Swift Creek Subarea. All activities related to the proposed timber sale are compatible with future goals outlined in the plan in these subareas.

Recreation Use Easement (DNRC 2015)
The City of Whitefish purchased a permanent public recreation easement on approximately 1,520 acres. This area is displayed in Attachment A-4 *Recreation Map*. A Memorandum of Understanding for Road Maintenance is also attached to this easement.

Whitefish Community Wildfire Protection Plan (CWPP)
This project was designed to accommodate the strategic requirements detailed within the CWPP. The CWPP plan identifies the area immediately adjacent (east) of the Beaver-to-Boyle Project Area as a priority treatment area (Whitefish, 2009). See Attachment A-5 *Community Wildfire Protection Plan* for a map delineating the relationship between the CWPP priority area and the Beaver-to-Boyle Project Area.

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

- Close the Loop Trail and Recreation Use Easements EA (January 2019)
- East Beaver Road Users Association Environmental Assessment (November 2018)
- Beyond Boundaries Categorical Exclusion (2015)
- Whitefish Bike Retreat Categorial Exclusion (June 2013)
- Beaver–Skyles Public Recreation Easement (November 2012)
- Beaver Smith Skyles Timber Sale Environmental Assessment (April 2009)
- Trail Runs Through It Environmental Assessment (2007)
- Montana Jumpstart Forest Stewardship and Fuels Reduction Project (June 2006)
- Beaver Bugs 2 Categorical Exclusion (2005)
- Beaver Lake Timber Sale Project Environmental Impact Statement (1999)

Impacts on the Physical Environment

VEGETATION:

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

- *COVER TYPE & AGE CLASS DISTRIBUTION: Covertypes and age-class distributions may be affected by timber harvesting related to this project and other timber-harvesting projects*
- *OLD GROWTH: Timber harvesting and road building in old-growth timber stands may affect the amount and distribution of old growth remaining on Stillwater Unit.*
- *TIMBER STAND HEALTH: Concern was expressed that the present timber stand species mixes and the level of tree mortality from insects and diseases present risks in terms of an increase in losses due to wildfire and a continued loss of sawlog value due to mortality, rot, and firewood gathering.*
- *FIRE REGIMES & FOREST FUELS: Concern was expressed that forest fuel loadings in areas that haven't been harvested in 40+ years are at a moderate to high level, causing many areas to be susceptible to intense fires.*
- *NOXIOUS WEEDS: Concern was expressed that soil disturbances and logging equipment could increase the amount and distribution of noxious weeds in the project area.*
- *SENSITIVE PLANTS: Concern was expressed that there may be damage caused to the amount and distribution of sensitive plants in the project area.*

COVER TYPES & AGE CLASS DISTRIBUTION

The desired future condition of the project area should be mostly represented by the western larch/Douglas-fir cover type (86%) and this cover type is still slightly underrepresented currently (74%). The project area is also showing an overrepresentation of stands that are predominately Douglas-fir while the ponderosa pine cover type is slightly underrepresented.

No-Action Alternative: ***Direct, Secondary, and Cumulative Effects***
No trees would be harvested in the analysis area, thus cover type and age-class distributions would remain unchanged.

Action Alternative: ***Direct, Secondary, and Cumulative Effects***
Trees would be harvested on 897 acres throughout the analysis area to promote desired species throughout. Harvest treatments would be designed to retain all age classes while creating conditions appropriate for regenerating future generations of sawtimber.

Within the areas where treatment is proposed, the following results in cover type and age class would be expected:

- 68.1 acres of mixed conifer would be converted to the western larch/Douglas-fir cover type.
- 7.3 acres of western larch/Douglas-fir would be converted to the western white pine cover type.
- 1.5 acres would be converted from lodgepole pine to western larch/Douglas-fir.
- 886.0 acres would be unchanged.

The following list shows how the proposed treatments will change the stand structure throughout the harvest units:

- Precommercial Thin (210 acres) – This treatment would result in no change in the overstory but would retain vigorously growing seedlings and/or saplings at 14-foot spacing.
- Improvement Cut – These would be harvested with two treatments with the following effects:
    - Regeneration patches (74 acres) –This treatment would reduce overstory density in small patches (<5 acres) to 60-foot spacing.
    - Selection harvest (590 acres) – This treatment would reduce tree density within all 3 canopy levels leaving a 30 to 40-foot spacing in the remaining 589.7 acres.
- Overstory Removal (133 acres) – This treatment would change sawtimber to a seedling/sapling stand with two snags and two snag recruit trees per acre.
- Old Growth Maintenance (49 acres) – This treatment would reduce tree density within all 3 canopy levels while maintaining the old-growth characteristics of the existing stand.
- Seedtree Harvest (125 acres) – This treatment would reduce overstory density to 60- to 80-foot spacing in preparation for the next generation of seedlings.

OLD GROWTH

In the project area, 270 acres meet the minimum criteria to be classified as old growth according to DNRC's old-growth definition described in ARM 36.11.403(48).

No-Action Alternative: *Direct, Secondary, and Cumulative Effects*
No change in amount or distribution of old-growth would occur.

Action Alternative: *Direct, Secondary, and Cumulative Effects*
Under the Action Alternative, 65.6 total acres that meet old-growth criteria have been proposed for harvest. Old-growth maintenance treatments would be implemented on the 42.6 acres in two cutting units. The 42.6 acres would remain old growth after harvesting by retaining enough large-diameter trees, snags, trees per acre, and large downed logs. The old-growth attributes would be slightly less in these units due to fewer trees being retained over existing conditions. Old-growth removal would be implemented on small portions of five other harvest units. These portions, totaling 23.0 acres, would be harvested resulting in conditions that do not meet minimum old-growth characteristics. This would result in an 8% reduction of old-growth within the project area.

Overall, this would proposal would remove 0.1% of the 16,269 total acres identified as old-growth in the Stillwater State Forest.

TIMBER STAND HEALTH

The insects and diseases encountered in the project area commonly infect, infest, and damage the tree species in the area. Armillaria, larch dwarf mistletoe, pouch fungus, quinine conks, pini (red-ring rot), western gall rust, Douglas-fir beetle, and fir engraver were the most commonly observed. The primary damages observed were stem damages, wind throw, and premature needle senescence.

No Action Alternative: *Direct, Secondary, and Cumulative Effects*
Insect populations, disease infestations, mortality, and decay would continue to rise and fall as they respond to natural climatic conditions. Individuals harvesting firewood would continue to remove trees from accessible areas.

Action Alternative: *Direct, Secondary, and Cumulative Effects*
Trees would be harvested throughout the project area with silvicultural treatments intended to promote insect and disease resistant tree species.

Stands would be treated in accordance with the following list:

- Individual larch trees heavily infected with dwarf mistletoe would be harvested. This would result in the reduced spread of mistletoe and improved vigor of the residual stands.
- Trees heavily affected by stem rots or insect damage would be retained for wildlife snags.
- Lodgepole pines infected with gall rusts would be harvested to reduce density and increase species diversity.
- Species with known resistance to and/or tolerance of root infection such as western larch and ponderosa pine would be the preferred species for leave tree retention and regeneration.

These treatments would have the result of increasing overall insect and disease resistance while retaining important habitat structures in the project area.

FIRE REGIMES & FOREST FUELS

The proposed project is located within the Whitefish wildland urban interface and is part of the Community Wildfire Protection Program (CWPP) area, and the amounts and arrangement of forest fuel are critical factors considered for successful engagement by wildland firefighters. Since 1999, approximately 1,020 acres of the project area have been treated to meet Montana's Hazard Reduction Law. An additional 720 acres outside the area have been treated through timber sales, and 70 acres have been treated on private lands under the CWPP program (*CWPP, 2009*).

No Action Alternative: *Direct, Secondary, and Cumulative Effects*
Trees would not be harvested from the proposed stands other than those stems removed by firewood harvesting activities. Stands would retain current density, fuel load, and ladder fuels until a prescribed or natural disturbance occurs. Because these characteristics would not be altered, the risk of wildfire and the potential wildfire intensity in the area would continue to increase.

Action Alternative: *Direct, Secondary, and Cumulative Effects*
Trees would be harvested throughout the project area with the intention of reducing the existing continuity and density of available forest fuels.

Maintaining an age-class mosaic, in conjunction with proposed fuel-treatment projects, would reduce the potential of high-intensity wildfires. Success of aerial- and ground-attack would also potentially be improved by the reduction of available forest fuels.

NOXIOUS WEEDS

Throughout the project area, weeds have been identified on roadsides, old skid trails, previously used landings, and other areas where soil had been disturbed. Currently, the primary vectors for noxious weeds are vehicle traffic, human and pet traffic on trails, illegal motorized access, and railroad traffic. DNRC has been spraying herbicide and hand-picking along most road systems and the City of Whitefish has been spraying weeds on trails and trailheads.

No Action Alternative: *Direct, Secondary, and Cumulative Effects*
No additional soil disturbance would be caused in the proposed harvest units. Established infestations of noxious weeds would continue to be treated with an ongoing program of site-specific herbicide spraying along roads and in small areas of infestation.

Action Alternative: *Direct, Secondary, and Cumulative Effects*

Mechanized equipment could increase soil disturbance and vectoring of weed seeds throughout the harvest units and along roads.

The following weed spread mitigation measures would be implemented on all harvest areas as part of an integrated weed management plan on this project:

- Pressure-washing of all equipment used in road construction and off-road logging activity,
- Sowing grass seed on temporary roads after harvesting has been completed, and
- Applying herbicide along roadsides, landings, and any identified weed outbreaks as is currently being implemented.

These mitigations have been moderately effective on most DNRC timber sales.

SENSITIVE PLANTS

No species of concern, as identified in the Montana Natural Heritage Database, were identified in the project area during reconnaissance or project layout. If any species are confirmed, timber harvest will be postponed in that specific area until risk to any species of concern can be evaluated.

FOR COMPLETE VEGETATION ANALYSIS, SEE APPENDIX A.

FOR SPECIFIC VEGETATION AND NOXIOUS WEED MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

SOILS:

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

- *Timber harvesting activities may result in reduced soil productivity and increased erosion due to compaction and displacement.*
- *Removal of both coarse and fine woody material off site during timber harvest operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.*

Existing Conditions

Nearly all DNRC-managed land in the project area has been harvested since logging first started in 1913. Adverse compaction and displacement impacts from past logging, roads and trails are estimated to cover less than 10 percent of the project area.

Direct, Indirect and Cumulative Effects

No-Action Alternative:
Implementation of the No-Action Alternative would result in no additional soil resource impacts in the project area.

Action Alternative:
Considering data from the *DNRC SOIL MONITORING REPORT* (DNRC 2011), the implementation of Forestry BMPs has resulted in less risk of detrimental soil impacts from erosion, displacement, and severe compaction. Comparing the soil type map, field reconnaissance notes and topographic map features with the proposed harvest unit map indicates that under this alternative ground-based skidding would occur on a majority of the proposed harvest areas. The extent of impacts expected would likely be similar to harvest areas monitored by DNRC and reported in the monitoring report or approximately 14.7 percent of the harvest area on ground-based harvest units.

Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the *SFLMP*) through implementation of BMPs, skid-trail planning on tractor units, and limiting operations to dry or frozen conditions.

Coarse woody debris would be left on-site in volumes recommended to help maintain soil moisture and forest productivity, generally in the 10 to 20 tons per acre range for habitat types found in the harvest locations (*Graham et. al. 1994*). Because coarse woody debris would be left on site in amounts recommended by scientific literature, benefits to nutrient cycling and forest productivity would be maintained over the long term. However, removal of fine material may result in reduced soil macronutrients and tree productivity (*Harrington and Kirkland 2012*).

FOR COMPLETE SOILS ANALYSIS SEE APPENDIX B.

FOR SPECIFIC SOILS MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

WATER AND FISHERIES RESOURCES:

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

- *Timber harvesting and road construction activities have the potential to increase water yield, which may affect stream channel stability.*
- *Timber harvesting and road construction activities may increase sediment delivery into streams/lakes and affect water quality.*
- *Timber harvesting activities may adversely affect fish habitat parameters of large woody debris, stream shading, and stream temperature.*
- *Stream connectivity may be adversely impacted by barriers at stream crossings.*

Existing Conditions

There are 5 watersheds within the Beaver to Boyle project area and 5 lakes. Within the Beaver Lake watershed streams generally flow less than 6 months of the calendar year. Boyle Lake has several tributaries with streams that feed the lake but several tributaries are somewhat disconnected from the lake due to the location of the railroad. The outlet of Boyle Lake flows under the railroad track and contributes flow to Stillwater River. The Lazy Creek watershed is a 10,430-acre watershed that contributes surface flow to Whitefish Lake via Lazy Creek. This is a Class 1 stream that flows through several meadows and wetlands before entering Whitefish Lake. Most of the other watersheds do not have streams identified within them.

Beaver Lake, Little Beaver Lake, Dollar Lake, Murray Lake, and Woods Lake are stocked with hatchery fish. Boyle Lake is a perennial fish-bearing lake with largemouth bass, northern pike and pumpkinseeds inhabiting the lake. Lazy Creek contains eastern brook trout.

Direct, Indirect and Cumulative Effects

Water Quality:
DNRC verified streams within the project area as well as roads to determine sediment delivery risks. Since there are very few stream crossings on the current road system and no stream crossing were identified on the proposed haul route, the risk of sediment delivery to streams is very low or nonexistent.

Water Quantity:
Field reconnaissance of stream channels follow previous harvest and assessments have found no physical evidence of channel scour or erosion due to any substantial increase in annual water yield. Due to the limited amount of harvest in the watersheds coupled with the low annual precipitation and lack of scoured stream channels, a low risk of direct or indirect impacts—such as scoured stream channels—would result.

Fisheries:
Neither alternative would alter the amount of recruitable woody debris near fish-bearing streams or lakes therefore, no further analysis is deemed necessary. No harvest is proposed within the Riparian Management Zone along Lazy Creek or near fish-bearing lakes, therefore no change in stream shading is expected. No stream crossings were identified along the proposed haul route and therefore no manmade barriers to fish passage exist within the project area.

FOR COMPLETE WATER AND FISHERIES RESOURCES ANALYSIS, SEE APPENDIX C.

FOR SPECIFIC WATERSHED AND FISHERIES MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

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

Issues and Concerns - The following analysis will disclose the anticipated direct, secondary, and cumulative effects to wildlife associated with the No-Action and Action alternatives.

- *Mature forest cover, old-growth forest and connectivity*. The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature and old-growth forest.
- *Canada lynx*. The proposed activities could result in the modification of habitat preferred by Canada lynx (*Lynx canadensis*) and decrease the area's suitability for lynx.
- *Grizzly bears*. The proposed activities could alter grizzly bear (*Ursus arctos*) cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.
- *Common loons*. The proposed activities could alter shoreline nesting habitat or disturb common loons during the breeding season, which could adversely impact loon reproduction.
- *Fishers*. The proposed activities could decrease habitat suitability for fishers (*Pekania pennanti*) by decreasing canopy cover in mature forest stands, decreasing abundance of snags and coarse woody debris, and by increasing roads, which could elevate risk of trapping mortality.
- *Flammulated owls*. The proposed activities could alter the structure of flammulated owl *(Otus flammeolus)* preferred habitat, which could reduce habitat suitability for flammulated owls.
- *Pileated woodpeckers*. The proposed activities could reduce tree density and alter the structure of mature forest stands, which could reduce habitat suitability for pileated woodpeckers (*Dryocopus pileatus*).
- *Big game*. The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, increasing roads in secure areas, and disturbing animals.

TABLE WI-1 provides a brief synopsis of the anticipated direct, secondary and cumulative effects for each threatened, endangered, sensitive or fine-filter species DNRC analyzes for based on Forest Management Rules identified in the project area. All information is directly referenced from the detailed analysis included in Appendix D -- WILDLIFE ANALYSIS.

Table WI-1: Synopsis of Effects on Wildlife Species

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No/Negligible Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Mature forest cover, old-growth forest, and connectivity	Moderate adverse direct, secondary and cumulative effects to connectivity and suitability of mature forest and minor effects to old-growth habitat in the Project Area would be expected.
Threatened and Endangered Species	
Canada lynx (*Lynx canadensis)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	[**Y**] **Detailed Analysis Provided in Appendix D -** The Project Area contains approximately 2,868 acres of suitable lynx habitat. Minor adverse direct, secondary and cumulative effects to habitat suitability would be expected.
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	[**Y**] **Detailed Analysis Provided in Appendix D -** The proposed Project Area occurs in non-recovery occupied habitat associated with the Northern Continental Divide Ecosystem (NCDE) (*USFWS 1993, Wittinger 2002*). Moderate adverse direct and secondary effects and minor cumulative effects associated with displacement or mortality risk would be expected.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest less than 1 mile from open water	[**N**] The proposed Project Area is within the Whitefish Lake bald eagle territory and approximately 0.8 miles from the last known nest site. While this eagle pair likely spends the majority of its time on Whitefish Lake, the Project Area contains several small lakes where bald eagles may periodically forage. This eagle territory routinely fledges young. Whitefish Lake receives heavy recreational use and numerous private homes are within 0.2 miles of the nest site. Consequently, this eagle pair is likely habituated to high amounts of human presence and motorized disturbance. The proposed harvesting would not impact any shoreline habitat within 50 feet of the lake edge and large, emergent trees and snags would be retained. Thus, negligible direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	[**Y**] **Detailed Analysis Provided in Appendix D** – Suitable lake habitat occurs within the Project Area and several pairs of loons are known to breed in the area. Minor adverse direct, secondary and cumulative effects to nesting common loons and chick recruitment would be anticipated.
Fisher *(Pekania pennanti)* Habitat: Dense mature to old forest and riparian areas	[**Y**] **Detailed Analysis Provided in Appendix D** – Approximately 1,138 acres of suitable fisher habitat occur within the Project Area. Minor adverse direct, secondary and cumulative effects would be anticipated that would affect fisher habitat suitability
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest	[**Y**] **Detailed Analysis Provided in Appendix D** – Approximately 182 acres of potentially suitable flammulated owl habitat occur within the Project Area. Minor adverse direct, secondary and cumulative effects would be anticipated on Flammulated owl habitat suitability

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No/Negligible Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Gray Wolf *(Canis lupus)* Habitat: Ample big game populations, security from human activities	[**N**] Wolves may use habitat in the vicinity of the Project Area. Disturbance associated with timber sales at den and rendezvous locations can adversely affect wolves; however, timing restrictions would apply if den or rendezvous sites are documented (*ARM 33.11.430(1)(a)(b)*). Thus, negligible adverse direct, indirect, or cumulative effects to wolves would be anticipated as a result of the Action Alternative. No direct, indirect, or cumulative effects would be anticipated as a result of the No Action Alternative.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	[**Y**] **Detailed Analysis Provided in Appendix D –** Approximately 1,534 acres of suitable pileated woodpecker habitat occur in the Project Area. Moderate adverse direct, secondary and cumulative effects would be anticipated to the habitat suitability for pileated woodpeckers
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[**N**] No suitable caves or mine tunnels are known to occur in the Project Area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be expected to occur as a result of either alternative.
Big Game Species	
Elk **Whitetail Deer** **Mule Deer** **Moose**	[**Y**] The Project Area contains winter range habitat for white-tailed deer, mule deer, elk and moose (DFWP 2008). Year-round use of the Project Area by white-tailed deer and elk is likely. Occasional (rare) use by moose and mule deer is possible. Moderate adverse direct and secondary effects and minor cumulative effects associated with big game habitat quality and security would be expected.

FOR COMPLETE WILDLIFE ANALYSIS, SEE APPENDIX D.

FOR SPECIFIC WILDLIFE MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

AESTHETICS:

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

- *Activities associated with the proposed action may affect the visual quality as seen from the trail and road systems and several observation locations within or near the project area including along Delrey and East Lakeshore roads and within the Whitefish Mountain Resort.*

Direct and Indirect Effects

No Action Alternative
Effects to the visual resource would be from activities such as firewood gathering and recreational use, which are presently taking place.

Action Alternative
Vegetation damage and soil disturbance would have short-term effects to the visual resource as seen from roads and trails. The view distance into the harvest units and to broader landscapes would be increased. Short-term visual impacts are anticipated and, over time, brush, grasses, and seedlings would regenerate lessening the impacts.

In the Beaver Lake area, seasonal color contrast would be the most notable effect at these landscape levels.

In the Boyle Lake area harvesting within Unit A on the northeast face ridge, approximately 90 acres (most of the unit) would be very visible. The proposed harvest would create a mosaic of seedtree openings, moderately stocked areas, uncut areas, and areas with vigorous sapling-sized understory trees.

Cumulative Effects of No-Action Alternative
Cumulative impacts to the proposed Whitefish Trail's Close the Loop trail would not occur if the No-Action Alternative is selected.

Cumulative Effects of Action Alternative
Cumulative impacts to the proposed Whitefish Trail's Close the Loop Trail would occur as a result of this project. Short-term effects would be similar to those described in the direct and indirect effects foreground section of this report. Treatment of this area would also open views of the Swift Creek drainage and mountains to the north and northeast.

The proposed action would be similar but would be additive to changes that have taken place within the viewshed historically.

FOR COMPLETE AESTHETICS ANALYSIS SEE APPENDIX E.

FOR SPECIFIC AESTHETIC MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

HISTORICAL AND ARCHEOLOGICAL SITES:

A Class I (literature review) level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. The Class I search revealed past cultural resource inventories have occurred within much of the area of potential effect (APE), but none of the identified cultural resources are within the project APE. Because of past extensive logging activities in the APE, no additional archaeological investigative work will be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

FOR SPECIFIC ARCHAEOLOGY MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, AND ENERGY:

There will be no measurable direct, secondary, and cumulative impacts related to the demand on land, water, air, and energy due to the relatively small size of the timber sale project.

Impacts on the Human Population

HUMAN HEALTH AND SAFETY:
Air Quality

The project area is located within Montana Airshed 2, which encompasses portions of Flathead County. Most of the project area lies in the Kalispell Impact Zone within the larger Airshed.

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

- *Smoke will be produced during pile burning.*
- *Log hauling may increase the dust levels within the area and DNRC should consider sharing in costs to dust abate the Beaver Lake County Road.*

-SLASH BURNING

No-Action Alternative:
No slash would be generated and burned because of this alternative. Thus, there would be no effects to air quality within the local vicinity and throughout Airshed 2.

Action Alternative:

Direct and Secondary Effects
Slash consisting of tree limbs and tops and other vegetative debris would be piled throughout the project area during and following harvesting. Slash would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter (PM) into the local airshed, temporarily affecting local air quality. Over 70% of emissions emitted from prescribed burning are less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous.

Burning within the project area would last only a few days and would also be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. DNRC would also follow regulations Flathead County has for Air Quality.

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

Cumulative Effects
Burning that may occur on adjacent properties in combination with the proposed action could potentially increase cumulative impacts to the local airshed. Cumulative effects to air quality would not exceed the levels defined by State of Montana Cooperative Smoke Management Plan (1988) and managed by the Montana/Idaho Airshed Group. Prescribed burning by other nearby airshed cooperators (for example the U.S. Forest Service) would have potential to affect air quality. All cooperators currently operate under the same Airshed Group guidelines. The State, as a member, would burn only on approved days. This should

decrease the likelihood of additive cumulative effects. Thus, cumulative effects to air quality due to slash burning associated with the proposed action would also be expected to be minimal.

-DUST

No-Action Alternative:
No increased dust would be produced because of the proposed timber sale. Current levels of dust would be produced in the area.

Action Alternative:

Direct, Secondary, and Cumulative Effects
Harvesting operations timeframe would be short. Dust may be created from log hauling on portions of native surface roads during summer and fall months. Timber sale contract clauses would provide for the use of dust abatement or require trucks to reduce speed if necessary, to reduce dust.

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

Log Hauling Traffic

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

- *Log hauling on Trust Lands roads and county roads may add to safety concerns. Visitors may not expect large trucks on these roads or may not know how to share the roadways.*
- *There will be increased travel on roads accessing the Beaver Lake area.*
- *Truck drivers seem to drive fast*.

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

- Log hauling will take place Monday through Friday.
- Signs will be posted making the public aware of log hauling traffic in the area.
- If necessary, a slower speed limit may be imposed on State roads and is currently set at 25 mph on the County road. DNRC will be monitoring complaints and operations.
- Public service announcements will be posted periodically as operations begin, and social media will be utilized to fullest capability especially in conjunction with the WLP website.

No-Action Alternative:
No increase in log truck traffic would occur as a result of this proposal.

Action Alternative:

Direct, Secondary, and Cumulative Effects
Traffic would increase from additional log truck traffic in the area for the duration of the timber sale however, signs would be posted indicating that log truck traffic is present in the area and public safety announcements would be issued to advise area users of increased log truck traffic. If necessary, a slower speed limit may be imposed in the timber harvest contract.

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

RECREATION *(including access to and quality of recreational and wilderness activities):*

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

- *The proposed action could disrupt recreation on the Beaver Lake trail system and within the Recreation Use Easement boundaries.*
- *Timber harvesting and slash cleanup may impact proposals such as the Close the Loop project by delaying trail construction until the timber sale is completed.*

Existing Conditions

There are two separate areas that will be included in this assessment, Beaver Lake Area and Boyle Lake Area.

Beaver Lake Area
Beaver-to-Boyle Project Area encompasses 12.6 miles of open State forest that allow motorized access. Roads with higher levels of public use such as South Beaver and North Beaver have deteriorated, making travel slow and difficult. These native surface roads were not designed for all season use which they sometimes receive.

The City of Whitefish holds the Recreation Use Easement on portions of this area as shown in Attachment A- 4. This easement allows the city to manage the 24 miles of existing trails and construct one additional mile of trail. This easement also compensates the trusts for the loss of commercial and residential development rights. According to the Headwaters Economics 2017 report completed for WLP, visitor use into the Beaver Lake area averaged 37 vehicles per day during the June to September period.

Several Special Recreational Use Licenses and Land Use Licenses are permitted in the project area which DNRC must administer. Also, there are numerous cabin leases on the north and south side of Beaver Lake, as well as private cabin sites.

Boyle Lake Area
Public access to this area is restricted due to the surrounding adjacent private property. Forest logging roads are in place and in need of minor maintenance. Public access to this area is restricted due to the surrounding adjacent private property.

This area is outside the Recreation Use Easement held with the City of Whitefish and there have not been any licenses or leases authorized for this area.

Direct, Indirect and Cumulative Effects

No Action Alternative
Per the Memorandum of Understanding related to the Recreation Use Easement, DNRC would improve and recondition the main roads open to public motorized uses, especially in the Beaver Lake area. North Beaver and South Beaver roads would be the primary roads to recondition.

No appreciable changes or conflicts would result to the following list of current uses:

- Uses related to the recreation easement

- Traditional recreational pursuits such as camping, hunting and fishing
- Licensed activities

Also, if the Close the Loop Trail is constructed and legal access is obtained to cross the BNSF rail line south of Boyle Lake, then non-motorized use of the Boyle Lake area would moderately increase.

Action Alternative
The proposed project would directly affect 12.6 miles of open roads by reconditioning the road through reshaping and grading thereby improving driving conditions on these roads. Additional commitments have been made for DNRC to maintain these road surfaces within the Recreation Use Easement area.

The roads would be utilized over a three- to four-year period for hauling which would primarily be in the fall and winter when recreation traffic tends to be less. Mitigations for notifying public would be implemented as noted in Appendix G – Stipulations and Specifications and may help in reducing the inconvenience of temporary closures in the project area as well as help with potential safety concerns.

This project, as designed, would preserve the existing and future recreational value of the area as identified in the Recreation Use Easement. There would be some short-term negative impacts to the user experience on the Whitefish trail system as well to general recreationists, fisherman, and hunters.

There would be some negative impacts to Land Use Licenses and Special Recreational Use License holders as well as for residential leases and lots in the area for a 3 to 4-year period.

Construction of the Close the Loop Trail within the project area would be delayed until harvesting is completed. Also, if the Close the Loop Trail is constructed and legal access is obtained to cross the BNSF rail line south of Boyle Lake, then non-motorized use of the Boyle Lake area would moderately increase.

FOR COMPLETE RECREATION ANALYSIS SEE APPENDIX F.

FOR SPECIFIC RECREATION MITIGATION MEASURES, SEE APPENDIX G - STIPULATIONS AND SPECIFICATIONS.

OTHER IMPACTS TO THE HUMAN POPULATION

Will the Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Health and Human Safety	**X**													
Industrial, Commercial, and Agricultural Activities and Production	**X**													
Quantity and Distribution of Employment	**X**													
Local Tax Base and Tax Revenues	**X**													
Demand for Government Services	**X**													

Will the Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Density and Distribution of Population and Housing	**X**													
Social Structures and Mores	**X**													
Cultural Uniqueness and Diversity	**X**													
Action														
Health and Human Safety		**X**				**X**				**X**			**Y**	**H-1**
Industrial, Commercial, and Agricultural Activities and Production	**X**				**X**				**X**					**H-2**
Quantity and Distribution of Employment	**X**				**X**				**X**					**H-3**
Local Tax Base and Tax Revenues	**X**				**X**				**X**					
Demand for Government Services	**X**				**X**				**X**					
Density and Distribution of Population and Housing	**X**				**X**				**X**					
Social Structures and Mores	**X**				**X**				**X**					
Cultural Uniqueness and Diversity	**X**				**X**				**X**					

Comments:

H-1: Log truck traffic would be active within the project area and along the Beaver Lake County Road increasing the potential of traffic accidents. An estimated 10 logs trucks per day as well as administrative traffic would be anticipated Monday through Friday. Several mitigations would be applied to help communicate to the public and residents using these roads that logging and hauling operations are active. A full list of planned mitigations is listed in Appendix G - Stipulations and Specifications. The following partial list of mitigations would be implemented to facilitate safe interactions between recreational users and project contractors:

- Signage and social media outlets would be in place to inform recreationists of the project status and closures when they exist,
- A 25 mile per hour speed limit will be posted,
- Log landings would usually be located more than 60 feet off open roads.

H-2: A consistent flow of timber contributes towards meeting the current and future demand for raw material resources to operate value-added timber products manufacturing facilities.

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

OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

The timber harvest would generate approximately $1,700,000 to $1,750,000 for Montana Tech School of Mines, Montana State University Agricultural College, State Normal School and Public Buildings trusts.

Approximately $70,000 of improvements to DNRC's road system would occur as a result of implementing this project. And approximately $178,000 in Forest Improvement (FI) fees would also be collected for FI projects. This is based on a stumpage rate of $29.70 per ton, multiplied by the estimated volume of tons (38,580 tons). This stumpage rate was derived by comparing attributes of the proposed timber sale with the attributes and results of other DNRC timber sales recently advertised for bid.

Costs related to the administration of the timber sale program are only tracked at the Northwestern Land Office (NWLO) and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated Statewide and by Land Office. A recent revenue-to-cost ratio of the Northwest Land Office was 1.93:1. These revenue-to-cost ratios are a measure of economic efficiency. This means that, on average, for every $1.00 spent in costs, $1.93 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

Mills in Montana need 351 MMbf per year to maintain current production levels and industry infrastructure. Currently the sustained yield and target harvest from Trust Lands is 56.9 MMbf, which represents approximately 16.4% of timber harvested in the state of Montana. This project would provide between 5.5 and 6.5 MMbf of timber towards the sustained yield target thus helping sustain current mill capacity.

Environmental Assessment Checklist Prepared By:

Name: Matt Lufholm and Mike McMahon
Title: Management Forester and Forest Management Specialist
Date: December 13, 2019

Finding

NOTICE OF DECISION

A Department of Natural Resources and Conservation (DNRC) Interdisciplinary Team (ID Team) has completed the Environmental Assessment (EA) for the proposed Beaver to Boyle Timber Sale Project.

The project is located 4 miles west-northwest of the City of Whitefish, Montana in portions of sections 6, 7, 8, 17, 18, 19 & 20 of Township 31 North, Range 22 West. The State Normal School Trust (Montana State University [MSU]-Billings, University of Montana Western -Dillon), MSU 2nd Grant (Montana State-Bozeman), Montana Technical College (Butte) and Public Buildings would be the beneficiary institutions of the income generated by this project.

DNRC initiated the public scoping process for this project by posting a scoping notice on the DNRC Website and in the *Whitefish Pilot* and the *Daily Interlake* newspapers. In addition, the scoping notice was sent to adjacent landowners, businesses, interested parties, local industry professionals and posted at the Olney Post Office for 30 days. Public scoping for this project was open from April 5, 2018 to May 10, 2018. In addition to the scoping notices, DNRC -Stillwater Unit hosted several tours for the public and interested parties:

- Public Tour - May 5, 2018
- Whitefish Legacy Partner and City of Whitefish Tour - September 13, 2018
- Whitefish Legacy Partner and City of Whitefish Tour – November 14, 2018

- Timber Industry & Flathead Economic Development Council Tour – March 20, 2019
- Whitefish Legacy Partners and City of Whitefish Tour – May 23, 2019

The issues and concerns identified through the public scoping and ID Team work were summarized and used to further refine the project. Extensive data collection and reconnaissance of the project area were conducted by a DNRC ID Team. The ID team consisted of foresters, wildlife biologist, fisheries biologist, hydrologist, soil scientist, archeologist, and administrative staff.

After a thorough review of the EA, project file, public correspondence, Montana Statutes, Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP), Real Estate Management Plan (REMP), State Forest Land Management Plan (SFLMP), Whitefish Neighborhood Plan, Beaver Lakes Area Deed of Public Recreation Use Easement and adopted rules, I have made the following decision:

Alternative Selected

Two alternatives are presented and were fully analyzed in the Environmental Analysis:

No-Action Alternative:
Under this alternative, no revenue would be generated through timber harvest from the project area at this time for the following trusts: State Normal School Trust (Montana State University [MSU]-Billings, University of Montana Western -Dillon), MSU 2nd Grant (Montana State- Bozeman), Montana Technical College (Butte) and Public Buildings.

Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and ongoing management requests may still occur.

Natural events, such as plant succession, tree mortality due to insects and diseases, windthrow, down fuel accumulation, in-growth of ladder fuels, and wildfires, would continue to occur.

Action Alternative:
A commercial timber harvest would take place to remove between 5.5 and 6.5 MMbf of timber using ground-based methods on 897 acres. Specific harvest unit data and definitions of proposed harvest treatments are provided in *Attachment B – Beaver-to-Boyle Timber Sale Project Prescription Table*. Using this table with *Attachment A-2 Beaver-to-Boyle Project Map* will provide additional detail for this project.

- New stands of trees would be regenerated on 125 acres through seed tree with reserves treatment.
- Approximately 590 acres would be treated with an improvement cut prescription which is an intermediate harvest treatment with small openings; the small openings are designed to regenerate a new age class within the larger stand.
- Old-growth maintenance treatments would take place on 49 acres to maintain old-growth status and characteristics.
- 133 acres of successfully regenerated stands from the 2001 to 2012 harvests would have the seed trees removed, retaining 2 snags and 2 snag recruits per acre for wildlife considerations (this is also known as an overstory removal treatment).
- Mechanical site preparation would occur on 199 acres. Site preparation would facilitate the establishment of natural regeneration and the process of planting when natural regeneration is not likely to occur or doesn't occur.
- Depending on natural regeneration that occurs, up to 199 acres would be planted post-harvest. Additional post-harvest acres may be included dependent on the successful establishment of natural regeneration.

- Concentrations of logging slash would be piled and burned or trampled with heavy equipment to help incorporate the slash into the soil. This would occur on most areas with exception of the overstory removal treatments.
- Pre-commercial thinning would occur on 210 acres. This is broken down to 144 acres of pre-commercial thinning within harvest units, and 66 acres outside harvest units.
- Known existing noxious weed populations would be treated with herbicide and monitored to determine treatment effectiveness.
- Road maintenance and BMP improvements would be performed on approximately 15.6 miles of existing road. Road reconstruction and re-alignment would be performed on approximately 0.76 miles of existing roads. Approximately 0.40 miles of temporary roads would be constructed which would be reclaimed post-harvest.

On behalf of the Montana DNRC I have selected the **Action Alternative**.

Rationale for Alternative Selected

With considerations to the following rationale, I have selected the **Action Alternative**:

- The lands involved in this project are held by the State of Montana in trust for the support of specific beneficiary institutions. DNRC is required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11; and 77-1-202, Montana Codes Annotated [MCA]). The SFLMP and associated rules provide the management philosophy and framework to evaluate which alternative would maximize real income while sustaining the production of long-term income.
- The Action Alternative meets the project objectives stated in **Type and Purpose of Action**, page 2.
- The analyses of identified issues did not reveal information to persuade DNRC to choose the No-Action Alternative.
- The Action Alternative did not reveal major effects to potentially affected resources.
- The project design with its associated mitigations **(Appendix G – Stipulations and Specifications)** minimizes effects on potentially affected resources.
- This project was designed to provide revenue to the trust beneficiaries while allowing their primary purpose, forest management, to continue along with other stacked uses such as land use licenses, special recreational use licenses, and commercial recreation opportunities.
- The timber harvest would generate approximately $1,700,000 to $1,750,000 for the State Normal School, MSU 2nd Grant, Montana Technical College and Public Buildings trusts. Approximately $70,000 of improvements to DNRC's road system would occur as a result of implementing this project, and approximately $178,000 in Forest Improvement (FI) fees would also be collected.
- Project designs are within the parameters of the Beaver Lakes Area Deed of Public Recreation Use Easement (July 1, 2015) including mitigations to reduce impacts to aesthetics and trail use from the timber harvest operations. In addition, this project will enable the State to meet our obligations in the MOU for the Road Maintenance under the Public Recreation Use Easement.
- On March 13, 2003, DNRC adopted Administrative Rules for Forest Management (Forest Management Rules ARM 36.11.401 through 456). This project is designed in accordance with these rules.

- On July 18, 2005, the DNRC adopted the Real Estate Management Programmatic Plan (REMPP) through a Final Programmatic Environmental Impact Statement Record of Decision. The REMPP provided policy, direction, and guidance in the selection and management of real estate development on Montana's trust lands. The REMPP embodies three general goals: (1) sharing in expected community growth; (2) planning proactively; and (3) increasing revenue for trust beneficiaries. This project is designed in accordance with this plan.

Significance of Potential Impacts

For the following reasons, I find the Action Alternative will not have significant impacts on the human environment, as:

- There is no conflict with local, State, or Federal laws, requirements, or formal plans.
- No impacts are regarded as major, geographically widespread, or frequent.
- Due to the mitigations listed in this Environmental Analysis, the quantity and quality of various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree.
- There is no precedent for future actions that would cause significant impacts.

In summary, I find that the identified low to moderate impacts will be avoided, controlled, or mitigated by the design of the project to the extent that the impacts are not significant.

Need for Further Environmental Analysis

Based on the following considerations, I find an EIS does not need to be prepared, as:

- The EA adequately addresses the issues identified during project development and displays the information needed to make the decisions.
- Evaluation of the potential impacts of the Close the Loop Project and Public Recreation Use Easement indicates no significant impacts would occur when the mitigations are applied.
- The ID Team provided adequate opportunities for public review and comment. Concerns received from the public as well as those identified by the resource specialists involved were addressed in project design and the analysis of impacts.

	EIS		More Detailed EA		**X**	No Further Analysis

Environmental Assessment Approved By:

Name: Dave Ring
Title: Stillwater Unit Manager
Date: December 24, 2019
Signature: *[/s/ David A. Ring]*

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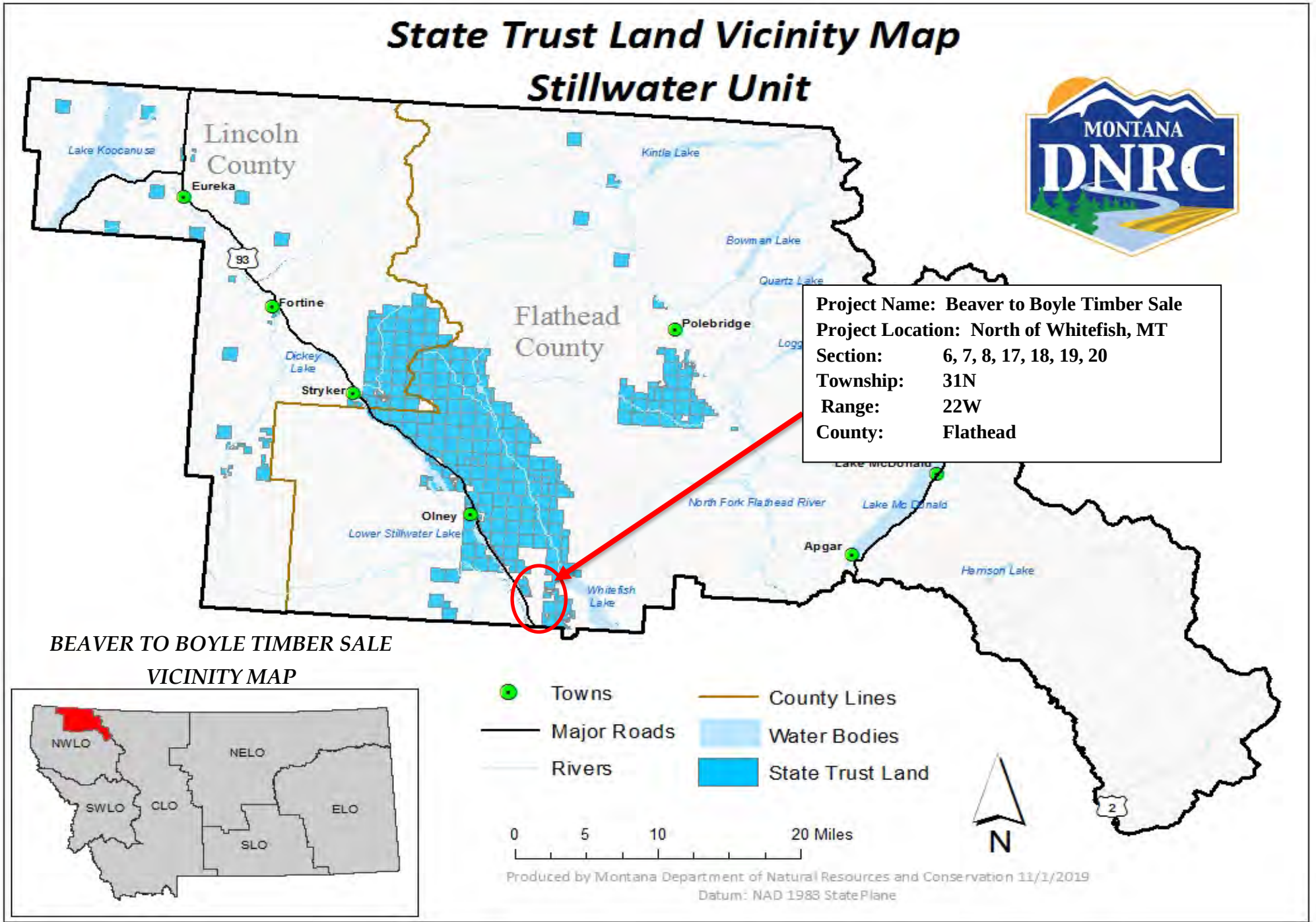
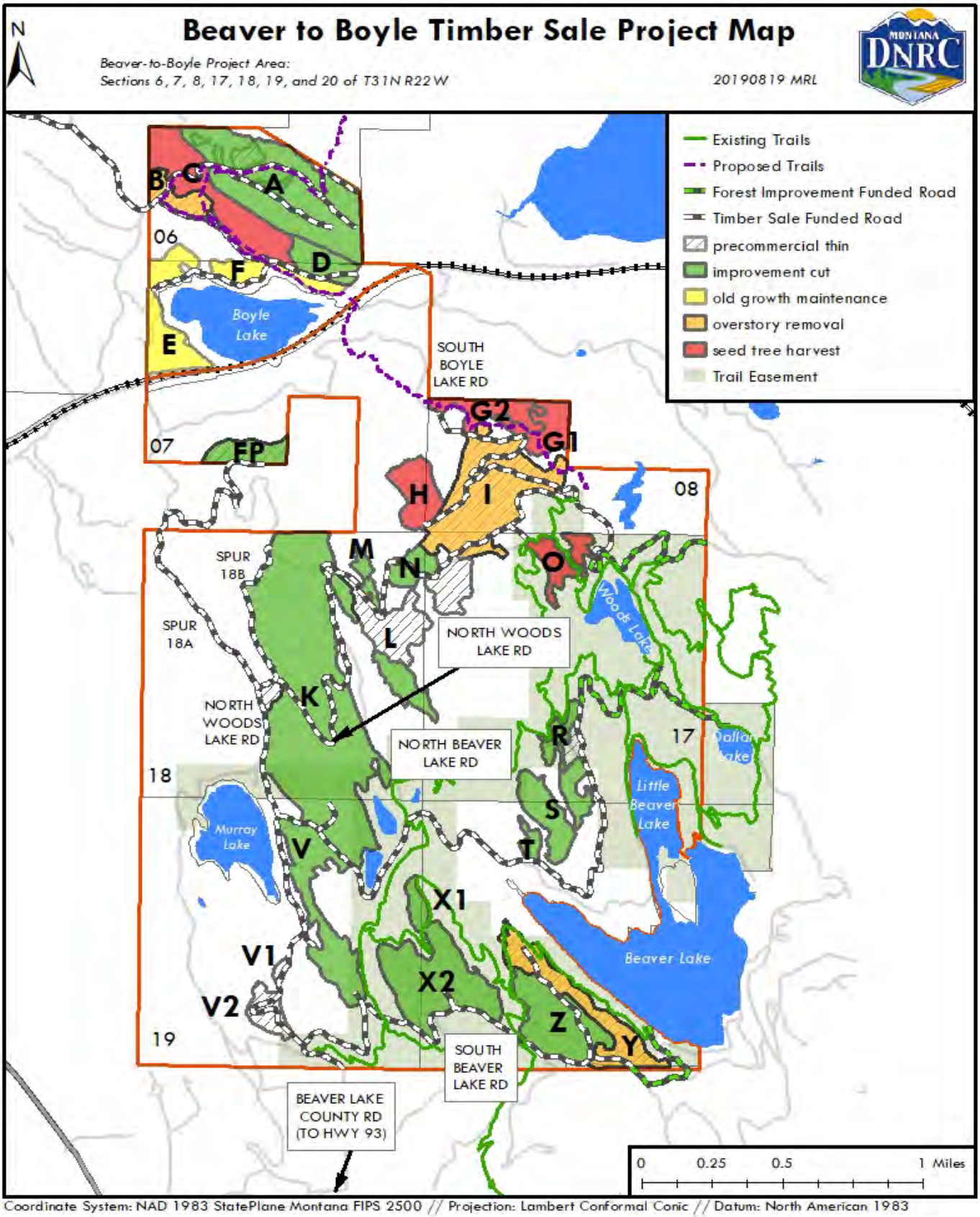
Attachment A: Maps

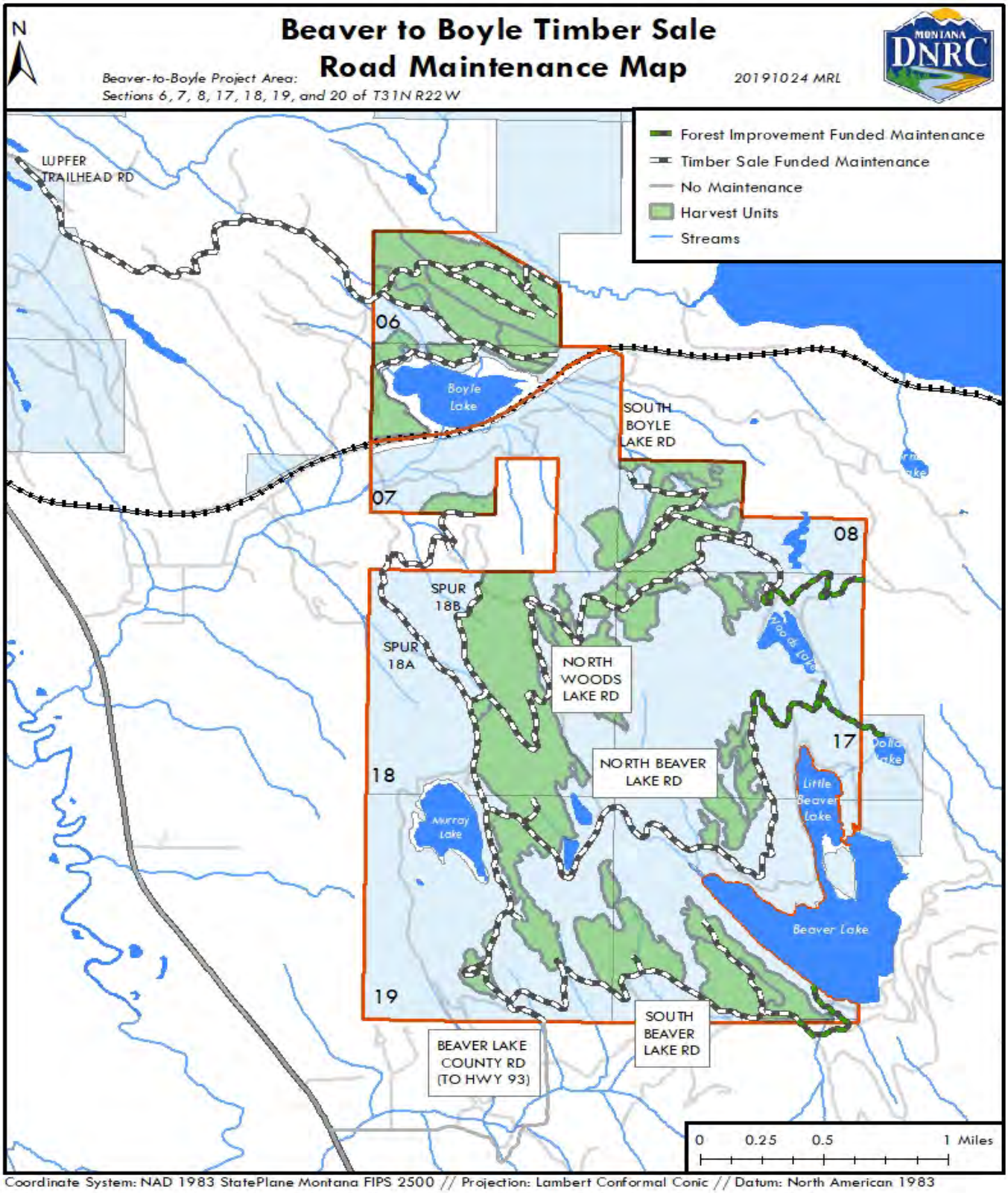
Attachment A-1: Beaver to Boyle Timber Sale Vicinity Map



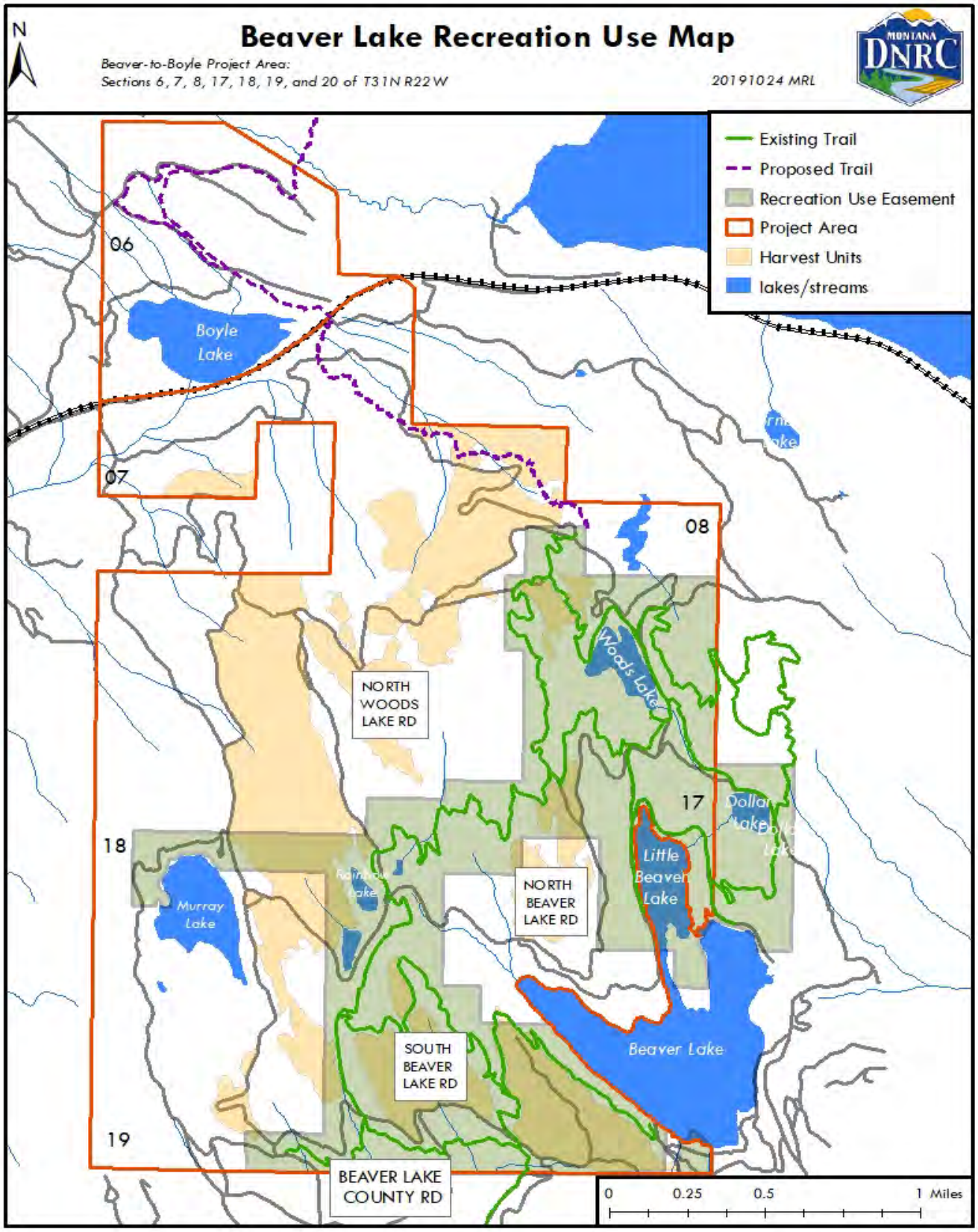
Attachment A-2: Beaver to Boyle Project Area Map



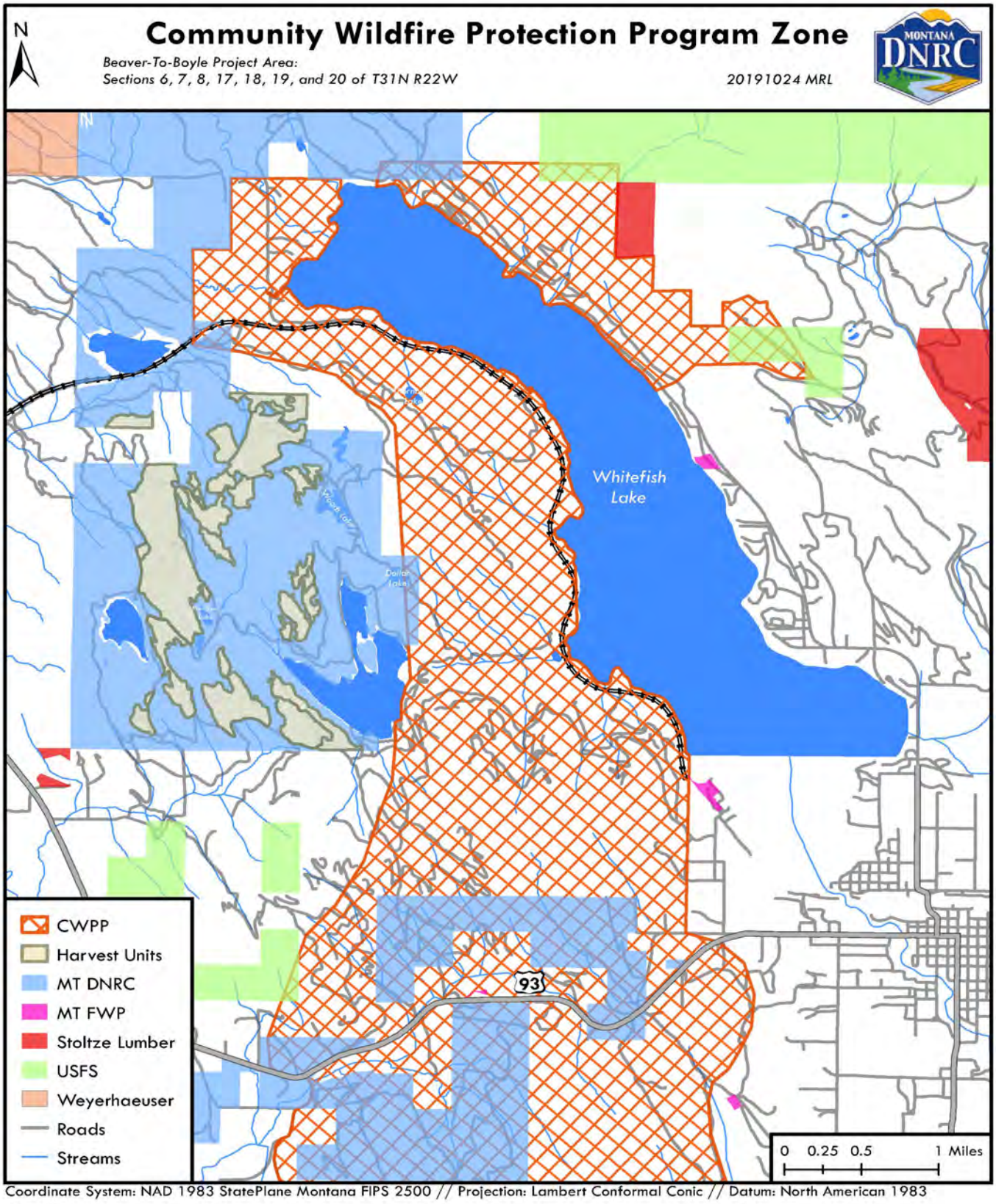
Attachment A-3: Beaver to Boyle Road Maintenance Map



Attachment A-4: Recreation Use Map



Attachment A-5: Community Wildfire Protection Program (CWPP) Zone



Attachment B: Prescription Table

PRESCRIPTION DEFINITIONS AND UNIT PRESCRIPTION TABLE

Harvest Treatments

Improvement Harvest Treatment (IHT) – Overall, most of the proposed unit would be treated with an "intermediate harvest" as defined below and select areas within the proposed harvest unit would receive small "Seedtree with Reserves", "overstory removal" and/or precommercial thinning treatments also defined below. The Prescription Table below shows the approximate amount of the various treatments proposed for implementation.

Varying the prescription across the unit would help break up openings and create shapes that are more irregular to emulate the variation of natural disturbances across the landscape. This overall treatment method would also address forest fuels reduction, regenerate portions of the stand, provide the remaining trees with the needed sunlight, moisture, and nutrients to increase the stands resilience.

Silviculturally, this treatment would remove trees that are at high risk for value loss and mortality or are showing signs of low vigor; low vigor generally displayed when the live crown ratio is less than 35%. In efforts to reduce the effects of wildfire on the survival of the trees remaining after harvest and increase the fire control opportunities in areas treated, the recommended amount of separation between tree canopies is determined by steepness of slope. According to the CWPP standards, this requires crown spacing of at least 10 feet on flat to gentle slopes (< 20%); 20 feet between crowns on moderate slopes (21-40%); or 30 feet on steeper slopes (> 41%). Clumps of large diameter trees up to 1/8th acre in size may be left within thinning areas; within clumps, stems <4" DBH would be cut.

Seedtree with Reserves (ST) – This treatment would regenerate portions of the unit by cutting all merchantable timber with the exception of 6 to 10 of the larger-diameter western white pine, western larch, Douglas-fir, and ponderosa pine per acre. The selected leave trees would show the most vigor, contain the healthiest crowns, and have the potential to produce healthy cone crops. Additional reserve trees as noted above would also be retained.

Old-growth maintenance harvest (OGM) – Silviculture treatments in old-growth stands designed to retain old-growth attributes and old-growth status as defined by DNRC's *Forest Management Rules*, including large live trees, snags and CWD (coarse woody debris), but that would remove encroaching shade-tolerant species, create small canopy gaps generally less than one acre in size, and encourage regeneration of shade-intolerant species. This type of treatment is applicable on sites that historically would be characterized by mixed severity fire regimes, either relatively frequent or infrequent (ARM 36.11.403 (49)).

Intermediate harvest (IH) – Harvest treatment designed to improve the form, quality, health, or wildlife potential of the remaining stand. The selective harvesting would increase the seral component in the species mix meaning more western larch and lodgepole pine regenerating versus Douglas-fir, spruce and grand fir.

Overstory removal (OSR) – Harvesting of many of the larger trees within a stand where there is a viable and vigorous understory of small trees. Additional reserve trees as noted above would also be retained.

Precommercial thinning (PCT) – This treatment reduces competition among sapling-sized trees. The saplings are spaced to maintain a live crown ration greater than 40%, improve the desired species composition, and improve the amount of sunlight, moisture, and nutrients the final crop trees require to maintain their vigor.

PROPOSED PRESCRIPTIONS FOR THE BEAVER TO BOYLE TIMBER SALE PROJECT				
Unit	Acres	Prescription	~ volume	Unit Details and projected prescription
A	103	Improvement Harvest	1,000 MBF	• Harvest percentages 33% Seedtree (ST) 49% Intermediate Harvest (IH) 8% Precommercial Thin (PCT) 10% No Harvest • Tractor Harvest • Pini and mistletoe present • Machine pile/scarify (ST) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons • PCT thinning areas post-harvest (170 - 220 TPA)
B	14	Overstory Removal	30 MBF	• Tractor Harvest • Pini and mistletoe present • Machine pile/scarify (ST) • Burn slash piles • PCT thinning areas post-harvest (170 - 220 TPA)
C	51	Seedtree with Reserves	500 MBF	• Tractor Harvest • Pini and mistletoe present • Retain groups of advanced regen in view of (IVO) approved Whitefish Trail (WFT) location • Machine pile/scarify • Burn slash piles • Natural regen; evaluate for planting after 2 seasons • PCT thinning areas post-harvest (170 - 220 TPA)
D	17	Improvement Harvest	40 MBF	• Harvest percentages 11% Seed tree (ST) 89% Intermediate Harvest (IH) • Tractor Harvest • Pini and mistletoe present • Machine pile/scarify (ST) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons • PCT thinning areas post-harvest (170 - 220 TPA)
E	33	Old Growth Maintenance	125 MBF	• Tractor Harvest • Retain old growth characteristics and status • Retain groups of shade-tolerant stems that do not show signs of disease. • Machine Pile • Burn slash piles
F	16	Old Growth Maintenance	65 MBF	• Tractor Harvest • Retain old growth characteristics and status • Retain groups of shade-tolerant stems that do not show signs of disease. • Machine Pile • Burn slash piles
FP	15	Improvement Harvest	90 MBF	• Cable Yard – uphill • Slash damaged residual • Pile/Burn landings along upper road

G1	18	Seedtree with Reserves	113 MBF	• Tractor Harvest • Pini and mistletoe present • Machine pile/scarify (ST) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
G2	18	Seedtree with Reserves	164 MBF	• Tractor Harvest • Pre-trail required to access unit in winter • Pini and mistletoe present • Machine pile/scarify • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
H	21	Seedtree with Reserves	241 MBF	• Tractor Harvest • Pini and mistletoe present • Root rot, especially along edges of unit • 850’ of temp road required to access unit • Machine pile/scarify • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
I	81	Over Story Removal	307 MBF	• Tractor Harvest • Pini and mistletoe present • Burn landing piles • PCT thinning areas post-harvest (170 - 220 TPA) • Tractor Harvest – late fall acceptable
K	215	Improvement Harvest	1,473 MBF	• Harvest percentages 13% Seed tree 76% Intermediate harvest 11% No Harvest • Tractor Harvest • Pini, mistletoe, and armillaria • Douglas-fir beetles • Drought stress • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
L1	5	Improvement Harvest	26 MBF	• Tractor Harvest • Machine pile/trample • Burn slash piles
L2	13	Improvement Harvest	108 MBF	• Harvest percentages 28% Seed tree 72% Intermediate harvest • Tractor Harvest • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
M	6	Improvement Harvest	42 MBF	• Tractor Harvest • Machine pile/trample • Burn slash piles

N	12	Fuels Reduction	5 MBF	• Tractor Harvest • Leave some dense pockets of saplings within unit for hiding cover • Clear submerchantable material 70' on either side of road • Masticate or Machine Pile and Burn
O	17	Seedtree with Reserves	152 MBF	• Tractor Harvest • Machine pile/scarify (ST) • Burn slash piles • Plant WL and DF – 14' X 14' spacing
R	20	Improvement Harvest	132 MBF	• Tractor Harvest • Protect advanced regen near north landing area • Machine Pile/trample • Burn slash piles • Interplant WWP – 30' x 30' (7.25 acres)
S	21	Improvement Harvest	117 MBF	• Combination Harvest 20% Seed tree 80% Intermediate harvest • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
T	5	Improvement Harvest	27 MBF	• Combination Harvest 31% Seed tree 29% Intermediate harvest • Tractor Harvest • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
V	47	Improvement Harvest	304 MBF	• Combination Harvest 20% Seed tree 80% Intermediate harvest • Tractor Harvest • Pini, mistletoe, and armillaria • Douglas-fir beetles • Drought stress • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons
X1, X2	68	Improvement Harvest	472 MBF	• Combination Harvest 9% Seed tree 91% Intermediate harvest • Tractor Harvest • Pini, mistletoe, and armillaria • Douglas-fir beetles • Drought stress • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles Natural regen; evaluate for planting after 2 seasons
Y	39	Over Story Removal	159 MBF	• Tractor Harvest • Burn slash piles • PCT entire unit post-harvest

Z	44	Improvement Harvest	306 MBF	• Combination Harvest 41% Seed tree 59% Intermediate harvest • Tractor Harvest • Pini, mistletoe, and armillaria • Douglas-fir beetles • Drought stress • Machine pile/scarify (ST) • Machine pile/trample (IH) • Burn slash piles • Natural regen; evaluate for planting after 2 seasons

PROPOSED PRECOMMERCIAL THINNING UNITS FOR THE BEAVER TO BOYLE TIMBER SALE PROJECT

Unit	Acres	Prescription	Unit Details
A	9	Precommercial Thin	• Hand-thin or masticate regen areas post-harvest • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles
I	97	Precommercial Thin	• Hand-thin or masticate OSR unit and additional attached 16-acre PCT unit • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles
K	4	Precommercial Thin	• Hand-thin or masticate • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles
L	28	Precommercial Thin	• Hand-thin • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles
R	5	Precommercial Thin	• Hand-thin • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles
V	14	Precommercial Thin	• Hand-thin or masticate • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles
Y	39	Precommercial Thin	• Hand-thin or masticate post-harvest • Retain 170 - 220 crop trees per acre • Pile ≤ 200' of roads and trails • Burn slash piles

Appendix A – Vegetation Analysis

Beaver to Boyle Timber Sale – Vegetation Analysis

Analysis Prepared By:
Name: Mike McMahon, Matt Lufholm
Title: Management Foresters, Montana DNRC

Introduction

This section describes conditions of the existing vegetation on Stillwater Unit as a whole, and in the project area specifically, and describes how the No-Action and Action Alternatives would affect the various components of this resource. Forest cover types, age-class distributions, and the amounts, distribution, and attributes of old growth will be evaluated at the landscape and stand levels to facilitate the analysis of direct, indirect, and cumulative effects. Forest fuels, fire regimes, insects, diseases, and noxious weed conditions will be discussed at the project-area level. Past, present, and reasonably foreseeable activities have been identified and will be considered in the analysis of effects.

Issues

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

- *COVER TYPE & AGE CLASS DISTRIBUTION: Covertypes and age-class distributions may be affected by timber harvesting related to this project and other timber-harvesting projects*
- *OLD GROWTH: Timber harvesting and road building in old-growth timber stands may affect the amount and distribution of old growth remaining on Stillwater Unit.*
- *TIMBER STAND HEALTH: Concern was expressed that the present timber stand species mixes and the level of tree mortality from insects and diseases present risks in terms of an increase in losses due to wildfire and a continued loss of sawlog value due to mortality, rot, and firewood gathering.*
- *FIRE REGIMES & FOREST FUELS: Concern was expressed that forest fuel loadings in areas that haven't been harvested in 40+ years are at a moderate to high level, causing many areas to be susceptible to intense fires.*
- *NOXIOUS WEEDS: Concern was expressed that soil disturbances and logging equipment could increase the amount and distribution of noxious weeds in the project area.*
- *SENSITIVE PLANTS: Concern was expressed that there may be damage caused to the amount and distribution of sensitive plants in the project area.*

Regulatory Framework

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

- Montana's State Forest Land Management Plan, ARM's 36.11.401 through 36.11.450.

Analysis Areas

Direct and Secondary Effects Analysis Area
The direct, indirect, and cumulative effects for cover types and age classes consider historic conditions from Climatic Section M333c for the Stillwater Unit (*Losensky, 1997*).

The assessment of direct and indirect effects to cover types and age classes, old-growth attributes, timber stand health (insect and disease conditions), forest fuels, and noxious weeds were conducted on the project area.

Cumulative Effects Analysis Area
The cumulative effects analysis area for cover types and age classes, old growth, and timber stand health are based on the Stillwater Unit's administrative area and the cumulative effects for fire regimes and noxious weeds is based on the project area.

The Stillwater Unit administers Stillwater State Forest, Coal Creek State Forest, most of the scattered State lands north of Coal Creek State Forest in Flathead County and the northeastern portion of Lincoln County.

Analysis Methods

The *Forest Management Rules* direct DNRC to promote biodiversity by taking a coarse-filter approach that favors an appropriate mix of stand structures and composition on state lands (ARM 36.11.404). Static ecological parameters, including landtype, climatic section, habitat type, disturbance regime and other unique characteristics influence the forest communities that occur in a given area, and provide a basis for determining and managing for appropriate structures and composition. Dynamic characteristics of forest communities, such as species composition, age-class distribution, cover type, and stand structure, reflect the ecological parameters influencing a site and describe the resulting biodiversity in an area. The described effects of an action on these characteristics explain the contribution of the action toward the goal of promoting biodiversity.

To assess the existing condition of the project area, Stillwater Unit, and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, and Stand Level Inventory (SLI) data were used as well as consultations with other professionals, all of which provided information for the analysis.

The current cover type distribution was compared to DNRC's desired future conditions. The Stillwater SLI, specifically *SLI20190417*, was used to describe current cover types. DNRC's desired future conditions refer to the cover type that DNRC attempts to manage toward in a forest stand. Desired future conditions are determined according to the model described in ARM 36.11.405. This information is available at the Stillwater Unit office in Olney. *SLI20190417* was used to address the cumulative effects on cover type and age-class distributions. The data used for this analysis does not include the lands DNRC acquired in 2018; those lands are currently being inventoried.

Historic age-class distributions described by *Losensky (1997*) for Climatic Section M333C, which represents Upper Flathead Valley, were compared to the current age-class distribution on the Stillwater Unit. SLI20190417 was used for this analysis.

The old-growth amounts and distribution for the Stillwater Unit will utilize the old-growth acres found through *2019 Old Growth Master* and during field verification of this proposed project.

Existing Conditions

Cover Types and Age Classes Existing Condition

Cover type refers to the dominant tree species that currently occupy a forested area. TABLE V-1 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVER TYPES ON BEAVER-TO-BOYLE PROJECT AREA (BY PERCENT) and TABLE V-2 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVER TYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT) shows the percentage of the current cover types and the percentages of cover types for the desired future condition.

TABLE V-1 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVER TYPES ON BEAVER-TO-BOYLE PROJECT AREA (BY PERCENT)

Cover Type	Current Condition		Desired Future Condition	
	Acres	Percent	Acres	Percent
Douglas-Fir	363	11%	0	0%
Lodgepole pine	60	2%	8	0%
Mixed conifer	188	6%	51	2%
Western larch/Douglas-fir	2459	74%	2855	86%
Western white pine	39	1%	16	0%
Ponderosa pine	0	0%	179	5%
Non-stocked	219	7%	219	7%
Total	**3328**		**3328**	

TABLE V-1 shows that the project area should be mostly represented by the western larch/Douglas-fir cover type and that cover type is currently slightly underrepresented. This table is also showing an overrepresentation of predominately Douglas-fir types and slightly underrepresented in the ponderosa pine cover type within the project area.

TABLE V-2 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVER TYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)

COVER TYPE	CURRENT COVER TYPE (percent)	DESIRED FUTURE CONDITION COVER TYPE (percent)
Douglas-fir	4.6	1.6
Subalpine fir	27.7	17.6
Lodgepole pine	13.4	10.2
Ponderosa pine	1.2	1.8
Mixed conifer	24.0	6.4

Western larch/Douglas-fir	25.1	47.2
Western white pine	1.9	14.9
Hardwoods	0.2	0.2

Data indicates, as illustrated by TABLE V-2 (above), that Douglas-fir, subalpine fir, lodgepole pine, and mixed conifer stands are currently overrepresented compared to DNRC's desired future conditions. Many of the species that comprise the mixed-conifer and subalpine cover types are shade-tolerant, and stand structure tends to be multi-storied. The multi-storied structure has resulted, in part, from the in-growth of shade-tolerant trees over time. Therefore, the component of shade-tolerant species increases as the interval between disturbances such as wildfires or timber harvests is lengthened.

The western larch/Douglas-fir and western white pine cover types are currently underrepresented on the forest compared to the desired future condition cover type distribution. Western larch and western white pine are not shade-tolerant and have historically been perpetuated through disturbances such as wildfires as well as harvest operations. These disturbances most often created single and two-storied stands of primarily western larch and Douglas-fir overstories; and western larch, western white pine, and Douglas-fir understories. While western larch is not shade-tolerant, past silvicultural treatments have promoted multistoried western larch/Douglas-fir stands with numerous age classes represented in small groups of trees within larger stands. The white pine blister rust infection has drastically affected the western white pine cover type over several decades by substantially reducing the number of healthy western white pine that occupy the canopy as an overstory dominant species. Additionally, in 1988, a weather event occurred that caused mature western white pine to become susceptible to bark beetle mortality.

Age-class distributions delineate another characteristic important for determining trends on a landscape level. Comparing the entire Stillwater Unit's administrative area with historical data for the Upper Flathead Valley climatic section (*Losensky, 1997*), TABLE V-3 – DISTRIBUTION OF AGE CLASSES shows that Stillwater Unit currently has proportionately less area in the 0-to-39-year (seedling/sapling stands) and 100-to-150-year age classes, and higher proportions of areas in the 40-to-99-year age class. DNRC's *Forest Management Rules* reflect the ecological principle that age-class distributions are not static and are dependent upon disturbances, regardless of whether those disturbances are natural, or implemented by man through silvicultural practices.

TABLE V-3 – DISTRIBUTION OF AGE CLASSES

AGE CLASS	HISTORIC PERCENT IN CLIMATIC SECTION M333C	HISTORIC ESTIMATES OF PERCENT ON STILLWATER UNIT	CURRENT PERCENT
0-to-39-year	36	22.8	16.8
40-to-99-year	13	17.9	35.5
100-to-150-year	22	24.7	19.0
150+-year	29	32.8	28.7

Old Growth Existing Condition

DNRC uses the minimum criteria for number and age of large, live trees and stand basal area as described by Green et al. to identify old-growth stands on State trust lands. In the project area, 270 acres of old-growth; these acres meet medium old-growth attribute levels as defined in DNRC "Full Old Growth Maintenance Index" computer modeling.

The Stillwater State Forest currently has 16,269 acres of old-growth, representing 14.0% of the Stillwater Unit (excluding lands DNRC recently acquired in 2018).

Timber Stand Health Existing Condition

The insects and diseases encountered in the project area commonly infect, infest, and damage the tree species in the area. Armillaria (*Armillaria ostoyae*), pouch fungus (*Cryptoporus volvatus*), quinine conks (*Fomitopsis officinalis*), pini (*Phellinus pini*), western gall rust (*Endrocronartium harknessii*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), and fir engraver (*Scloytus ventralis*) were the most commonly observed. The primary damages observed were stem damages, wind throw, and premature needle cast.

The following insects and diseases have been observed in the project area:

Larch Dwarf Mistletoe – In units Y, I, K, and V, many of the overstory western larch have developed larch dwarf mistletoe infections. This is evident by the presence of dense "brooms" in the lower portion of tree crowns, top-kill in the leader, and swelling on the stems. At this point, most of the mistletoe has not advanced to the point of causing mortality, but vigor and photosynthetic processes are being negatively affected (*Hagle, 2003*).

Douglas-fir Beetles – Damage from Douglas-fir beetles is evident in the older, larger Douglas-fir trees throughout the project area. Pitch streaming from wounds, woodpecker holes, pouch fungus, and red needles in the crown are indicators of mortality caused by this beetle. Warm, dry weather is favorable for insect survival while also causing stress on the trees. These trees may also be pre-disposed to beetle attack because of the existing root diseases (*Hagle, 2003*).

Fir Engraver – Many pockets of densely stocked grand fir exist in the project area, and many of them show evidence of fir engraver attacks. Like the Douglas-fir beetles, fir engravers draw secondary damage from woodpeckers, while turning the canopy completely red. Large patches of bark are also commonly removed from the trunk. Again, warm, dry weather coupled with root diseases may be pre-disposing these trees to insect damage (*Hagle, 2003*).

Armillaria Root Disease – Armillaria is the most common root disease fungus in Douglas-fir, grand fir, and subalpine fir in this region, and has been prevalent in the project area. The root disease causes root, butt, and stem decay, and can pre-dispose trees to insect attack (*Shaw, 1991*). The damage to the tree roots also commonly leads to windthrow (*Hagle, 2003*).

Quinine Conk – This has been found in isolated areas in units K, V, I, and X. The large white conks have been found on western larch and Douglas-fir and indicate that the tree is a complete cull because of brown heart rot in the stem (*Hagle, 2003*).

Western Gall Rust – Western gall rust was evident in the lodgepole stems and branches in the project area, especially in unit H. These galls cause swelling in the infected areas, and can lead to branch weakening, stem breakage, and mortality (*Hagle, 2003*).

Pini – The swollen pini knots with brown fungal growths were observed in small- and large-diameter western larch throughout the project area. Trees infected with pini are decayed a few feet above and below the observed conks. Trees with many conks are considered complete cull (*Hagle, 2003*).

Fire Regimes and Forest Fuels Existing Conditions

The proposed project is located within the Whitefish wildland urban interface and is part of the Community Wildfire Protection Program (CWPP) area, and the amounts and arrangement of forest fuel are critical factors considered for successful engagement by wildland firefighters. Since 1999, approximately 1,020 acres of the project area have been treated to meet Montana's Hazard Reduction Law. An additional 720 acres outside the

area have been treated through timber sales, and 70 acres have been treated on private lands under the CWPP program (*CWPP, 2009*).

Fire regimes across Stillwater Unit are variable. The forest has a mosaic pattern that developed from different fire frequencies and intensities. Areas of frequent fires have produced Douglas-fir and western larch cover types. As the intervals between fires become longer, cover types of shade-tolerant species (Engelmann spruce, subalpine fir, grand fir, western hemlock, and western red cedar) begin to develop. The Stillwater Unit's higher elevations have longer fire-return intervals and the stands tend to be multistoried with a dominant shade-tolerant cover type. Where fire frequencies are short, the stands are open, single-storied, and occasionally, two-storied. With the arrival of aggressive wildfire-suppression efforts, cover types and wildfire frequencies were altered.

Stands of western larch and/or Douglas-fir have become multistoried with shade-tolerant species. Stands that were once open now have a dense understory of predominantly Douglas-fir, grand fir, Engelmann spruce, and subalpine fir. Due to fire-suppression efforts, forest fires are generally smaller, limiting natural fire effects. If a large-scale fire were to occur, many acres could be affected due to ladder fuels, heavy fuel accumulation, and other environmental factors.

In Fire Ecology of Western Montana Habitat Types, Fisher and Bradley described the fire ecology of habitat-type groups in Montana. Fire groups are models that describe existing ecology, potential wildfire responses, and management recommendations for different habitat types in the project area. These fire groups are useful for generalizing existing types of fuels, amounts of fuels, historical role of fire, forest succession, and considerations for forest managers (*Fisher, 1987*).

The fire groups present in the Beaver to Boyle Timber Sale project area are summarized in TABLE V-4 –FIRE REGIME GROUPS WITHIN THE BEAVER TO BOYLE TIMBER SALE HARVEST UNITS.

TABLE V-4 – FIRE REGIME GROUPS WITHIN THE BEAVER TO BOYLE TIMBER SALE PROPOSED HARVEST UNITS

FIRE GROUP	ACRES WITHIN PROPOSED HARVEST UNITS	PERCENT OF PROPOSED HARVEST UNITS	FIRE GROUP DESCRIPTION	RETURN INTERVAL (yrs)	SEVERITY	FUEL LOADING (tons/acre)
11	580	60%	Warm, moist grand fir	50-200	Low to moderate	25
7	180	19%	Cool lodgepole or Douglas-fir	100-500	Moderate to high	18
6	165	17%	Moist Douglas-fir	42	moderate	12
9	29	3%	Moist lower subalpine	128	high	25
4	9	1%	Warm, dry Douglas-fir	5-25	low	11

Description of Fire Groups:

- Fire Group Eleven - In the harvest units, 580 acres are categorized as Fire Group Eleven. This is considered a warm, moist habitat type dominated by grand fir. Because of the "relatively heavy load of twigs and small branch wood", this fire group is characterized by higher than average fuel loads, compared to other fire groups. Under normal temperature and moisture conditions, the fire hazard is normally low to

moderate. Fire severity for this fire group varies from minor-ground fire to stand-replacement fire (*Fisher, 1987*). In the project area, these stands are highly variable. Some stands are open western larch overstories with larch saplings in the understory, while some are western larch/Douglas-fir overstories with very densely stocked shade-tolerant species in the understory.

- Fire Group Seven – This group makes up 180 acres of the harvest units. With a longer return interval of 100 to 500 years, this cool lodgepole/Douglas-fir type has an average of 18 tons per acre accumulation of dead and downed fuel loading. The moderate to high potential severity of Fire Group Seven makes it a priority concern for wildfire risk during periods of drought or extreme fire weather conditions. In the project area, these acres are generally western larch/Douglas fir overstories with densely stocked shade tolerant species in the understories.

- Fire Group Six – The 165 acres in Fire Group Six are characterized by an absence of dense understory, although some fuel is present due to breakage, blowdown, and other forest health issues. For this Fire Group, stands with dense understories pose the most hazardous wildfire threat. These conditions occur throughout the harvest units in the project area.

- Fire Group Nine – Although there are fewer acres in Fire Group Nine, it represents the most severe risk of wildfire in the project area. In the absence of periodic low- to moderate severity fire, the stands in this Fire Group trend toward a densely-stocked, shade-tolerant subalpine fir and Engelmann spruce understory. In the project area, these conditions are replicated wherever Fire Group Nine has been identified.

- Fire Group Four – Traditionally, the understory ingrowth has been prevented by the occurrence of frequent fires. Where fire has been excluded, seedlings grow into the understory, creating conditions favorable for ladder fuels. Fire Group Four exists in only one unit of the project area and shows the beginning stages of understory ingrowth.
-

Noxious Weeds Existing Conditions

Montana Law (MCA 7-22-2101) defines noxious weeds as, “any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities”. Throughout the project area, weeds listed in TABLE V-5- NOXIOUS WEEDS IN BEAVER TO BOYLE PROJECT AREA have been identified in roadsides, old skid trails, previously used landings, and other areas where soil had been disturbed. Currently, the primary vectors for noxious weeds are vehicle traffic, human and pet traffic on trails, illegal motorized access, and railroad traffic (in the Boyle Lake sections).

TABLE V-5 - NOXIOUS WEEDS IN BEAVER TO BOYLE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	WEED PRIORITY
orange hawkweed	*Hieracium aurantiacum*	2A
tansy ragwort	*Senecio jacobea*	2A
spotted knapweed	*Centraurea maculosa*	2B
St. Johnswort	*Hypericum perforatum*	2B
oxeye daisy	*Leucanthemum vulgare*	2B
common tansy	*Tanacetum vulgare*	2B
Canada thistle	*Cirsium arvense*	2B
hound’s-tongue	*Cynoglossum officinale*	2B

- Weed Priority 2A – These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant (*MFG, 2019*).

- Weed Priority 2B – These weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant (*MFG, 2019*).

Sensitive Plants Existing Condition

Montana Natural Heritage Database identified that the species of concern listed in TABLE V-6- SPECIES OF CONCERN IN BEAVER TO BOYLE PROJECT AREA may occur in the project area.

TABLE V-6- SPECIES OF CONCERN IN BEAVER TO BOYLE PROJECT AREA

SCIENTIFIC NAME	COMMON NAME	MT STATE RANK	HABITAT
Dryopteris cristata	crested shieldfern	S3	Wetland/Riparian
Bidens beckii	Beck water-marigold	S2	Aquatic
Castilleja covilleana	Coville Indian Paintbrush	S3	Subalpine slopes
Lobelia kalmii	Kalm's Lobelia	S3	
Rubus arcticus	nagoonberry	S2	
Carex chordorrhiza	creeping sedge	S3	Wetland/Riparian
Epipactis gigantea	giant helleborine	S2/S3	Wetland/Riparian
Eriophorum gracile	slender cottongrass	S3	Fens
Lobaria hallii	gray lungwort lichen	S2	

Montana State Rank Definitions	
S2	At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.
S3	Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.

None of these Species of Concern (SOC) or Potential SOCs were identified in the proposed harvest units during project reconnaissance. These SOCs were not identified in the Plant Survey conducted in 1998 (*Vanderhorst, 1998*). If any are confirmed, timber harvest would be postponed in that specific area would be postponed until risk to any SOCs can be evaluated (*MTNHP, 2017*). No additional analysis will be conducted.

Environmental Effects

COVER TYPES AND AGE CLASSES

Direct and Indirect Effects of the No-Action Alternative to Cover Types and Age Classes

Neither cover types nor age-class distributions in the analysis area would be directly or indirectly affected. Over time, lacking substantial disturbances such as timber harvests or wildfires, the proportion of seedling/sapling-sized stands would gradually decrease, and proportions of older age classes would increase.

Direct and Indirect Effects of the Action Alternative to Cover Types and Age Classes

Within the areas where treatment is proposed, the following results in cover type and age class would be expected:

- 68.1 acres of mixed conifer would be converted to the western larch/Douglas-fir cover type.
- 7.3 acres of western larch/Douglas-fir would be converted to the western white pine cover type.
- 1.5 acres would be converted from lodgepole pine to western larch/Douglas-fir.
- 886.0 acres would have no change in cover type.

The overall trend with the Action Alternative would continue to move stands towards the desired cover types of western white pine and western larch/Douglas fir through harvest treatments and future forest improvement projects within proposed harvest units.

The primary changes to age class would occur in the OSR and ST harvest units. The Action Alternative would cause:

- an increase of 257.7 acres in the 0-to-39-year age class in the western larch/Douglas-fir cover type from the 133 acres harvested with OSR treatments and 124.7 acres from ST treatments,
- a 60.3 acre decrease in the 40-99 year age class,
- an 86 acre decrease in the 100-149 year age class, and
- a 111.3 acre decrease in the 150+ year age class.

Cumulative Effects of the No-Action and Action Alternatives to Cover Types and Age Classes

The No-Action Alternative would change neither the cover type nor the age-class distribution.

The cumulative effects of timber-stand management and wildfire on Stillwater Unit trend toward increasing seral cover types in areas where recent forest-management activities and fires have taken place. This project would be additive to that trend. Over the years timber sale projects have been implemented to increase the amount of the western larch/Douglas-fir cover type across the analysis area which is Stillwater Unit's administrative jurisdiction. This has reduced acreage in the mixed-conifer and subalpine fir cover types. Stillwater Unit also has a precommercial thinning program that often favors the retention of western larch and western white pine saplings. In some cases, this changes a mixed-conifer cover type to a western larch or western white pine cover type.

OLD GROWTH

In the project area, 269.7 acres meet the minimum criteria to be classified as old growth according to DNRC's old-growth definition described in ARM 36.11.403(48). On the Stillwater Unit 16,269 total acres are identified as old-growth or 14.1% of the Stillwater Unit meets the old-growth criteria (excluding those lands acquired in 2018).

Direct and Indirect Effects of the No-Action Alternative to Old Growth

Under the No-Action Alternative, trees would not be harvested from the old-growth acres. This would have no effect on old-growth distribution since no old-growth acres would be treated, although the existing pockets of insect damage and disease would persist. The No-Action Alternative would allow the existing stand to continue to mature toward the climax forest type, promoting more shade-tolerant trees in all canopy layers. Volume and tree growth, as well as disease and insect damage would continue.

Direct and Indirect Effects of the Action Alternative to Old Growth

Under the Action Alternative, 42.6 old-growth acres would be treated with an old-growth maintenance treatment and would take these acres from medium to low old-growth attribute levels. In the old-growth acres

proposed for Old-growth maintenance harvest, insect damage, wind throw, and root rot are prevalent throughout, especially in the shade-tolerant species.
More than 10 large-diameter trees would be retained, snag amounts may be reduced, and amounts of downed-woody debris may be increased. Overall, this treatment would retain old-growth attributes of the stands while removing patches of existing shade-tolerant species.
This treatment would maintain the multi-storied, multi-aged characteristics of the stands while creating opportunity for regeneration through shade-tolerant species removal. This would also reduce resource competition for the remaining trees.

Old-growth removal would be implemented on portions of five other harvest units. These portions, totaling 23.0 acres, would be harvested resulting in conditions that do not meet minimum old-growth characteristics.

Cumulative Effects of the No-Action to Old Growth

The No-Action Alternative would not remove any portion of any old-growth stand. Volume growth, insect and disease damage, and wind throw would continue, which would increase fuel loading in the understory. Shade-tolerant species would continue to grow into the understory as well, increasing the ladder fuel component of the stands.

Cumulative Effects of the Action to Old Growth

Under the Action Alternative, 23.0 acres would be removed from the old-growth acres on Stillwater Unit, and 42.6 acres would be moved from medium Full Old Growth Index (FOGI) to low FOGI. These acres represent 0.02% of Stillwater Unit's total old-growth acres. Old Growth would be reduced to 14.0% on the Stillwater Unit.

TIMBER STAND HEALTH

Direct and Indirect Effects of the No-Action Alternative to Timber Stand Health

In general, insect populations would continue to rise or fall based on natural disturbances or climatic conditions. As mortality and stem decay occurs in the project area, there would be loss of sawlog volume and value. Shade-tolerant species would continue to be susceptible to western spruce budworm possibly causing a loss of sawlog volume and value for the Trusts and increasing the potential of a wildfire within the stands. Diseases and parasites such as Armillaria root rot and dwarf mistletoe would continue to exist and may increase in susceptible species. White pine populations would continue to die from white pine blister rust until possibly disappearing from the area altogether.

Direct and Indirect Effects of the Action Alternative to Timber Stand Health

Mortality from some insects and diseases that are currently active in the project area would likely continue, but the amount would decrease as: a) tree species susceptible to current insect and disease infestations are reduced; and, b) tree species with higher disease resistance are regenerated. Harvest treatments would target those species or individuals affected by insects and diseases, as well as salvage of recently killed trees.

Individual larch trees heavily infected with dwarf mistletoe would be harvested. This would result in the reduced spread of mistletoe and improved vigor of the residual stands, and increased resources for individual trees to live with or possibly resist mistletoe infection.

Trees heavily affected by stem rots or insect damage would be retained for wildlife snags or snag recruitment trees.

Lodgepole pines infected with gall rusts would be harvested or thinned out to reduce density and increase species diversity.

In areas within and near pockets of root disease, uninfected trees of species susceptible to root disease could be put at greater risk for infection. Root diseases are known to intensify post-harvest in infected areas as stumps and residual roots are colonized. To limit the further spread of root disease in and adjacent to infected areas soil compaction and disturbance would be limited. Species with known resistance and/or tolerance of infection such as western larch and ponderosa pine would be the preferred species for leave tree retention and regeneration. Residual stand composition (post-harvest) would be less than 30% total composition in susceptible species such as Douglas-fir, grand fir and subalpine fir.

Cumulative Effects of the No-Action Alternative to Timber Stand Health

In the project area no harvesting of live, dead, dying, or high-risk trees would occur. Some salvage harvesting of insect-infested and disease-infected trees may occur under a separate environmental review document if a salvage permit is requested. Incidence of dwarf mistletoe would likely increase, infecting increasing numbers of western larch through seed dispersion from the larger dominant trees to the saplings and intermediate story trees. Stands would continue to be susceptible to infestation and infection, thereby increasing the potential for mortality in all canopy layers.

Cumulative Effects of the Action Alternative to Timber Stand Health

On the Stillwater Unit, silvicultural prescriptions have generally been implemented that would reduce losses and recover mortality caused by insects and disease. This project would create forest stands that are more resilient to the impacts of insects and disease and are more in-line with desired forest conditions. This would be achieved by reducing stocking density, increasing vigor, promoting the regeneration of western larch, western white pine, ponderosa pine and Douglas-fir.

FIRE REGIMES & FOREST FUELS

Direct and Indirect Effects of the No-Action Alternative to Fire Regimes and Forest Fuels

In the short term, stands would retain current density, fuel load, and ladder fuels, until a prescribed or natural disturbance occurs. Risk of torching and crown fires would remain high. Over time, increased fuel loading would be expected to increase the risk and intensity of fires as described above.

Direct and Indirect Effects of the Action Alternative to Fire Regimes and Forest Fuels

Although the potential for ignition would continue to exist following treatment, ladder fuels to crowns would be removed in the proposed harvest units, and fuel treatments would limit the fire intensity under most circumstances. The success of aerial-and ground-attack on wildfires would potentially be improved because fires would most likely burn through and remain in the understory, rather than climbing into the overstory and moving through the upper canopy.

Areas treated with the regeneration treatments would emulate a mixed-severity or a stand-replacement fire without the risk of burning the seed trees of desired seral species or overheating the soil. Approximately 5-20 tons of large woody debris per acre would be retained following site-preparation treatments.

During initial design and development for this timber sale project, harvest units were intentionally aligned to create a fuel break with a north-to-south oriented longitudinal axis along the west side of Whitefish Lake. This fuel break specifically aligns with the protection zone established by Flathead County and Whitefish Community Wildfire Protection Plan (2009).

Cumulative Effects of the No-Action Alternative to Fire Regimes and Forest Fuels

Forest succession and fire suppression efforts would continue. If high to extreme fire weather occurs in this area, the present levels of fuel-loading and fuel-continuity would likely create conditions favorable for wildfire. Wildfires that occur in this area have the potential to be stand-replacing events and difficult to suppress.

Cumulative Effects of the Action Alternative to Fire Regimes and Forest Fuels

Natural stand development, past timber sales, and wildfires have created the current vegetative mosaic in this area. These mosaics break up the continuity of fuels and behave as fire breaks. Maintaining an age-class mosaic, in conjunction with proposed fuel-treatment projects, would reduce the potential of high-intensity wildfires.

NOXIOUS WEEDS

Direct and Indirect Effects of the No-Action Alternative to Noxious Weeds

Additional mineral soil would not be exposed, and heavy tree canopies would continue to compete with weeds. The risk of additional weed population establishment would not increase. Established infestations of noxious weeds would continue to be treated with an ongoing program of site-specific herbicide spraying along roads, trails, trailheads, and in small areas of infestation.

Direct and Indirect Effects of the Action Alternative to Noxious Weeds

The proposed activities would result in an increase in ground disturbance. Mechanized equipment and ground disturbance could increase or introduce noxious weeds along roads and throughout forested areas. Weed seeds are likely to be scattered throughout the forested areas, and the reduction of canopy and disturbance from the timber-harvesting activities are expected to provide the catalyst for spread. Mitigation measures to reduce the establishment or spread of weed seed would include:

- Pressure-washing of all equipment used in road construction and off-road logging activity
- Sowing grass seed on temporary roads after harvesting has been completed, and
- Applying herbicide along roadsides, landings, and any identified weed outbreaks.

Cumulative Effects of both Alternatives to Noxious Weeds

The open roads in the project area receive regular traffic from dispersed recreation and other management activities. These disturbances, coupled with illegal motorized use, increase exposure to weed establishment. The weed management program at Stillwater Unit, in cooperation with the USFS and weed departments of Flathead and Lincoln counties, has improved over time and more weed control is taking place. The City of Whitefish, in conjunction with Whitefish Legacy Partners, has also assisted in the successful implementation of this weed-control program, as they monitor and treat noxious weeds on trails and in trailhead areas.

Cumulative Effects of the No-Action Alternatives to Noxious Weeds

Under the No Action Alternative, a limited number of noxious weed populations on restricted roads would not receive herbicide treatment. The spread of existing weed populations would continue, and establishment of weeds on currently uninfected areas that are located away from open roads would continue.

Cumulative Effects of the Action Alternative to Noxious Weeds

All haul roads on State land in the project area would be treated by spraying for weeds, either under this specific project or as part of the Stillwater Unit annual weed spraying program. The weed spraying would help

slow the rate of spread of existing weed populations and minimize establishment of weeds on currently uninfected areas that are located away from open roads.

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Appendix B – Soils Analysis

Beaver to Boyle Timber Sale – Soils Analysis

Analysis Prepared By:
Name: Marc Vessar
Title: Forest Hydrologist, Montana DNRC

Introduction

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

Issues and Measurement Criteria

- *Timber harvesting activities may result in reduced soil productivity and increased erosion due to compaction and displacement.*
- *Removal of both coarse and fine woody material off site during timber harvest operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.*

Methods for disclosing impacts include using general soil descriptions and the management limitations for each landtype. ***Landtype*** refers to a unit of land with similar designated soil, vegetation, geology, topography, climate, and drainage. This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative, using insight from previously collected soils-monitoring data from over 70 DNRC postharvest monitoring projects.

While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

Regulatory Framework

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

- Administrative Rules of Montana (Forest Management Rules)
- Forestry Best Management Practices

Analysis Areas

Direct, Secondary and Cumulative Effects Analysis Area
The project area for this proposal includes approximately 3,328 acres. Within the project area are 4 individual landtypes; however, only 3 of these landtypes have proposed units for timber-harvesting activities, which includes road construction, reconstruction, or obliteration. The analysis area for soil impacts will be the area within harvest units and where proposed road activities would take place. This analysis area will adequately allow for disclosure of existing conditions and direct, indirect, and cumulative impacts. This analysis also looks at cumulative effects for the entire project area.

Analysis Methods

Methods for disclosing impacts include using general soil descriptions and the management limitations for each landtype. *Landtype* refers to a unit of land with similar designated soil, vegetation, geology, topography, climate, and drainage. This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative, using insight from previously collected soils-monitoring data from over 70 DNRC postharvest monitoring projects.

If the Action Alternative is selected, recommendations based upon scientific literature as required by ARM 36.11.414 (2) will assist in developing contract requirements and mitigation measures necessary to ensure post-project levels of coarse woody debris (CWD) adequately meet the recommendations of relevant literature, primarily Graham et al (1994). Fine woody material will be addressed solely through contract language that minimized removal (ARM 36.11.410).

While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

Existing Conditions

Geology
Stillwater State Forest, like much of northwest Montana, are dominated by bedrock consisting of metasedimentary rocks from the Proterozoic age. Rocks in this formation are generally comprised of argillites, quartzites, and siltites. Surface deposits of glacial till, outwash, and lacustrine sediments can be found throughout the area. Overlying these sediments is a layer of loess that has been influenced by volcanic ash deposited and redeposited from Mount Mazama approximately 6,700 years ago (Martinson and Basko 1998).

Physical Disturbance (Compaction, Erosion and Displacement)
DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15 percent or less of a harvest area, as noted in the *SFLMP* (DNRC 1996). As a recommended goal, if existing detrimental soil effects exceed 15 percent of an area, proposed harvesting should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20 percent should avoid any additional impacts and include restoration treatments, as feasible, based on site-specific evaluation and plans.

Past monitoring on DNRC timber sales from 1988 to 2006 has shown an average of 13.1-percent soil impacts across all parent materials for ground-based harvesting and 6.8 percent on skyline yarding locations. The majority of soils in the project area are comprised of cobbly and/or gravelly silty loams from glacial till. Stratifying the results by texture similar to the majority of the proposed harvesting shows an average of approximately 14.7 percent of the harvest areas impacted by displacement and severe compaction (DNRC 2011).

When winter harvesting is implemented on these areas, the impacts are typically less than summer operations due to frozen soils being more difficult to compact or displace. Winter harvesting operations on similar soils shows an average of 12.3 percent of the harvest area impacted by displacement or severe compaction (DNRC 2011).

Cumulative effects from past and current uses on the proposed harvest units are limited, although evidence of selective or salvage actions is present in some of the proposed harvest units. In addition, stands adjacent to proposed harvest areas have been entered in the past. During field reconnaissance, it was noted that impacts in these areas are limited to a few skid trails and roads.

Past harvesting operations in the project area started around 1913 with primarily harvests for making railroad ties. Since that time, harvesting has continued with a variety of harvest types, from clearcuts to thinnings.

Smaller forest-product removals include small salvage harvests; post-and-pole harvests; firewood gathering, and individual Christmas tree harvesting throughout the last 80-plus years.

Nearly all of DNRC-managed land in the project area has been harvested since logging first started in 1913. While some of these skid trails and roads are still discernable, vegetation similar to the surrounding vegetation is generally present and growing. Through the freeze-thaw cycles and root-mass penetration of the soil, impacts from past entries are substantially reduced. Adverse compaction and displacement impacts from past logging, roads and trails are estimated to cover less than 10 percent of the project area.

Table S3 – Soil Map Unit Description

Map Unit	Description	Acres	Analysis Area	Landtype Description	Compaction Hazard	Erosion Hazard	Displacement Hazard
14-3	Broad stream bottoms and depressions on terraces/moraines 0-5% slopes	30	3.3%	Soils in this landtpe are generally over silty glacial lake sediments. Vegetation supported is a mixed forest of subalpine fir, Engelman spruce and lodgepole pine over grass and shrubs.	H	M	L
23-8	Glaciated mountain slopes. 20- to 40-percent slopes	857	96.6%	Soils of this landtype are formed in glacial till. Vegetation found ranges from a moist, mixed forest to a dry, mixed forest.	M	M	M
27-7	Kettles, kames, terraces 10- to 20-percent slopes	<1	<0.1%	Cobbly, sandy, glacial till sorted by meltwater, but not stratified, underlies a surface loess influenced by 2 to 10 inches of volcanic ash. Vegetation consists of Douglas-fir, ponderosa pine, subalpine fir, lodgepole pine, and western larch over an understory dominated by low shrubs.	M	M	M

Nutrient Cycling and Soil Productivity

Coarse and fine woody debris provide a crucial component in forested environments through nutrient cycling, microbial habitat, moisture retention and protection from mineral soil erosion. (Harmon et. al., 1986). Fine woody debris, typically the branches and foliage, contain most of the macronutrients in forest stands. Harrington and Kirkland found higher levels of nitrogen, carbon and other important macronutrients on sites where debris was retained compared to sites where most of the debris is removed (Harrington and Kirkland 2012). While coarse woody debris decays at various rates due to local climatic conditions, the advanced stages of decay contain many nutrients and holds substantial amounts of moisture for vegetation during dry periods (Wicklow et. al. 1973). Forest management can affect the volumes of fine and coarse woody debris through timber harvesting and result in changes to the available nutrients for long term forest production.

Recommendations for CWD by habitat type can be found in Managing Coarse Woody Debris in Forests of the Rocky Mountains (Graham et. al., 1994). Subalpine fir habitat types are generally recommended to retain coarse woody debris in the range of 7 to 24.5 tons per acre to maintain forest productivity; Douglas fir habitat types are recommended to maintain 5-13 tons per acre and grand fir habitat types are recommended to retain 7 to 14 tons per acre.

Environmental Effects

No Action Alternative: Direct, Secondary, and Cumulative Effects

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

Action Alternative: Direct, Secondary, and Cumulative Effects

Geology

Direct and Secondary & Cumulative

The geology would remain similar to those described in the existing conditions sections of this environmental assessment.

Physical Disturbance (Compaction, Erosion and Displacement)

Direct and Secondary

To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. *ARM 36.11.422 (2)* and *(2)(a)* state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure that the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the BMPs listed in the "Soils Mitigation" section below are considered appropriate and, therefore, would be implemented during harvesting operations.

Considering data from the *DNRC SOIL MONITORING REPORT* (DNRC 2011), the implementation of Forestry BMPs has resulted in less risk of detrimental soil impacts from erosion, displacement, and severe compaction. While the report noted that the impacts were more likely on the fine-textured soils and steep slopes, reduced soil productivity due to compaction and displacement may occur on coarser parent materials similar to those found in the analysis area. Also, the greatest impacts were noted where harvesting implementation departed from BMPs, such as steep slope ground-based skidding.

Comparing the soil type map, field reconnaissance notes and topographic map features with the proposed harvest unit map indicates that under this alternative ground-based skidding would occur on a majority of the proposed harvest areas. The extent of impacts expected would likely be similar to harvest areas monitored by DNRC and reported in the monitoring report or approximately 14.7 percent of the harvest area on ground-based harvest units and 6.8 percent on skyline yarding locations (DNRC 2011).

In addition to the proposed timber harvest, approximately 75.9 acres of precommercial thinning outside of proposed harvest units would implemented. The thinning would be accomplished either by masticator or chainsaw. All soil mitigations listed below would apply to this activity; due to the limited trafficking by heavy equipment that *may* occur, the impacts from this activity would be low.

Cumulative

Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the *SFLMP*) through implementation of BMPs, skid-trail planning on tractor units, and limiting operations to dry or frozen conditions. Future harvesting opportunities would likely use the same road system, skid trails, and landing sites to reduce additional cumulative impacts.

Table S4 – Detrimental Soil Disturbance for the Action Alternative

Area of Analysis	Total Area (Acres)	Disturbance Rate (%)	Affected Area (Acres)
Ground-based harvest area (including landings)	834.7 (872.1 – 37.4 acres of equipment restriction)	14.7	122.7
Cable yarding	15	6.8	1.0
Roads *	1.2	100	1.2

* assumes a disturbance width of 25 feet for 0.4 miles of temporary road

Nutrient Cycling

Direct, Secondary and Cumulative

Coarse woody debris would be left on-site in volumes recommended to help maintain soil moisture and forest productivity, generally in the 10 to 20 tons per acre range for habitat types found in the harvest

locations (Graham et. al. 1994). Because coarse woody debris would be left on site in amounts recommended by scientific literature, benefits to nutrient cycling and forest productivity would be maintained over the long term. However, removal of fine material may result in reduced soil macronutrients and tree productivity (Harrington and Kirkland 2012).

Soils Mitigations

1) Limit equipment operations to periods when soils are relatively dry, (less than 20 percent), frozen, or snow-covered to minimize soil compaction and rutting and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
2) On ground-based units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw-bottom trails) would not be used without additional mitigation and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.
3) Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive erosion. Based on site review, short, steep slopes above incised draws may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline skidding from the more moderate slopes of less than 40 percent.
4) Keep skid trails to 20 percent or less of the harvest-area acreage. Provide for drainage in skid trails and roads concurrently with operations.
5) Slash disposal - Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.
6) Retain 10 to 20 tons of large woody debris and a majority of all fine litter feasible following harvesting. On units where whole-tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute in the harvest area; or 3) cut tops from every third bundle of logs so tops are dispersed as skidding progresses. Sites near private property, trail system and open roads would have less large woody debris and fine litter left to reduce fire hazards.

SOILS REFERENCES

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Appendix C –Water & Fisheries Resource Analysis

Beaver to Boyle Timber Sale – Water Resources Analysis

Analysis Prepared By:
Name: Marc Vessar
Title: Forest Hydrologist, Montana DNRC

Introduction

The following analysis will disclose anticipated effects to water resources within the Beaver to Boyle Timber Sale project area. Direct, secondary, and cumulative effects to water resources of both the No-Action and Action alternatives will be analyzed.

Issues and Measurement Criteria

- Timber harvesting and road construction activities have the potential to increase water yield, which may affect stream channel stability.
- Timber harvesting and road construction activities may increase sediment delivery into streams/lakes and affect water quality.
- Timber harvesting activities may adversely affect fish habitat parameters of large woody debris, stream shading, and stream temperature.
- Stream connectivity may be adversely impacted by barriers at stream crossings.

Regulatory Framework

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

WATER-QUALITY STANDARDS

The portion of the project area within the Whitefish Lake and tributary watersheds, is classified as A-1 by the State of Montana DEQ, as stated in ARM 17.30.608. The water-quality standards for protecting beneficial uses in A-1 classified watersheds are delineated in ARM 17.30.622. Water in A-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment for naturally present impurities; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life; waterfowl and furbearers; and agricultural and industrial water supply.

The portion of the project area within the Stillwater River and its tributary watersheds is classified as B-1 by the State of Montana DEQ, as stated in ARM 17.30.608. The water-quality standards for protecting beneficial uses in B-1 classified watersheds are in ARM 17.30.623. Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

State water-quality regulations limit any increase in sediment above naturally occurring concentration in water classified A-1 or B-1. Naturally occurring “means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied” (ARM 17.30.602 [19]). Reasonable land, soil, and water conservation practices include “methods, measures or practices that protect present and reasonably anticipated beneficial uses…”

(ARM 17.30.602 [25]). The State of Montana has adopted BMPs through its nonpoint source management plan as the principle means of meeting Water Quality Standards (DEQ, 2017).

WATER QUALITY LIMITED WATERBODIES

The 303(d) list is compiled by DEQ as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify waterbodies that do not fully meet water-quality standards, or where beneficial uses are threatened or impaired. Within the project area, none of the waterbodies are listed as "water-quality-limited waterbodies" in the 2018 303(d) list. However, Whitefish Lake is listed on the 2018 303(d) list as threatened for aquatic life support. The probable causes of impairment are listed as mercury and polychlorinated biphenyls (PCBs), although the probable source of impairments is "unknown".

STREAMSIDE MANAGEMENT ZONE LAW

All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35 percent. An SMZ width of 50 feet is required when the slope is less than 35 percent. Alternative practices that deviate from the SMZ law are allowed with appropriate environmental review and documentation.

WATER RIGHTS AND BENEFICIAL USERS

Surface water rights exist within 3 miles downstream of the project area for fish and wildlife propagation, lawn and garden use, industrial use, stock watering, domestic use, and irrigation uses.

Analysis Areas

The analysis areas will be organized by watershed. Ideally, a 6th Hydrologic Unit Code (HUC) would be utilized, but due to the various lakes that have no outlet in the project area, smaller watersheds will be used. These will include (1) Beaver Lake, (2) Boyle Lake, (3) Murray Lake, (4) Woods Lake and (5) unnamed tributary to Stillwater River. Additionally, Lazy Creek 6th code HUC will be used.

The analysis area for sediment delivery is limited to harvest units and the roads used for hauling. This includes upland sources of sediment that could result from this project. In addition, in-channel sources of sediment, such as mass wasting locations or excessive scour/deposition, will be discussed for any identified streams near proposed harvest units.

WATER YIELD AND CUMULATIVE EFFECTS

Water yield and cumulative effects analysis areas will be the same as used for direct and indirect effects. Although this will not consistently be on a 6th code HUC scale, this organization is due to the disconnected drainages within the Beaver Lakes 6th code watershed area.

FISHERIES HABITAT PARAMETERS

The analysis area for fisheries-habitat parameters is the proposed harvest units immediately adjacent to fish-bearing streams and lakes.

Analysis Methods

These issues can best be evaluated by 1) analyzing the anticipated effects of sediment delivery and water yield on the water quality of streams in the project area, and by 2) assessing the level of riparian harvesting and the potential risk of changing fisheries habitat parameters.

The ENVIRONMENTAL EFFECTS section discloses the anticipated direct, indirect, and cumulative effects to water resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships in each analysis area have been considered for the cumulative-effects analysis.

The primary concerns relating to aquatic resources in the analysis area are potential impacts to water quality from sources outside the channel. To address these issues, the following parameters are analyzed by alternative:

- miles of new road construction and road improvements
- potential for sediment delivery to streams
- increases in ECA and/or annual water yield. This will be addressed using quantitative and qualitative assessments.
- increases or decreases in fish habitat parameters

Existing Conditions

General Description

Beaver Lake Watershed

The Beaver Lake watershed is approximately 1,564 acres and includes Beaver Lake, Little Beaver Lake and Dollar Lake. Ownership is primarily State of Montana Trust Lands (60%) followed by private ownership (39.8%) and approximately 0.2% Flathead National Forest. Annual estimated precipitation is 20-30 inches per year. Streams found within the watershed generally flow less than six months of the calendar year.

Beaver Lake is stocked with rainbow trout and kokanee salmon although eastern brook trout, redside shiner, and yellow perch also inhabit the lake. Little Beaver Lake is stocked with rainbow trout; Dollar Lake has been historically stocked with westslope cutthroat trout and rainbow trout, although more recently only westslope cutthroat trout have been stocked.

Boyle Lake Watershed

The Boyle Lake watershed is 3,695 acres and includes all lands contributing runoff to the lake and its outlet stream which contributes flow to the Stillwater River. Ownership is primarily private (59%) with the remaining 41% owned by the State of Montana. Precipitation is estimated to be 20-30 inches per year.

Boyle Lake is a perennial, fish-bearing lake with several unnamed tributaries that historically likely contributed surface flow. However, due to the location of the railroad on the south side of the lake, surface water in several tributaries is somewhat disconnected from the lake. During field review, the culvert under the railroad tracks did not appear to have been accessed by streams on the south side of the tracks in the recent past.

These streams on the south side of the railroad tracks are generally Class II streams that do not contain fish but contribute surface water to a man-made ditch adjacent to the tracks. Due to the short period of surface flow, these streams do not provide fish habitat.

Boyle Lake contains rainbow trout, largemouth bass, northern pike and pumpkinseed. Yellow perch are also suspected in this lake.

Murray Lake Watershed

The Murray Lake watershed is approximately 615 acres and includes Murray and Rainbow lakes. Ownership is nearly all State of Montana Trust Lands; approximately 5 acres are in private ownership. Annual estimated precipitation is 20-30 inches per year. No streams were identified in this watershed during field reconnaissance.

Murray Lake contains both westslope cutthroat trout and rainbow trout as a result of historical stocking. Recent fish stocking has been only rainbow trout.

Woods Lake Watershed

The Woods Lake watershed is approximately 237 acres. Ownership is nearly all State of Montana Trust Lands; approximately 11 acres are in private ownership. Annual estimated precipitation is 20-30 inches per year. No streams were identified in this watershed during field reconnaissance.

Woods Lake is stocked annually with rainbow trout. However, due to its shallow depths, periodically has winter kill of fish.

Unnamed Tributary to Stillwater River Watershed

This watershed is approximately 1,951 acres in size. Ownership is dominated by non-industrial private (79.8%) followed by State of Montana Trust Lands (21.2%). Annual estimated precipitation is 20-30 inches per year.

This ephemeral stream drains a small portion of the project area although no scoured streams were found on the DNRC-managed lands during field review. Due to the ephemeral nature of the channel, this tributary likely does not support fish.

Lazy Creek Watershed

Lazy Creek is the main channel of a 10,430-acre watershed that contributes surface flow to Whitefish Lake. Annual precipitation in the watershed ranges from 20 to 30 inches. The elevation ranges from 3,000 feet above sea level at the mouth of the creek at Whitefish Lake to approximately 4,800 feet above sea level at the northern boundary; however most (91%) of the watershed area is below 3,600 feet in elevation. Terrain is generally gentle with slopes predominately less than 40%. Ownership within the watershed is 72.1 percent State of Montana Trust Lands, 18.5 percent industrial lands (Weyerhaeuser), and 9.4 percent in private non-industrial ownership.

Lazy Creek and it three main tributaries—East Fork, Middle Fork and West Fork—all originate on forest lands that were recently acquired by the State of Montana from industrial ownership. This Class 1 stream flows into and through several meadows and wetlands as it flows across State lands for approximately 1.5 miles prior to crossing non-industrial private lands and entering Whitefish Lake.

Eastern brook trout inhabit Lazy Creek.

Water Quality

Sediment Delivery

Streams within the project area are very limited. Field reconnaissance during the 2018 field season verified streams according to the SMZ law. While the USGS topographic maps noted several intermittent streams, the field verification process noted that most of these were only ephemeral draws with no scoured channel. Also, during field reconnaissance, roads within the project area were inventoried for sediment delivery risk. This process included looking at all segments of road and all drainage structures—mainly corrugated metal pipes (CMPs). Due to the limited number of streams in the project area and the design of the current road system, no stream crossings were identified on the proposed haul route. Therefore, the risk of sediment delivery to streams is very low or nonexistent.

Water Quantity

Annual Water Yield

Annual water yield has been modeled for the Beaver Lakes area in the Beaver Lake Final Environmental Impact Statement (DNRC 1999) and the Beaver/Swift/Skyles Timber Sale Project Environmental Assessment (DNRC 2009). Both modelling efforts concluded that the annual water yield increase was well below any threshold of concern. Field reconnaissance of potential stream channels supports the previous assessments. No physical evidence (such as channel scour or erosion) of a substantial increase in annual water yield has been identified for any watershed in the Beaver to Boyle project area.

Fish Habitat Parameters

- *Recruitable Woody Debris*

Large woody debris recruitment to streams is important to maintain channel form and function and as a component of fish habitat. According to ARM 36.11.425, DNRC will establish a RMZ '…when forest management activities are proposed …on sites that are adjacent to fish bearing streams and lakes.' One reason for the RMZs is to retain adequate levels of large woody debris recruitment to the stream channel. Site potential tree height (SPTH) is the method used to identify RMZ width according to ARM 36.11.425 (5). Data collection for site potential tree height near the project area resulted in SPTH of 90 feet.

Using geographic information systems with aerial photography as the background layer, no substantial reduction in recruitable woody debris near fish-bearing streams and lakes was observed. During field reconnaissance, very few stumps or other evidence of timber harvest were apparent in these areas.

Because no RMZ harvest is proposed, neither alternative would alter the amount of recruitable large woody debris near fish-bearing streams and lakes. Therefore, no further analysis of recruitable woody debris is deemed necessary.

- *Stream Temperature Increases*

Because stream shading is generally the biggest factor in maintaining stream temperatures, a qualitative assessment of the existing riparian stream shading was conduct using aerial photos. No substantial reduction in shade-providing forest near fish-bearing streams and lakes was observed.

As described in the Montana DNRC Forested Trust Lands Habitat Conservation Plan Final EIS (USFWS and DNRC 2010), a no-harvest zone of 50 feet immediately adjacent to Class 1 streams (such as Lazy Creeks) is expected to retain a level of stream shading similar to pre-harvest conditions (DNRC 2018). As discussed earlier, no harvest is proposed in the 90-foot RMZ along Lazy Creek or near fish-bearing lakes. Therefore, no change in stream shading is expected from either the No action or Action alternative and further analysis is not considered necessary.

- *Connectivity*

As discussed in the *sediment delivery* section, no stream crossings were identified along the proposed haul route. Therefore, no manmade barriers to fish passage exist on DNRC managed roads within the project area.

Environmental Effects

No Action Alternative: Direct, Secondary, and Cumulative Effects

Water Quality

Direct and Secondary

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

Cumulative

No additional cumulative impacts to water quality would be expected. Sediment delivery sites from roads on the proposed haul routes would remain unchanged.

Water Quantity

Direct and Secondary

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

Cumulative

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

Action Alternative: Direct, Secondary, and Cumulative Effects

Water Quality

Direct and Secondary

Although the project area has several lakes scattered throughout the landscape, scoured stream channels leading to and from those lakes are limited. Regardless of the surface water feature, no SMZ harvest or RMZ harvest is proposed under the action alternative. With no proposed harvest in the SMZ/RMZ of streams or lakes, the risk of sediment delivery to surface water in the project area would be very low.

No sediment sources from roads were identified during the field reconnaissance. Because the action alternative does not propose any new road construction in the SMZ of streams or lake and no new stream crossings are proposed, the risk of sediment delivery to any stream or lake in the project area would be very low.

Cumulative

Due to the limited number of streams and the lack of stream crossings on the proposed haul route, the risk of any cumulative increase in sediment delivery because of the action alternative would be very low.

Water Quantity

Direct and Secondary

The amount and type of harvest in each of the watersheds varies, however the low annual precipitation is consistent across all project watersheds. Table WR-1 displays the harvest acres for each watershed as well as the estimated increase in equivalent clearcut acres.

Table WR- 1: Proposed Harvest in Project Watersheds

Watershed	Acres	Proposed Harvest (acres)	Proposed Thinning (acres)	Estimated ECA increase (acres)
Beaver Lakes	1,564	125.2	4.9	83.9
Boyle Lake	3,695	371.8	25.1	248.2
Murray Lake	615	179.8	22.9	131.8
Woods Lake	237	17.1	0	16.8
Lazy Creek	10,432	100.3	9.1	73.1
Unnamed Stillwater Trib	1,951	92.9	13.9	67.8
Total	--	887.1	75.9	621.6

The proposed timber harvest would increase the ECA by less than 10 percent in all watersheds except the Murray Lake watershed. Due to the limited amount of harvest in the watersheds coupled with the low annual precipitation and lack of scoured stream channels, a low risk of direct or indirect impacts—such as scoured stream channels—would result.

Cumulative

After reviewing the previous environmental analyses for projects that overlap the Beaver-to-Boyle project area (DNRC 1999; DNRC 2009; DNRC 2009a; DNRC 2013), all watersheds were modelled as having annual water yield increases well below the recommended thresholds of concern. Field reconnaissance for all locations identified as potential stream channels within and immediately downslope from proposed harvest units showed no scoured channels. The lack of scoured channels supports previous analyses predictions of low or immeasurable impacts.

Due to the limited amount of harvest in the watersheds coupled with the low annual precipitation and lack of scoured stream channels, a low risk of cumulative impacts from the implementation of this proposal would be expected.

Water Resources Mitigations

Hydrologic related resource mitigations that would be implemented with the proposed Action Alternative include:

- Follow all Forestry BMPs including the Streamside Management Zone Law.

WATER RESOURCES REFERENCES

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Appendix D –Wildlife Analysis

Beaver to Boyle Timber Sale – Wildlife Analysis

Analysis Prepared By:
Name: Chris Forristal
Title: Wildlife Biologist, Montana DNRC

Introduction

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

Issues

- Mature forest cover, old-growth forest and connectivity. The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature and old-growth forest.
- Canada lynx. The proposed activities could result in the modification of habitat preferred by Canada lynx (*Lynx canadensis*) and decrease the area's suitability for lynx.
- Grizzly bears. The proposed activities could alter grizzly bear (*Ursus arctos*) cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.
- Common Loons. The proposed activities could alter shoreline nesting habitat or disturb common loons during the breeding season, which could adversely impact loon reproduction.
- Fishers. The proposed activities could decrease habitat suitability for fishers (*Pekania pennanti*) by decreasing canopy cover in mature forest stands, decreasing abundance of snags and coarse woody debris, and by increasing roads, which could elevate risk of trapping mortality.
- Flammulated Owls. The proposed activities could alter the structure of flammulated owl *(Otus flammeolus)* preferred habitat, which could reduce habitat suitability for flammulated owls.
- Pileated woodpeckers. The proposed activities could reduce tree density and alter the structure of mature forest stands, which could reduce habitat suitability for pileated woodpeckers (*Dryocopus pileatus*).
- Big game. The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, increasing roads in secure areas, and disturbing animals.

Regulatory Framework

The following plans, rules, and practices have guided this project's planning and/or will be implemented during project activities: *DNRC Forest Management Rules, DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan (USFWS and DNRC 2010), the Endangered Species Act, the Migratory Bird Treaty Act,* and the *Bald and Golden Eagle Protection Act.*

Analysis Areas

Direct and Secondary Effects Analysis Area
The direct and indirect effects of the proposed activities on all species/issues were analyzed within the 3,328-acre Project Area (*FIGURE WI-1*), which consists of 3,201 acres of DNRC-managed lands, 107 acres of lakes and 20 acres of private land owned by the Burlington Northern Santa Fe Railroad.

Cumulative Effects Analysis Areas
The cumulative effects of the proposed activities on all species/issues were analyzed at a broad surrounding landscape scale that varies according to the issue or wildlife species being discussed. Cumulative effects analysis areas are named according to the relative size of the area and are summarized in *TABLE WI-1* and *FIGURE WI-1*. Cumulative effects analysis areas (CEAAs) include the Project Area as well as lands managed by other agencies and private landowners. Detailed descriptions of each analysis area are located in the **Affected Environment** section for each issue or wildlife species evaluated (e.g., fisher, pileated woodpecker, etc.). In general, CEAAs were delineated to approximate the size of a focal species' home range or to approximate a surrounding landscape in which the proposed activities could most likely have measurable cumulative effects to wildlife habitat.

Table WI-1 - Wildlife Analysis Areas. *Descriptions of the areas used to analyze the proposed project's effects on wildlife species/issues.*

Analysis Area Name	Description	Total Acres	Issues/Species Analyzed
Project Area	Sections 6,7,8,17,18,19, and 20 of T31N, R22W	3,328	Direct & indirect effects for all issues/species
Small CEAA	The Project Area and sections surrounding it, bordered by US Highway 93 to the west and Whitefish Lake to the east.	11,673	Mature forest cover, old growth & connectivity, common loons, fishers, pileated woodpeckers, flammulated owls
Large CEAA	Lands bordered by US Highway 93 to the west and south; Whitefish Lake, the city of Whitefish, and the crest of the Whitefish Mountain Range to the east; and well-travelled open roads to the north.	46,493	Canada lynx, grizzly bears, big game

Analysis Methods

Analysis methods are based on the DNRC State Forest Land Management Plan, which is designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, USDA Forest Service VMap data, GIS aerial photograph analysis, and consultation with professionals.

The coarse-filter wildlife analysis section includes analyses of the direct, secondary, and cumulative effects of the proposed alternatives on old-growth forest and connectivity of mature forest habitat.

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

Cumulative effects analyses account for known past and current activities, as well as planned future agency actions. Recent projects (≤4 years) that could contribute to cumulative effects are summarized in the following table.

Table WI-2 - RECENT PROJECTS. *Recent projects that could contribute to cumulative effects and the number of harvested or potentially affected acres that occur in each analysis area. Proposed trails are reported in miles.*

Project Name	Agency	Status	Project Area	Small CEAA	Large CEAA
Lupfer Morrill Timber Sale	DNRC	Active 2019-2022			259.3 ac
King East Fork Salvage	DNRC	Active 2019			214.3 ac
Olney Commercial Lease	DNRC	RFP closed, MEPA planning			7.3 ac
Private Driveway Easements	DNRC	Approved, roads unbuilt	0.4 mi	0.4 mi	0.4 mi
Whitefish Trail Close the Loop	DNRC	MEPA complete	3.1 mi	3.9 mi	7.3 mi
Taylor Hellroaring Trails	USFS	Analysis complete			8.2 mi
Taylor Hellroaring Vegetation Management	USFS	Analysis complete			1175.9 ac*

**Includes approximately 414.8 acres of prescribed burning.*

Coarse Filter Wildlife Analysis

Issue

The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature and old-growth forest.

Introduction

A variety of wildlife species rely on older, mature forests to meet some or all of their life history requirements. Mature forests, generally characterized by abundant large-diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipter gentilis*), and winter wrens (*Troglodytes troglodytes*). On nearby lands on the Flathead National Forest, approximately 31 wildlife species associated with old-growth forests have been documented (*Warren 1998*). Of the 48 old-growth associated species occurring in the Northern Rockies, about 60% may require stands larger than 80 acres (*Harger 1978*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, species composition and development. Timber harvest, like wildfire and blowdown, is a disturbance event that often creates open patches of young, early-successional habitat. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forests. In contrast, other wildlife species flourish in early seral habitats created by disturbance.

Connectivity of forest stands under historical fire regimes in the vicinity of the Project Area was likely relatively high as fire differentially burned various habitats across the landscape (*Fischer and Bradley 1987*).

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 11,673-acre Small CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Small CEAA is large enough to support a diversity of species that could use old growth, mature forested habitat, and/or require connected forested habitats. This CEAA centers evaluation of cumulative effects on those areas most likely to be affected by the proposed action.

Measurement Criteria
Mature forested habitat was defined as forest stands with ≥40% canopy cover comprised primarily of trees ≥9 inches dbh. Forested stands containing trees of at least this size and density were considered adequate for providing minimal conditions necessary to facilitate movements of many wildlife species that benefit from well-connected mature forest conditions across the landscape. Old-growth forest patches were identified based upon tree density, age and size characteristics described by Green et al. (1992). Old-growth stands are also considered mature forest if they contain overstory canopy closure ≥40%. Road density was calculated in linear miles per square mile by dividing the number of road miles by the specified analysis area in square miles. Factors considered in the analysis include: 1) availability of mature forested and old-growth habitat (≥40% canopy cover, ≥9 inches dbh), 2) average patch size and abundance of larger old-growth patches (>80 acres), 3) the degree of timber harvesting, 4) open and restricted road density, and 5) the availability of potential travel corridors.

Affected Environment
The Project Area currently contains approximately 1,886 acres (56.7% of Project Area) of mature forest stands that have a reasonably well-developed canopy (≥40% crown closure). Approximately 1,109 acres (33.3% of Project Area) consists of mature stands with a more open canopy (<40% crown closure). Harvesting activities within the last 40 years have resulted in approximately 126 acres (3.8% of Project Area) of younger, regenerating forest within the Project Area. Overall, some level of timber harvest has occurred over 1,146 acres (34.4% of the Project Area) within the last 40 years. Small clearings, wetlands, and lakes occupy another 207 acres. Old-growth forest, as defined by Green et al. (1992), occurs on 270 acres (8.1% of Project Area) amongst 5 patches within the Project Area (TABLE WI-4). Mature forest habitat is well represented within the proposed Project Area; with 12 patches and an average patch size of 157.2 acres (TABLES WI-3 and WI-4). The abundance and connectivity of both mature forest and old-growth forest has been influenced by unfavorable growing conditions (e.g. dry, rocky slopes and lakes/wetlands), forest insects and disease, as well as by past forest management activities. Because of these factors, mature forest and old-growth patches typically contain high amounts of edge and many patches are relatively narrow corridors that may not be suitable for species that prefer larger blocks of dense, interior forest (FIGURE WI-2). Insects and disease are prevalent in some stands and are reducing mature forest by killing trees and removing crown closure. Approximately 21.8 miles (4.2 miles/sq. mile) of roads exist in the Project Area, of which 13.8 miles (2.7 miles/sq. mile) of road are open to public motorized use and 8.0 miles are currently restricted to non-motorized use by the public. Approximately 0.4 miles of driveway easement roads within the Project Area are included in open and total road statistics, as they have been approved but not yet built. Illegal motorized use of restricted roads is occurring in the Project Area around Boyle Lake, which is likely disturbing wildlife in what would otherwise be relatively secure habitat. The Burlington-Northern Santa Fe railway also cuts across the northern 1/3 of the Project Area and likely functions as a barrier to some species especially sensitive to disturbance. Additionally, 13.9 miles of existing non-motorized trail are present in the Project Area and receive moderate to heavy use during the non-winter seasons. Due to existing forest cover, patch characteristics and road/trail densities, habitat connectivity for species using well-stocked mature forest is moderate and old-growth connectivity is poor within the Project Area.

Similar to the Project Area, the amount and location of mature, well-stocked forest within the Small CEAA has been influenced by past timber harvesting and topography with unsuitable growing conditions. An additional

factor limiting mature and old-growth forest within the Small CEAA is increasing levels of private land development and land cleared for grazing/agriculture. Presently, 35.2 percent (4,104.5 acres) of the small CEAA contains mature forest stands possessing ≥40% crown closure. Unforested areas (e.g. lakes, agricultural fields) comprise approximately 1,481 acres (12.7%) of the CEAA. Average patch size of mature forest in the small CEAA is 78.9 acres (see TABLE WI-3). Landscape connectivity of mature forest stands within the CEAA is moderate, with one 2,338-acre patch accounting for over half of the mature forest inside the CEAA. However, some of this patch contains narrow corridors less than 300 feet that could limit connectivity for some species more sensitive to forest openings. It is not possible to quantify old-growth forest outside of DNRC-lands in the CEAA due to the lack of forest inventory data. Given private-lands management history and development patterns in the CEAA, it is unlikely much old-growth forest is present. Approximately 2.9% (334.1 acres) of the CEAA is comprised of old-growth forest on DNRC lands. Average patch size is 66.8 acres (TABLE WI-4, FIGURE WI-2). Additional mature forested stands not meeting old-growth classification are interspersed between some old-growth stands and likely provide some additional connectivity for species that move between existing patches (FIGURE WI-2). Timber harvest over the last 40 years has resulted in approximately 3,164 acres (27.1% of the CEAA) of younger, regenerating forest within the Project Area, particularly on private lands in the eastern and southern portions of the CEAA. Past timber harvesting older than 40 years has likely occurred on many more acres of private lands in the CEAA due to their proximity to Whitefish and a long history of intensive logging in the area. Approximately 84.1 miles (4.6 miles/sq. mile) of roads exist within the CEAA. Of these roads, there are 61.5 miles of open and seasonally open roads that equate to a density of 3.4 miles/square mile. The majority of these open road miles (38.0 miles) are residential access roads associated with housing developments in the southern 1/3 of the CEAA (non-DNRC). Restricted roads are primarily narrow forest roads used for logging and administrative activities within the CEAA. Approximately 19.5 miles of non-motorized trails are also present in the CEAA. Across the CEAA, mature forest habitat abundance and landscape connectivity are moderate, whereas old-growth habitat availability and connectivity is poor.

Table WI-3 – Mature Forest Attributes. *Acreages and patch size metrics of mature forested habitat[a] (≥40% canopy cover, ≥9 inches dbh) pre- and post-harvest in the Project Area and Small CEAA for the Beaver to Boyle Timber Sale(s). Percent of the total corresponding analysis area is in parentheses.*

Mature Forest Attribute	Project Area		Small CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
Acres of Mature Forest[a]	1,886.1 (56.7%)	1,295.1 (38.9%)	4,104.5 (35.2%)	3,513.5 (30.1%)
Number of Patches	12	25	52	66
Average Patch Size (acres)	157.2	51.7	78.9	53.2
Minimum Patch Size (acres)	0.9	0.9	0.9	0.9
Maximum Patch Size (acres)	1,576.5	937.6	2,337.5	1,677.0

[a] *Mature forested habitat includes the majority of old-growth found within the Project Area and CEAA.*

Table WI-4 – Old-Growth Attributes. *Acreages and patch size metrics of old-growth forests (Green et al. 1992) pre- and post-harvest in the Project Area and Small CEAA for the proposed Beaver to Boyle Timber Sale(s). Percent of the total corresponding analysis area is in parentheses.*

Old Growth Attribute	Project Area		Small CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
Acres of Old Growth	269.7 (8.1%)	246.7 (7.4%)	334.1 (2.9%)	311.1 (2.7%)
Number of Patches	5	5	5	5
Average Patch Size (acres)	53.9	49.3	66.8	62.2
Minimum Patch Size (acres)	28.8	28.5	29.8	28.5

Maximum Patch Size (acres)	110.1	100.6	114.4	105.0
Number of large patches greater than 80 acres	1	1	2	2
Average size for large patches	n/a	n/a	101.6	96.9

Environmental Effects – Mature Forest Cover and Connectivity

No Action Alternative: Direct and Secondary Effects

None of the proposed forest management activities would occur. This would result in: 1) no changes to existing stands; 2) no appreciable changes to forest age, the distribution of forested cover, or landscape connectivity; and 3) no changes to wildlife use. Insects and disease would likely continue to cause tree mortality in some areas; potentially reducing the amount of mature forest further over the long-term. Thus, no direct or indirect effects to old-growth or mature forested habitat suitability and connectivity would be expected.

No Action Alternative: Cumulative Effects

None of the proposed forest management activities would occur. Thus: 1) no changes to existing stands would occur, 2) no further changes to the suitability of mature forested cover, old-growth forest or connectivity would be anticipated, and 3) no changes to wildlife use would be expected. Past and ongoing forest management projects have affected old-growth and mature forest wildlife habitat in the CEAA, and other proposed projects could affect these habitats in the future (TABLE WI-2). No additional cumulative effects to connectivity and suitability of old-growth and mature forested habitat are expected to result from the No-Action Alternative that could affect wildlife in the CEAA.

Action Alternative: Direct and Secondary Effects

Under the Action Alternative, approximately 963 acres (28.9% of the Project Area) would be harvested or thinned. Of these acres, 689 acres (20.7% of the Project Area) of well-stocked, mature forest averaging ≥40% overstory crown closure would undergo harvesting. Approximately 591 acres of mature forest would receive harvest treatments that would reduce overstory crown closure below ≥40% and remove mature forest. Harvesting on another 98 acres of mature forest would reduce tree densities, however overstory crown closure in these treated stands would likely remain above 40% postharvest and provide suitable habitat for some species preferring more dense forest conditions. Average patch size of mature forest would be reduced by 106 acres and the number of patches would increase by 13 (TABLE WI-3). Harvesting would remove approximately 23 acres of the existing 270 acres (8.5% of available habitat) of old-growth forest within the Project Area. Another 42.6 acres of old growth would receive a maintenance harvest treatment that would reduce tree and snag densities but would retain the number of large live trees required to qualify as old-growth (*Green et al. 1992*). Average patch size of old-growth forest would be reduced by 5 acres, however the number of patches would not change (TABLE WI-4). The single old-growth patches over 80 acres in size would be reduced by 10 acres but would remain connected to larger stands of mature forest (FIGURE WI-2), increasing effective habitat patch size for species that are not old-growth obligates. Corridors of suitable habitat between larger mature forest patches and old-growth patches would occur throughout the Project Area (FIGURE WI-2), although some corridors are narrow (<300 feet wide) due to topography, open/dry forest types and forest harvesting. Overall, mature forest and old-growth stands would remain relatively well-distributed and well-connected throughout the Project Area, however the availability of this habitat would be reduced. After harvest, habitat conditions within 177 acres of regeneration treatments would be unsuitable for species preferring well-stocked mature or old-growth forest for at least 40 years. Approximately 413 acres of mature forest harvested with intermediate prescriptions would be anticipated to return to mature forest conditions in a shorter time period. In contrast, those species using forest stands with widely spaced large-diameter seral species or young, regenerating forest would experience an increase in habitat abundance and quality.

Under the Action Alternative, no new permanent roads would be built. Approximately 0.4 miles of temporary road would be built or reconstructed. These temporary roads would be reclaimed and rendered impassible after project completion. Another 9.8 miles of open roads and 4.7 miles of existing restricted roads would be also used for harvesting activities. Existing restricted roads would remain restricted to public motorized use

during and after activities. An increase in motorized use would be expected on 9.8 miles of open and seasonally open roads due to the proposed Action. Functional open road density could increase from 2.7 up to 3.6 miles/sq. mile within the Project Area for up to four years during harvesting and log hauling. At the conclusion of the proposed project, the total amount of roads within the Project Area would return to pre-project levels.

Thus, moderate adverse direct and secondary effects to connectivity and suitability of mature forest and minor effects to old-growth habitat in the Project Area would be expected since: 1) harvesting would appreciably reduce tree density and existing cover on approximately 689 acres (36.5%) of existing available mature stands and 66 acres (24.7%) of existing old-growth stands (TABLES WI-3 and WI-4); 2) connectivity of mature and old-growth forest would be altered with a decrease in average patch size of 106 and 5 acres, respectively; 3) a measure of habitat availability and connectivity would be maintained on 1,295 acres of mature forest (38.9% of Project Area) and 247 acres of old-growth forest (7.4% of Project Area); 4) the number of large patches of old growth (>80 acres) would not change; and 5) functionally open roads would increase in the short-term, however long-term open road density would not change and no new permanent roads would be built.

Action Alternative: Cumulative Effects

Under the Action Alternative, timber harvesting would alter 689 acres of the 4,105 available acres (35.2%) of mature forest habitat available in the Small CEAA. Harvest treatments would remove 591 acres of mature forest for 50-80 years and reduce habitat quality for species using dense, mature forest on another 98 acres (TABLE WI-3). Across the CEAA, 30.1% of mature, forested habitats would remain and landscape connectivity would be altered to a minor degree given habitat conditions within the surrounding forested landscape. Habitat availability and connectivity would be reduced, as the number of mature forest patches would increase from 52 to 66 and average patch size would decrease from 79 acres to 53 acres (TABLE WI-3). Approximately 66 acres (19.7% of available old growth within the CEAA) of old-growth forest would be altered by harvesting treatments; with 23 acres removed and another 43 acres receiving a prescription that would remove some trees and snags but retain sufficient large trees to remain an old-growth stand (TABLE WI-4). Remaining old-growth patches would decrease in average size from 114 acres to 105 acres and 2 large patches (>80 acres) would remain across the CEAA (TABLE WI-4). All but a few old-growth patches within the CEAA would be connected to larger interspersed mature forest patches within the CEAA, which likely provide a larger effective patch size for some old-growth associated species. However, overall abundance of old-growth forest within the CEAA would continue to be limited on all ownerships. Reductions in the availability of suitable mature forested and old-growth habitat would be additive to past harvest activities, and those that are proposed or ongoing in the Small CEAA (TABLE WI-2).

Under the Action Alternative, 0.4 miles of new temporary roads would be built and road use would increase on 11.3 miles of open/seasonally open and 6.1 miles of restricted roads. During activities, open road density would increase from 3.4 miles/sq. mile up to 3.7 miles/sq. miles within the CEAA. All temporary roads would be reclaimed and all restricted roads would remain restricted from public motorized access after the conclusion of project activities.

Thus, moderate adverse cumulative effects to connectivity and suitability of mature forest and old-growth habitat in the Project Area would be expected as a result of the Action Alternative since: 1) the abundance of mature forested and old-growth habitat in the CEAA would decrease by 5.1% and 0.2%, respectively (TABLES WI-3 and WI-4); 2) approximately 3,514 acres (30.1%) of mature forest and 311 acres (2.7%) of old-growth within the CEAA would continue to provide some habitat connectivity; 3) average patch size of suitable habitat would decrease by 26 acres for mature forest and 5 acres for old-growth forest; 4) the number of large old-growth patches greater than 80 acres would not change, and; 5) temporary increases in open roads would occur but long-term road density would not change.

Fine Filter Wildlife Analysis

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. TABLE WI-5 provides an analysis of the anticipated effects for each species.

Table WI-5 – Anticipated Effects of the Beaver to Boyle Timber Sale(s) on wildlife species.

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No/Negligible Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Threatened and Endangered Species	
Canada lynx (*Lynx canadensis)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	[**Y**] **Detailed Analysis Provided Below.** The Project Area contains approximately 2,868 acres of suitable lynx habitat.
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	[**Y**] **Detailed Analysis Provided Below**. The proposed Project Area occurs in non-recovery occupied habitat associated with the Northern Continental Divide Ecosystem (NCDE) (*USFWS 1993, Wittinger 2002*).
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest less than 1 mile from open water	[**N**] The proposed Project Area is within the Whitefish Lake bald eagle territory and approximately 0.8 miles from the last known nest site. While this eagle pair likely spends the majority of its time on Whitefish Lake, the Project Area contains several small lakes where bald eagles may periodically forage. This eagle territory routinely fledges young. Whitefish Lake receives heavy recreational use and numerous private homes are within 0.2 miles of the nest site. Consequently, this eagle pair is likely habituated to high amounts of human presence and motorized disturbance. The proposed harvesting would not impact any shoreline habitat within 50 feet of the lake edge and large, emergent trees and snags would be retained. Thus, negligible direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
Black-backed woodpecker *(Picoides arcticus)* Habitat: Recently burned or beetle-infested forest	[**N**] No recently (<5 years) burned areas occur within 0.25 miles of the Project Area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Coeur d'Alene salamander *(Plethodon idahoensis)* Habitat: Waterfall spray zones, talus near cascading streams	[**N**] No known moist talus or streamside talus habitat occurs within proposed harvest areas. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse *(Tympanuchus Phasianellus columbianus)* Habitat: Grassland, shrubland, riparian, agriculture	[**N**] No suitable grassland communities occur in the Project Area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	[**Y**] **Detailed Analysis Provided Below** – Suitable lake habitat occurs within the Project Area and several pairs of loons are known to breed in the area.

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No/Negligible Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Fisher *(Pekania pennanti)* Habitat: Dense mature to old forest and riparian areas	[**Y**] **Detailed Analysis Provided Below** – Approximately 1,138 acres of suitable fisher habitat occur within the Project Area.
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest	[**Y**] **Detailed Analysis Provided Below** – Approximately 182 acres of potentially suitable flammulated owl habitat occur within the Project Area.
Gray Wolf *(Canis lupus)* Habitat: Ample big game populations, security from human activities	[**N**] Wolves may use habitat in the vicinity of the Project Area. Disturbance associated with timber sales at den and rendezvous locations can adversely affect wolves; however, timing restrictions would apply if den or rendezvous sites are documented (*ARM 33.11.430(1)(a)(b)*). Thus, negligible adverse direct, indirect, or cumulative effects to wolves would be anticipated as a result of the Action Alternative. No direct, indirect, or cumulative effects would be anticipated as a result of the No Action Alternative.
Harlequin duck *(Histrionicus histrionicus)* Habitat: White-water streams, boulder and cobble substrates	[**N**] No potentially suitable high-gradient streams occur within the Project Area. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Northern bog lemming *(Synaptomys borealis)* Habitat: Sphagnum meadows, bogs, fens with thick moss mats	[**N**] Some potentially suitable wetlands occur within the Project Area. However, no sphagnum meadows, bogs or fens are known to occur. No bog lemmings have ever been reported within the Project Area or any of the CEAAs (MNHP 2019). Additionally, wetland habitat would not undergo harvesting or motorized activities. Thus, negligible direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	[**N**] No known cliffs suitable for peregrine falcon nesting exist within the Project Area. Recent or historical observations of peregrine falcons within the Project Area are lacking (MNHP 2019). Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	[**Y**] **Detailed Analysis Provided Below –** Approximately 1,534 acres of suitable pileated woodpecker habitat occur in the Project Area.
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[**N**] No suitable caves or mine tunnels are known to occur in the Project Area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be expected to occur as a result of either alternative.
Wolverine *(Gulo gulo)* Habitat: Alpine tundra and high-elevation boreal forests that maintain deep persistent snow into late spring	[**N**] No potentially suitable wolverine habitat exists within the proposed Project Area. The Project Area does not maintain deep snow into late spring and does not contain high-elevation alpine habitat. While a wolverine could pass through the Project Area during its extensive movements, appreciable use of the area is not expected. Given the large home range area (average 150+ sq. miles) wolverines occupy, and long distances wolverines typically cover during their movements, the proposed activities would not be expected to measurably affect use of the area by wolverines. Thus, no direct, indirect or cumulative effects to wolverines would be expected to occur under the proposed action.

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No/Negligible Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Big Game Species	
Elk	[**Y**] The Project Area contains winter range habitat for white-tailed deer, mule deer, elk and moose (DFWP 2008). Year-round use of the Project Area by white-tailed deer and elk is likely. Occasional (rare) use by moose and mule deer is possible.
Whitetail Deer	
Mule Deer	
Moose	

Threatened and Endangered Species

CANADA LYNX

Issue
The proposed activities could result in the modification of habitat preferred by Canada lynx and decrease the area's suitability for lynx.

Introduction
Canada lynx are listed as "threatened" under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (*Ruediger et al. 2000*). Lynx abundance and habitat use are strongly associated with snowshoe hare populations; thus activities which decrease habitat quality for snowshoe hares can reduce the availability of prey for lynx. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares including young and mature coniferous stands with high levels of horizontal cover (*Squires et al. 2010, Squires et al. 2013*). Forest type, tree densities, natural disturbance history, and time since harvesting play important roles in shaping the suitability of young foraging habitat for lynx. Mature forest stands with abundant horizontal cover and coarse woody debris provide structure important for foraging, denning, travel, and security. These conditions are found in a variety of habitat types (*Pfister et al. 1977*), particularly within the subalpine fir series. Historically, northwest Montana contained a variety of stand types with differing fire regimes. This variety of stand types, combined with patchy elevation and snow-depth gradients preferred by lynx, likely formed a non-continuous mosaic of lynx and non-lynx habitats (*Fischer and Bradley 1987, Ruggiero et al. 1991, Squires et al. 2010*). Forest management considerations for lynx include providing a mosaic of young and mature lynx habitats that are well connected across the landscape.

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 46,493-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The Large CEAA approximates the size of overlapping male and female lynx home ranges, is centered on the Project Area, and is defined according to geographic features (e.g., ridgelines, high traffic roads), which are likely to influence movements of Canada lynx in the vicinity of the Project Area; providing a reasonable analysis area for Canada lynx that could be influenced by project-related activities.

Measurement Criteria
Factors considered in the analysis include: 1) the level of harvesting, 2) the availability of suitable lynx habitat, and 3) landscape connectivity. Suitable lynx habitat was subdivided into the following lynx habitat classes: 1) winter foraging, 2) summer foraging, 3) other suitable, and 4) temporary non-habitat. Other suitable lynx habitat is defined as habitat that has the potential to provide connectivity and lower quality foraging habitat but does not contain the necessary attributes to be classified as winter or summer foraging habitat classes. The temporary non-habitat category consists of forested stands that are not expected to be used by lynx until adequate horizontal cover develops. All habitat classes were identified according to DNRC's lynx habitat mapping protocols (*USFWS and DNRC 2010*). On non-DNRC or recently acquired non-inventoried lands, mature stands with ≥40% canopy cover provided by trees >9 inches dbh on average was queried and digitized using a GIS program to estimate potential lynx habitat. Using these forest metrics on non-DNRC or non-

inventoried lands provides a conservative estimate and likely underestimates the total amount of suitable lynx habitat on the landscape because it excludes young, dense stands that can also serve as suitable habitat for lynx and lynx prey.

Affected Environment

Approximately 2,927 acres (88.0%) of potential lynx habitat occurs in the 3,328-acre Project Area. Of this potential lynx habitat, 2,868 acres (86.2% of Project Area) are currently providing suitable habitat (TABLE WI-6). Suitable lynx habitat within the Project Area is defined as the sum of the summer foraging, winter foraging, and other suitable lynx habitat categories. In the Project Area, winter foraging habitat is the most abundant type of suitable habitat (TABLE WI-6). Levels of coarse woody debris were qualitatively assessed within the Project Area and found to be appropriate for the habitat types present. Additionally, small ridges and riparian areas are present within the proposed Project Area that provide a number of potential travel corridors for lynx, should they be present in the area. Past harvesting of 1,087 acres (32.7%) within the proposed Project Area has altered lynx habitat, however 1,027 acres of these acres continue to provide suitable habitat for lynx. The remaining 60 acres of temporary non-suitable habitat will likely be suitable for use by lynx within the next 5 to 10 years. Despite a relative abundance of vegetation suitable for lynx, other factors likely limit the likelihood of appreciable use by lynx. Open roads, high-use recreational trails, and cabin sites all contribute human disturbance to the Project Area. Perhaps more importantly, the Project Area has relatively low snow loads compared to most of the surrounding area. Much of the Project Area is big game winter range, and a number of other competing predators have been observed in the Project Area, such as wolves (*Canis lupus*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and mountain lions (*Puma concolor*). These factors likely contribute to the lack of any recorded lynx sightings within the Project Area (MNHP 2019). Throughout the Project Area, habitat and connectivity conditions are favorable for use by lynx, however the likelihood of appreciable use by lynx is low.

The Large CEAA contains 13,847 acres of suitable lynx habitat on inventoried DNRC lands and another 5,906 acres of potentially suitable habitat on other ownerships and non-inventoried lands, for a total of 19,753 acres (42.5% of CEAA) of potentially suitable habitat within the CEAA (TABLE WI-6). This is a conservative estimate and there is likely more suitable habitat within the CEAA (see *Measurement Criteria* section above). The remaining portions of the CEAA that do not provide vegetation likely to support lynx consist primarily of open wetlands, lakes, unsuitable habitat types, human developed areas, and recently logged stands with <40% canopy cover. DNRC manages 59.8% of the CEAA, private timber companies own 5.4%, USDA Forest Service administers 10.0%, lakes occupy 0.7% and other private entities own 24.1%. DNRC-managed lands include 9,282 acres (20.0% of the CEAA) of mostly young, regenerating forest recently acquired from a private timber company. Approximately 16,717 acres (36.0%) of the CEAA has been harvested within the last 40 years and reduced the availability of suitable lynx habitat containing mature trees, although some of this harvesting has likely occurred on forest habitat types not suitable for lynx. Approximately 82% (9,182 acres) of private timber company lands (including the recent DNRC-acquired lands) have been harvested within the last 30 years. As these forest stands continue to grow in the absence of disturbance, lynx habitat suitability and connectivity would be expected to increase. Observations of lynx within the CEAA have been sporadic within last 30 years (*MNHP 2019*) but all have consistently remained in the northern half of the CEAA. Overall, habitat suitability and connectivity for lynx is moderate and use of the CEAA outside of the Project Area by lynx is likely.

Table WI-6 – **Lynx habitat.** *Estimates of existing lynx habitat and habitat that would persist post-harvest on inventoried DNRC lands in the Project Area and cumulative effects analysis area (CEAA). Percent refers to the percent of the lynx habitat category of the total potential habitat[a] present on inventoried DNRC-managed lands.*

Lynx Habitat Category	Acres of lynx habitat			
	Project Area		Cumulative Effects Analysis Area	
	Existing	Post-Harvest	Existing	Post-Harvest
Other Suitable	718.1 (24.5%)	1,030.0 (35.2%)	2,091.0 (12.7%)	2,402.8 (14.6%)

Summer Forage	67.3 (2.3%)	45.7 (1.6%)	1,021.7 (6.2%)	1,000.2 (6.1%)
Temporary Nonsuitable	59.1 (2.0%)	341.4 (11.7%)	2,608.5 (15.9%)	2,890.8 (17.6%)
Winter Forage	2,082.4 (71.1%)	1,509.8 (51.6%)	10,733.9 (65.2%)	10,161.3 (61.8%)
Grand Total: Suitable Lynx Habitat[b]	2,867.8 (98.0%)	2,585.5 (88.3%)	13,846.6 (84.1%)	13,564.3 (82.4%)

[a]Total potential lynx habitat describes all areas that contain appropriate habitat types for lynx (i.e., sum of summer forage, winter forage, other suitable, and temporary non-suitable lynx habitat classes).
[b]Total suitable lynx habitat describes all DNRC lynx habitat categories that contain structural attributes necessary for use by lynx (i.e., sum of summer forage, winter forage, other suitable lynx habitat classes).

Environmental Effects – Canada Lynx

No Action Alternative: Direct and Secondary Effects on Canada Lynx

Under this alternative, no changes in lynx habitat elements would be expected in the Project Area and landscape connectivity would not be altered. Thus, no direct or indirect effects influencing lynx habitat suitability would be expected to occur in the Project Area.

No Action Alternative: Cumulative Effects on Canada Lynx

No appreciable change in lynx habitats would occur under this No-Action Alternative, and no further changes in landscape connectivity would be anticipated. Past forest management projects not associated with the proposed Beaver to Boyle Timber Sale(s) have affected lynx habitat in the CEAA, and ongoing and proposed projects could alter lynx habitat in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering lynx habitat and create disturbance within the CEAA. Thus, no additional cumulative effects to suitable lynx habitat are expected to result from the No-Action Alternative that could affect lynx habitat suitability in the CEAA.

Action Alternative: Direct and Secondary Effects on Canada Lynx

Approximately 871 acres (26.2% of Project Area) of suitable lynx habitat would be subject to forest management activities with this alternative. Proposed harvest prescriptions on 282 acres (9.8% of existing suitable lynx habitat) would reduce conifer canopy cover below 40% and convert these acres to temporary non-suitable habitat (TABLE WI-6) for the next 15 to 20 years. Intermediate harvest treatments on another 589 acres of suitable lynx habitat would reduce tree densities and horizontal cover but retain sufficient vegetation and canopy to still be considered suitable habitat, albeit with lower habitat quality. Where operationally feasible and available, some existing patches of shade-tolerant sub-merchantable conifers would be retained. The total area of these patches would not be expected to comprise more than 10% of the acres proposed for harvest. Growth of retained mature trees and patches of sapling to pole-sized conifers, combined with post-harvest conifer regeneration following harvest, would lessen the time harvested stands would be temporarily unsuitable for lynx. Activities associated with active logging operations could temporarily displace any lynx using the area for 1-4 years. Following proposed logging, 2,586 acres (88.3% of Project Area) of suitable lynx habitat would remain within the Project Area (TABLE WI-6). Suitable lynx habitat would be largely retained throughout the Project Area, although some of the potential travel corridors are narrower than 300 feet wide and could be less effective for lynx movement. Vegetation retention along important travel features could facilitate lynx movement in the Project Area, although appreciable use by lynx within seed tree harvest unit boundaries would not be expected for 15 to 20 years. In the proposed harvest units, 10 to 20 tons/acre of coarse woody debris would be retained that would add to future horizontal cover and security structure for lynx and lynx prey once harvest units have regenerated back into suitable habitat. Overall, minor adverse direct and indirect effects to habitat suitability for Canada lynx would be expected since: 1) the likelihood of appreciable habitat use by lynx would remain low in most of the Project Area (see *Affected Environment* section), 2) the amount of existing suitable

lynx habitat in the Project Area would be reduced by 9.7% (TABLE WI-6), 3) suitable lynx habitat would likely develop on 59 acres during the next 5 to 10 years within the Project Area, 4) moderate levels of landscape connectivity would persist despite a minor overall reduction in landscape connectivity, and 5) coarse woody debris and small shade-tolerant conifers would be retained where feasible to promote forest structural complexity in harvest units, expediting their growth back into suitable lynx habitat.

Action Alternative: Cumulative Effects on Canada Lynx
Under the Action Alternative, approximately 963 acres (2.1%) of the 46,493-acre CEAA would be altered by harvesting. Of these acres, harvesting would affect 871 acres of currently suitable lynx habitat. Following proposed harvesting, the CEAA would contain 13,564 acres (29.2%) of suitable lynx habitat on inventoried DNRC-managed lands (TABLE WI-6). At least another 5,906 acres of potentially suitable habitat is present within the CEAA, although this number is likely much higher (see *Measurement Criteria* section). Expected reductions in suitable lynx habitat and increases in temporary non-suitable habitat in some of the proposed harvest units would not be expected to appreciably alter lynx use of the CEAA, particularly given that habitat suitability for lynx is highest in the northern two-thirds of the CEAA outside of the Project Area. Following treatments, connectivity of suitable lynx habitat would also be maintained throughout the majority of the CEAA. Suitable lynx habitat within the CEAA could be altered by ongoing and proposed DNRC timber sales, as well as actions on USFS lands (see TABLE WI-2). Alteration of suitable lynx habitat under the Action Alternative would be additive to these projects. Furthermore, increased levels of motorized activities associated with the Action Alternative would be additive to disturbance from current and proposed timber sales, recreational trails and open roads, which could temporarily displace lynx should they be present near the proposed Project Area and associated roads. Thus, minor adverse cumulative effects to lynx and the suitability of their habitat would be expected as a result of proposed activities since: 1) overall baseline habitat suitability would remain moderate with at least 41.9% of the CEAA in suitable habitat; 2) existing suitable lynx habitat within the CEAA would be reduced by 1.4% and those areas would remain unsuitable for at least 15 years, 3) approximately 2,608 acres of stands converted to temporary non-suitable habitat through past harvesting would continue maturing and developing into suitable habitat within the CEAA in the absence of natural disturbance, 4) habitat connectivity within the CEAA would be affected by a minor degree by the proposed activities, and 5) lynx could be temporarily displaced by logging activities in parts of the CEAA for up to four years, but are less likely to occur in these affected areas due to existing conditions.

GRIZZLY BEAR

Issue
The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.

Introduction
Grizzly bears are opportunistic omnivores that inhabit a variety of habitats in Montana. Preferred grizzly bear habitat includes avalanche chutes, fire-mediated shrub fields, and riparian areas, all of which provide seasonal food sources (*Servheen 1983, McLellan and Hovey 2001*). Grizzly bears are federally listed as a threatened species and primary threats are related to human-bear conflicts and long-term habitat loss associated with human development (*Mace and Waller 1997*). Reductions in vegetative cover and increased disturbances, such as those associated with timber harvest, can lower effective use of habitat by bears and render bears more vulnerable to human-caused mortality (*Roever et al. 2008*). Forest management considerations for grizzly bears include minimizing potential for conflicts with humans, minimizing adverse effects to cover, minimizing access and the construction of new roads, and reducing disturbance levels during the non-denning season, especially in the spring and fall periods when grizzly bears have important nutritional demands.

Analysis Area
The analysis area for direct and indirect effects is the 3,328-acre Project Area and the analysis area for cumulative effects is the 46,493-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.*

The Large CEAA approximates the home range size of a male or female grizzly bear in northwest Montana and is defined by landscape features (i.e., ridgelines, well-traveled open roads) which are likely to influence movements of a grizzly bear in the vicinity of the Project Area; providing a reasonable analysis area for grizzly bear that could be influenced by project-related activities.

Measurement Criteria
Factors considered in the analysis included: 1) the degree of harvesting, 2) the availability of visual screening cover, 3) risk of displacement from important grizzly bear habitat including spring habitat and riparian habitat, and 4) open and restricted road densities. Grizzly bear hiding cover and visual screening was considered to be forest vegetation that will hide 90% of a grizzly bear at a distance of 200 feet. Hiding cover/visual screening on DNRC lands was estimated by evaluating forest stand size class and the total crown density of all trees in the stand using GIS and forest inventory data. On non-DNRC lands, the acreage of stands with ≥40% canopy cover provided by trees ≥9 inches dbh on average was quantified to estimate the availability of visual screening cover. Within the CEAA, open road densities were calculated using the simple linear calculation method (road length in miles divided by area in square miles).

Affected Environment
All 3,328 acres of the proposed Project Area occur in grizzly bear non-recovery occupied habitat associated with the Northern Continental Divide Ecosystem (NCDE) (*USFWS 1993, Wittinger 2002*). Grizzly bears have been observed in the inside the Project Area in the past and continued use by bears is anticipated. Although the Project Area lacks some types of preferred habitat, such as avalanche chutes and sizable berry patches, some wetland and riparian habitats are available that could see appreciable use by bears during certain times of year. Approximately 2,564 acres (77.0% of Project Area) of grizzly bear hiding cover is present within the proposed Project Area. Existing habitat currently providing hiding cover varies from old-growth forest to dense patches of regenerating conifers resulting from timber harvesting in the last 20 to 40 years. The abundance of vegetative cover likely contributes to some security for bears and facilitates their ability to move within the Project Area. Managing human access and associated unnatural attractants are major factors in management of grizzly bear habitat. Presently, open road density in the proposed Project Area is 2.7 miles/sq. mile and total road density is 4.2 miles/sq. mile. Unauthorized motorized use of 2.9 miles of existing restricted road is also occurring. An additional 14.0 miles of well-used trails and 3-4 trailheads serve as sources of disturbance, attractants, and potential conflicts between people and grizzly bears. Cabin sites along Beaver Lake also present an increased risk to bears in the Project Area. The prevalence of well-used open roads and trails likely displaces bears from roughly half of the Project Area during the daytime hours. Due to existing levels of hiding cover, preferred habitat, trails and open roads, grizzly bear cover is moderate and security is low within the Project Area.

The 46,493-acre CEAA is comprised of 59.1% NCDE Recovery Area and 36.6% non-recovery occupied habitat (*USFWS 1993, Wittinger 2002*). The remaining 4.3% of the CEAA is comprised of mostly private lands outside of these grizzly bear management delineations. The northern two-thirds of the CEAA is a relatively intact, mostly undeveloped forested area with a variety of preferred grizzly bear habitats (avalanche chutes, berry fields, wetlands/riparian areas). In contrast, the southern one-third of the CEAA (surrounding the Project Area) contains numerous open roads and human developments, with development density increasing in closer proximity to the City of Whitefish. Grizzly bear use of the CEAA is well-documented and continued use of the CEAA by bears is likely. The CEAA contains at least 24,775 acres (53.3%) of hiding cover, although more likely exists on private and USFS lands than can be accurately quantified in this analysis. Forest habitats across the CEAA are a combination of age classes, ranging from recently harvested stands to mature, old-growth stands. Approximately 36.0% of the CEAA (16,717 acres) has been harvested within the last 40 years and consists of younger stands with regenerating trees. The Large CEAA contains approximately 1,373 acres (3.0% of the CEAA) of Stillwater grizzly bear security zone that are free of all motorized use during the non-denning period. Proposed or ongoing projects within the CEAA (see TABLE W-2) are sources of disturbance and are currently altering or could alter grizzly bear habitat. Human disturbance levels are closely tied to road abundance, trails and access. Open road density within the CEAA is approximately 2.4 miles/sq. mile and total road density is approximately 4.4 miles/sq. mile. Roads present in the CEAA are primarily a result of past

timber management activities, but also include roads used to access USDA Forest Service and private lands. Open road density is much higher in the southern one-third of the CEAA, where homes and private lands are more prevalent. Additionally, approximately 34.4 miles of existing non-motorized recreational trails are present in the CEAA, with another 15.5 miles planned or approved. The greatest risk factors for bears within or near the CEAA are associated with homes, developments, highways and railway activities in the southern one-third on the western border of the CEAA. Areas where high levels of human recreational use occur are also higher-risk localities for grizzly bears. Unnatural attractants potentially associated with these areas could increase the probability of human-bear conflicts, which can result in bear mortalities.

Environmental Effects – Grizzly Bear

No Action Alternative: Direct and Secondary Effects on Grizzly Bear

Under this alternative, no proposed project activities would occur. Thus, no direct or indirect effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Grizzly Bear

Under this alternative, no proposed project activities would occur. Past forest management projects not associated with the proposed Beaver to Boyle Timber Sale(s) have affected grizzly bear habitat in the CEAA, and ongoing and proposed projects could alter bear habitat in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering grizzly bear habitat and create disturbance within the CEAA. Thus, since no additional changes in available habitats or level of human disturbance would be anticipated as a result of the No-Action Alternative, no cumulative effects to grizzly bear displacement or effects involving mortality risk would be anticipated.

Action Alternative: Direct and Secondary Effects on Grizzly Bear

Under the Action Alternative, grizzly bear hiding cover would be affected by harvesting on approximately 963 acres (28.9%) of the Project Area. Harvesting carried out under the Action Alternative would increase sight distances within all proposed harvest units, however adequate vegetation for hiding cover would remain on 714 acres receiving intermediate harvest treatments. Removal of hiding cover for 15-20 years would occur over 213 acres (6.4% of the Project Area). Some patchy cover in the form of sub-merchantable trees would be retained where present and feasible inside these harvest units, decreasing the amount of time until they grow back into suitable hiding cover. Existing stands of adjacent dense regenerating conifers, neighboring unharvested forest patches, and topographic breaks would exist in such a manner that no point in any harvest unit would be greater than 600 feet to cover. Existing riparian cover along 5.2 miles of Class 2 streams would be retained and offer movement corridors as well as hiding cover for bears in this preferred habitat. Wetland habitat would not be impacted by the proposed action. Visual screening adjacent to open roads would retained where practicable, which lessens the risk of mortality by accidental or intentional shooting. Levels of hiding cover would be expected to recover within 15 to 20 years following proposed treatments as shrub and tree regeneration proceeds. Should grizzly bears be present in the area at the time of harvest operations, they could be affected by increased road traffic, noise, and human activity, and by reduced amounts of hiding cover. Proposed activities in grizzly bear habitats would reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditures to endure the disturbance or causing bears to move away from the area. These potential disturbances would only occur during harvesting operations (1 to 4 years). Continued use of the Project Area by grizzly bears would be anticipated, albeit at a lower level. Spring restrictions on motorized use and commercial harvest restrictions would apply to 49 acres of harvest units around Boyle Lake, which would minimize disturbance to bears during the spring period in an area with preferred food sources. Additionally, contract requirements would assist in mitigating bear-human conflict risk by specifying that contractors are not permitted to carry firearms on the work site and that unnatural attractants must be stored or disposed of in a bear-resistant manner.

Motorized activities associated with the Action Alternative, such as the use of restricted roads and the construction of new temporary roads, could affect grizzly bears by temporarily (1 to 4 years) displacing them from previously secure areas. No new permanent roads would be built. Approximately 0.4 miles of temporary

road would be built, and 4.7 miles of existing restricted road could be used under the Action Alternative. The use of up to 5.1 miles of restricted and temporary roads would increase motorized vehicle activity during the non-denning season for up to 4 years. The use of existing restricted roads, and temporary roads would contribute to open road density in the short term (1-4 years); increasing potential for disturbance to grizzly bears. Including temporary roads, functionally open road amounts could increase from 13.8 miles (density 2.7 mi./sq. mi.) up to 18.9 miles (density 3.6 mi./sq. mi.) during project operations. All 4.7 miles of restricted roads that would be used temporarily for 1 to 4 years to complete proposed project activities would be closed in a manner to prohibit public motorized access during harvesting activities, including 2.9 miles of restricted road currently receiving unauthorized motorized use. All temporary roads would be reclaimed in a manner that prevents any motorized use. At the conclusion of the proposed project, the total amount of open roads and total roads within the Project Area would remain the same as pre-project levels.

Thus, moderate adverse direct or indirect effects to grizzly bears associated with displacement and mortality risk would be expected since: 1) moderate levels of temporary (1-4 years) disturbance and displacement would be anticipated; 2) hiding cover would be altered on 714 acres (21.5% of the Project Area) and removed on 213 acres (6.4% of the Project Area); 3) hiding cover would remain on approximately 2,351 acres (70.6%) of the Project Area; 4) reductions in hiding cover would be partially mitigated through vegetation retention patches within and between harvest units, vegetation retention along riparian corridors, and reduced sight distances associated with varied topography; 5) commercial harvest would be restricted during the spring period near some preferred habitat; and 6) short-term increases in functional open road densities from 2.7 mi/sq. mi. to 3.6 miles/sq. mi. would be anticipated but long-term open road density would not change and illegal motorized use would be curtailed.

Action Alternative: Cumulative Effects on Grizzly Bear

Approximately 963 acres (2.1% of the CEAA) of grizzly bear hiding cover would be harvested within the CEAA. Reductions of hiding cover on 213 acres (0.05% of the CEAA) and anticipated elevated disturbance levels would be additive to past timber harvesting that has affected approximately 17,195 acres (37.0%), as well as current forest management projects (see TABLE W-2). Mature stands and young, fully stocked stands that likely provide hiding cover would continue to comprise at least 24,546 acres (52.8%) of the CEAA. No harvest activities would occur within Stillwater grizzly bear security zones. Continued use of the CEAA by grizzly bears would be anticipated. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands across the CEAA.

Collectively, short-term (1 to 4 years) increases in human disturbance would be anticipated in the CEAA, but contract requirements would lessen risk of human-bear conflicts during active harvest operations (e.g. proper storage/disposal of unnatural attractants, prohibiting possession of firearms etc.). The increased use of road systems during the proposed project would temporarily increase human disturbance and displacement risk for grizzly bears within the southern one-third portion of the CEAA. A short-term increase in open road density would occur, increasing from 2.4 mi/sq. mi. to 2.5 miles/sq. mile in the CEAA. Density of all permanent roads within the CEAA would not change. Disturbance associated with temporarily accessed roads would be additive to that occurring on roads used for other ongoing forest management projects, as well as numerous recreational trails and planned trail projects (see TABLE W-2). Within the CEAA, high-risk factors for bear mortality would continue to be associated with human developments in the southern portions and western border of the area.

Thus, minor adverse cumulative effects to grizzly bears associated with displacement or effects involving mortality risk would be expected in the short term (1 to 4 years) and long term (15 to 20 years) since: 1) short-duration (1 to 4 year) increases in human disturbance levels would be expected within the CEAA, 2) hiding cover would be removed in the short-term (~15 to 20 years) on a relatively small portion (2.1%) of the CEAA, 3) at least 52.8% of the CEAA would continue to provide hiding cover, and 4) short-term increases in functional open road densities from 2.4 mi/sq. mi. to 2.5 miles/sq. mi. would be anticipated but long-term open road density would not change.

Sensitive Species

COMMON LOON

Issue
The proposed activities could alter shoreline nesting habitat or disturb common loons during the breeding season, which could adversely impact loon reproduction.

Introduction
The common loon is a large, aquatic bird that preys primarily on fish, but will also consume frogs, salamanders, snails, leeches, and aquatic insects. Loons are highly territorial, and typically only one pair nests on a small to mid-size lake. Nests can be located on small islands, partially submerged logs, or on floating mats of herbaceous vegetation. Loons are poorly adapted to living out of the water; therefore nests are generally located where they can slip directly from the nest into the water. Loons are sensitive to human disturbance and are usually associated with water bodies with relatively low levels of human activity. Human disturbance during the nesting and early chick-rearing period (mid-April thru mid-July) could lead to nest failures if the adults are disturbed and leave the nest unattended for even short periods of time. Adverse impacts that can affect reproduction of loons include direct loss of nesting and nursery habitat, and loss of young to avian predators such as bald eagles. However, loon reproduction can also be adversely affected by recreational disturbance caused by humans (*Titus and VanDruff 1981, Croskery 1991, Kelly 1992, Paugh 2006*).

Analysis Area
Direct, indirect, and cumulative effects were analyzed within a 500-ft buffer of the shorelines of Beaver, Boyle, Murray, Little Beaver, and Woods lakes. All of these lakes are within the Project Area or share a border with it. Breeding loons use these lakes and could be potentially affected by the proposed Action Alternative.

Measurement Criteria
Effects were analyzed using a combination of field evaluations and aerial photograph interpretation. Factors considered include the amount of shoreline disturbance, relative level of recreational pressure on the lakes, and available nesting habitat.

Affected Environment

Common loons have attempted to nest on Beaver, Boyle, Murray, Little Beaver, and Woods lakes. Successful breeding and fledging of young has occurred on all of these lakes except for Woods lake. Annual monitoring has suggested that the common loon population in the analysis area is expanding; with increasing breeding efforts as well as territorial conflicts. With the exception of the eastern half of Beaver lake, DNRC-managed lands surround these water bodies. The level of existing human disturbance on these lakes depends on the lake in question. Beaver lake contains motorized and non-motorized watercraft (including water-skiers), lakeside cabins, docks and regular fishing pressure. Murray lake has a well-traveled open road in close proximity, receives heavy non-motorized use, fishing pressure and shoreline recreation such as swimming. Woods lake has moderate amounts of shoreline recreation but only occasional non-motorized watercraft. Little Beaver Lake has occasional shoreline or non-motorized fishing pressure. Boyle lake has little to no recreational use but is directly adjacent to the busy Burlington-Northern Santa Fe railroad track. Loons at all of the analysis lakes demonstrate some habituation to human disturbance and noise, with Boyle lake likely the most sensitive to non-motorized disturbance

Shoreline development and recreationalists (primarily anglers) are likely the greatest risk factors causing disturbance of breeding loons. People recreating with watercraft likely disturb loons, although cooperators and volunteers (e.g. USFS, Montana Loon Society) place signage on these lakes asking recreationalists to keep their distance from nesting areas. Given the popularity these lakes and their relatively small size, these signs likely have limited effectiveness. Despite moderate to high amounts of recreational use and disturbance, loons

on Beaver Lake usually do hatch at least one chick. Murray lake successfully hatched a chick in 2019, after an unsuccessful first attempt in 2018. Thus, nesting loons on at least two lakes are habituated to moderate levels of disturbance.

Environmental Effects – Common Loon

No Action Alternative: Direct and Secondary Effects on Common Loons

Under this alternative, no proposed project activities would occur. Thus, no direct or indirect effects to shoreline habitat or disturbance levels would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Common Loons

Under this alternative, no proposed project activities would occur. Thus, since no additional changes in shoreline habitat or human disturbance would be anticipated as a result of the No-Action Alternative, no cumulative effects to common loons would be anticipated.

Action Alternative: Direct, Secondary and Cumulative Effects on Common Loons

Proposed harvest operations would treat up to 39 acres (7.9%) of uplands within 500 feet of the analysis lakes. Proposed harvest could increase sight distances and the associated potential for disturbance to loons, however no harvesting would occur within 175 feet of the lakes and wetland nesting habitat would not be disturbed. Thus, vegetation along the lakeshore and potential nesting habitat would not be appreciably altered. Prescribed tree retention levels would not likely affect potential nesting habitats in the analysis area as retention levels would be relatively high and would minimize the potential for sediment delivery to the lake. For the duration of the project, construction of permanent roads or structures and mechanized activity within 500 feet of nest sites or potential nest sites would be restricted from March 16 to September 15 each year to protect nesting loons (ARM 36.11.441). No new permanent roads or developments would occur within 500 feet of any known nest sites. Should a pair of loons establish a nest closer to the proposed units, additional mitigation measures would be developed prior to harvesting to minimize effects to nesting loons. Disturbance levels and recreational use of Beaver lake associated with private land and cabin lease sites would persist, as would non-motorized disturbance sources on other analysis lakes. The proposed activities under this action would be additive to any sources of disturbance originating from private land. Thus, minor direct, indirect, and cumulative effects to nesting common loons and chick recruitment would be anticipated since: 1) short-term disturbance would occur within 500 feet of lakes where loons could be present, however harvest activities would not occur during the nesting season and no appreciable changes in shoreline disturbance or vegetation would be anticipated; 2) no changes to available nesting habitat would be expected; 3) current levels of human recreational use within loon habitat would not appreciably change; and 4) existing sources of nest failure or chick mortality would remain unchanged in the long-term.

FISHERS

Issue

The proposed activities could decrease habitat suitability for fishers by decreasing canopy cover in mature forest stands, decreasing abundance of snags and coarse woody debris, and by increasing roads, which could elevate risk of trapping mortality.

Introduction

In the Rocky Mountains, fishers prefer mesic late-successional forests with complex vertical and horizontal structure, large-diameter trees, and relatively dense canopies. Fishers generally avoid large openings, clearcuts, and ponderosa pine and lodgepole pine stands (*Raley et al. 2012, Schwartz et al. 2013*). Fishers prey on snowshoe hares, ungulate carrion, porcupines, birds, and small mammals as well as seasonally available fruits and berries. Fisher resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fishers involve providing upland and riparian resting and denning habitat,

retaining adequate snags and downed woody debris, maintaining a network of travel corridors, and reducing trapping risk associated with motorized access.

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 46,493-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The Large CEAA is centered on the Project Area and is defined according to geographic features and could support the home range of at least one male fisher and multiple female fishers, providing a reasonable analysis area for fishers that could be influenced by project-related activities.

Measurement Criteria
Factors considered in the analysis include: 1) the degree of harvesting, 2) availability and structure of preferred fisher habitats (upland, riparian), 3) landscape connectivity, and 4) human access as it relates to risk of trapping mortality. Fisher habitat classifications considered in the analysis include: a) upland fisher habitat, and b) riparian fisher habitat, which are defined according to proximity of the forest stand to streams. Riparian fisher habitat is located within 100 feet of Class 1 streams or within 50 feet of Class 2 streams (*ARM 36.11.440(b)*). The remaining fisher habitat is considered upland fisher habitat. Habitat structure considered appropriate for fisher use includes stands with 40-100% total stocking density. Potential fisher habitat (riparian, upland) on other ownerships was identified by identifying mature forested habitat (≥40% cover, trees >9 inches dbh average) in proximity to perennial and intermittent streams.

Affected Environment

The proposed Project Area contains 1138 acres (34.2% of Project Area) of suitable fisher habitat (TABLE WI-7). Due to the presence of unsuitable cover types, this habitat is not contiguous within the Project Area. Riparian fisher habitat within the Project Area is comprised of approximately 46.8 acres of preferred fisher cover types, of which 35.2 acres (75.1% of preferred cover types) of riparian habitat are currently suitable for use by fishers. Suitable fisher habitat that provides good habitat connectivity occurs along most of the perennial streams in the Project Area, however not many streams are present in the Project Area. Existing suitable stands are providing the mature forest conditions (≥40 crown closure) necessary for use as fisher travel habitat in upland areas but forest insects and disease are currently decreasing crown closure on many of these acres. Snags and coarse woody debris (CWD) were qualitatively assessed during field visits and found to be at appropriate levels where suitable fisher habitat was more than 200 feet from open roads. Snags greater than 21 inches dbh were present in low densities in almost all proposed harvest units. Coarse woody debris levels were also variable across the Project Area, but generally within the range of abundance recommended for the habitat types present (*Graham et al. 1994*). Similar to snags, downed logs were generally small diameter, although some larger logs (>15 inches diameter) were observed. Open roads facilitate firewood gathering, which has affected the abundance of snags and CWD available for potential use by fishers in the Project Area. Additionally, roads near streams can also offer trappers convenient access to forested riparian areas, which increase trapping risk to fishers should they be using the area. There are 13.8 miles of open and seasonally open roads within the Project Area and firewood gathering is moderate to high. The majority of these roads are not plowed in the winter; the lack of convenient vehicle access to the Project Area during periods of winter snow during trapping season likely limit trapper efforts and associated mortality risk for fisher. Despite the occurrence of suitable fisher habitat, fishers appear to be largely absent from the region. A number of recent scientific efforts to collect fisher observations and confirm fisher presence in the vicinity have not found any fishers (*DNRC and DFWP, unpublished data*). Additionally, no observations have been recorded in the Project Area or within 10 miles of it (*MNHP 2019*). Overall, fisher habitat suitability and connectivity within the Project Area is moderate and risk factors are moderate, however the likelihood of appreciable use by fishers is low.

Historical records of fisher occurring in the CEAA within the last 50 years are lacking and other observations within 10 miles of the CEAA are older than 18 years. However, fishers have been documented in Flathead County (MNHP 2019, Foresman 2012) and fisher use of the CEAA is possible. Within the CEAA, there are

12,957 acres (27.9% of the CEAA) of suitable fisher habitat (TABLE WI-7). The availability and connectivity of suitable habitat and preferred cover types increases in the northern half of the CEAA, compared to more scattered fisher habitat in the southern half around the Project Area. Riparian fisher habitat within the CEAA consists of approximately 796 acres of preferred fisher cover types on DNRC lands, of which 733 acres (92.1% of preferred fisher cover types) are currently suitable for use by fishers. The majority of Class 1 and 2 streams within the CEAA have accompanying riparian vegetation that would facilitate fisher travel, and contribute to habitat suitability and connectivity, however suitable upland habitat has been fragmented to a moderate degree by past timber harvesting on DNRC and private lands. On current private timber company lands and timber company lands recently acquired by DNRC within the CEAA (25.3% of the CEAA), suitable fisher habitat is largely absent due to logging within the last 30 years. Within the CEAA, past harvesting has influenced mature crown closure, snags and coarse woody debris levels on about 16,717 acres (36.0% of the CEAA). The CEAA contains a network of existing open roads (density = 2.4 mi/sq. mile) that facilitate trapper access, although most are not plowed, which limits motorized vehicle use during typical winter conditions. Collectively, habitat suitability for fishers within the CEAA is low and risk factors are moderate, but the likelihood of appreciable use by fishers is also low.

Table WI-7 – **Fisher habitat.** *Estimates of existing and post-harvest acreages of suitable fisher habitat within the Project Area and CEAA for the Beaver to Boyle Timber Sale(s), including potential habitat on non-DNRC ownership. Recently acquired, uninventoried DNRC lands were included in the non-DNRC lands totals due to the lack of detailed habitat data. Values in parentheses refer to the percentage that each fisher habitat type represents within the larger analysis area.*

Fisher Habitat Attribute	Project Area (3,328 acres)		Cumulative Effects Analysis Area (46,493 acres)	
	Existing	Post-Harvest	Existing	Post-Harvest
Upland Fisher Habitat (DNRC)	1,103.1 (33.1%)	761.1 (22.9%)	6,747.9 (14.5%)	6,406.0 (13.8%)
Upland Fisher Habitat (non-DNRC)	0.0 (0%)	0.0 (0%)	4,561.4 (9.8%)	4,561.4 (9.8%)
Riparian Fisher Habitat (DNRC)	35.2 (1.1%)	35.2 (1.1%)	732.8 (1.6%)	732.8 (1.6%)
Riparian Fisher Habitat (non-DNRC)	0.9 (0%)	0.9 (0%)	914.7 (2%)	914.7 (2%)
Total Suitable Fisher Habitat (DNRC)	1,138.3 (34.2%)	796.3 (23.9%)	7,480.7 (16.1%)	7,138.8 (15.4%)
Total Suitable Fisher Habitat (DNRC lands & non-DNRC lands)	1,139.2 (34.2%)	797.3 (24.0%)	12,956.8 (27.9%)	12,614.9 (27.1%)

Environmental Effects – Fishers

No Action Alternative: Direct and Secondary Effects on Fishers

Under this alternative, no proposed project activities would occur. Thus, no direct or indirect effects associated with fisher habitat suitability or trapping mortality risk would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Fishers

Under this alternative, no proposed project activities would occur. Past forest management projects not associated with the proposed Beaver to Boyle Timber Sale have affected fisher habitat in the CEAA, and ongoing and proposed projects could alter fisher habitat in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering fisher habitat and create increased trapping risk within the CEAA. Thus, since no additional changes in available habitat or level of human access would be anticipated as a result of the No-

Action Alternative, no cumulative effects to fisher habitat suitability or trapping mortality risk would be anticipated.

Action Alternative: Direct and Secondary Effects on Fishers

Approximately 432 acres of the 1,103 acres (39.2%) of suitable fisher habitat in the Project Area would be harvested under the Action Alternative (TABLE WI-7). Approximately 342 acres of upland fisher habitat within the Project Area harvest units would receive harvest treatments that would likely yield stands too sparsely forested for appreciable use by fishers for 40-80 years. An additional 90 acres of upland fisher habitat would receive harvest treatments that would reduce tree densities but retain adequate overstory crown closure (≥40%) for use by fishers. No riparian fisher habitat would be harvested. Approximately 75.1% (35 acres) of preferred fisher cover types in riparian areas would remain suitable for use by fishers, although relatively little riparian habitat is present in the Project Area. In all proposed units, harvest prescriptions call for retention of at least, 2 snags and 2 snag recruits per acre (≥21 in. dbh) where they exist, otherwise the next largest size class would be preserved. In addition, 10 to 20 tons of coarse woody debris per acre would be planned for retention within harvest units except adjacent to private lands, where high-hazard fuel reduction is required. Long-term open road density would not change under the Action Alternative and current unauthorized motorized use of restricted roads would be curtailed. The potential future risk for snag and coarse woody debris loss due to firewood gathering would be expected to remain the same, as 0.4 miles of newly constructed temporary road would be restricted from public motorized use and barricaded at the conclusion of activities. Thus, minor adverse direct and indirect effects would be anticipated that would affect fisher habitat suitability in the Project Area since: 1) existing baseline suitability and connectivity of fisher habitat within the Project Area is moderate but the likelihood of appreciable use by fishers is low, 2) approximately 761 acres (22.9% of the Project Area) would remain as suitable habitat, 3) harvesting would reduce suitable upland fisher habitat in the Project Area by 10.2% and alter another 8.2%, 4) reductions in upland habitat connectivity would occur but existing levels of riparian fisher habitat would be minimally affected, 5) some large snags and snag recruits and coarse woody debris would be retained, and 6) overall risk factors associated with motorized human access levels would decrease in the long-term.

Action Alternative: Cumulative Effects on Fishers

Approximately 432 acres (3.3%) of 12,957 acres of potentially suitable fisher habitat in the CEAA would be harvested. All of these proposed harvest acres would occur in upland fisher habitat and removal of approximately 342 acres of suitable habitat would be anticipated (TABLE WI-7). Approximately 90 acres of upland fisher habitat would receive harvest treatments that would reduce tree densities but retain adequate overstory crown closure (≥40%) suitable for use by fishers. Of the approximately 796 acres of preferred fisher cover types associated with Class 1 and 2 streams on inventoried DNRC lands, 733 acres (92.1% of preferred fisher cover types) would remain suitable for use by fishers. Reductions in upland fisher habitat would be additive to the changes associated with current timber harvesting in the CEAA, including the Lupfer Morrill Timber Sale and USFS Taylor Hellroaring Project (TABLE WI-2), as well as past harvesting within the last 40 years. Forest management and land development by humans, combined with scattered unsuitable cover types, would likely maintain suitable fisher habitat at low levels on 11,192 acres of private lands (24.1% of the CEAA) in the southern portion of the CEAA. Approximately 12,615 acres of the 46,493-acre cumulative effects analysis area (27.1%) would remain as suitable fisher habitat (TABLE WI-7). Reductions in landscape connectivity of suitable upland fisher habitat within the CEAA would occur; however existing suitable forest stands along riparian areas would persist and appreciable effects on fisher use of the CEAA would not be expected. The potential future risk for snag and coarse woody debris loss due to firewood gathering would not be expected to change, as no new open roads would be built and all existing restricted roads would remain restricted. Potential trapping mortality would be minimally influenced, as there would be no change in public access. Thus, minor adverse cumulative effects would be anticipated that would affect fisher habitat suitability within the CEAA since: 1) existing baseline suitability and connectivity of fisher habitat within the CEAA is low and the likelihood of appreciable use by fishers is low, 2) 12,615 acres (27.1% of the Project Area) would remain as suitable habitat, 3) harvesting would alter tree density, snags, and stand structure in 3.3% of suitable fisher habitat within the CEAA, 4) suitable fisher habitat associated with riparian areas in the CEAA would not be removed and 92.1% of the total preferred cover type acreage would remain moderately to well-stocked, 5)

suitable fisher habitat would remain connected within riparian areas but the suitability and connectivity of upland habitat would be reduced, and 5) no appreciable change in the risk of snag/coarse woody debris loss and trapping mortality would be expected.

Flammulated Owl

Issue
The proposed activities could alter the structure of flammulated owl preferred habitat, which could reduce habitat suitability for flammulated owls.

Introduction
The flammulated owl is a small insectivorous species that is migratory and inhabits old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States (McCallum 1994). Flammulated owls are secondary cavity nesters, typically nesting in 12 to 25 inch dbh aspen, ponderosa pine, or Douglas-fir cavities excavated by pileated woodpeckers or northern flickers (*Colaptes auratus*). Forest management considerations for flammulated owls include providing open, dry stands of ponderosa pine and Douglas-fir with scattered dense sapling thickets and retaining snags for nesting.

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 11,673-acre Small CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The Small CEAA is centered on the Project Area and provides a sufficient area to support multiple pairs of flammulated owls if ample suitable habitat is present.

Measurement Criteria
Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of available habitats. SLI data were used to identify preferred flammulated owl habitat types (ARM 36.11.403(28)). Canopy cover, trees/acre, and cover type were considered in the analysis of flammulated owl habitat availability and structure. Factors considered in the analysis include: 1) the degree of harvesting, and 2) the availability and structure of flammulated owl preferred habitats.

Affected Environment
The stands in the Project Area are largely, Douglas-fir, western larch, and mixed conifer. Within the Project Area there are approximately 182 acres (5.5% of the Project Area) of potential flammulated owl habitat. Of these potential acres, the majority (>80%) currently contain dense forest conditions likely unsuitable for foraging by flammulated owls. Site-specific growing conditions and past forest management have largely influenced the abundance and distribution of flammulated owl habitat and large snags within the proposed Project Area. Much of the Project Area contains forest types not known to be used by flammulated owls. Past harvesting of 33.5 acres of suitable flammulated owl habitat has created more open forest canopy conditions preferred by foraging flammulated owls. This harvesting likely reduced the availability of suitable large snags used for nesting. Relatively abundant open roads within the Project Area facilitate firewood cutting, which further reduces the availability of suitable nesting snags. However less than a third of potentially suitable flammulated owl habitat in the Project Area are near roads. Additionally, there are no records of flammulated owl observations in the Project Area (MNHP 2019). Overall habitat suitability for flammulated owls in the Project Area is primarily limited by the lack of preferred habitat types (due to natural growing conditions) and stands that are too dense in preferred habitat.

The CEAA contains approximately 206 acres (1.7%) of potentially suitable flammulated owl habitat on DNRC lands. Suitable habitat types on non-DNRC lands are difficult to quantify. Similar to the Project Area, site-specific growing conditions and past forest management have largely influenced the abundance and distribution of flammulated owl habitat and large snags within the proposed Project Area. Land clearing and human development on private lands have also likely removed potential flammulated owl habitat. Dense

second-growth conditions on previously harvested private lands make up a sizable portion of the CEAA and would also be unsuitable for use by flammulated owls. Firewood gathering on private lands within the CEAA further limits potential breeding habitat by reducing snags. Additionally, there are no records of flammulated owl observations in the Project Area or CEAA (MNHP 2019). Currently, habitat suitability for flammulated owls within the CEAA is likely low.

Environmental Effects – Flammulated Owls

No Action Alternative: Direct and Secondary Effects on Flammulated Owls

Under this alternative, no proposed project activities would occur. Thus, no direct or indirect effects to flammulated owl habitat suitability would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Flammulated Owls

Under this alternative, no proposed project activities would occur. Past forest management projects not associated with the proposed Beaver to Boyle Timber Sale(s) have affected pileated woodpecker habitat in the CEAA, and ongoing and proposed projects could affect habitat suitability in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering flammulated owl habitat within the CEAA. Thus, since no additional changes in available habitat would be anticipated as a result of the No-Action Alternative, no cumulative effects to flammulated owl habitat suitability would be anticipated.

Action Alternative: Direct and Secondary Effects on Flammulated owls

Timber harvest would occur on 91 of the 182 acres (50.1%) of suitable flammulated owl cover types available in the Project Area. Approximately 47 acres of flammulated owl cover types would be harvested with regeneration treatments that would likely reduce mature tree density and potential snags too much to be used by flammulated owls. Proposed harvest prescriptions on another 44 acres of suitable flammulated owl cover types would open stands to 20% to 40% canopy cover, improving stand structure suitability for flammulated owls in harvest units. Additionally, the proposed harvest prescriptions would favor leaving larger-diameter ponderosa pine, western larch, and Douglas-fir, which would benefit use by flammulated owls. Some snags could be removed by the proposed harvest, but at least 2 large snag and 2 large snag recruitment tree per acre (>21 inches dbh, or largest available) would be retained (ARM 36.11.411). Flammulated owls are tolerant of human disturbance (McCallum 1994), however disturbance associated with harvesting could temporarily displace flammulated owls should they be present in or near harvest units. Harvesting activities would not occur during the owl breeding season and flammulated owls would not be displaced by activities occurring in the winter months when the birds have migrated to their winter range. Thus, minor adverse direct and indirect effects to flammulated owl habitat suitability would be anticipated as a result of the Action Alternative since: 1) approximately 47 acres (25.8% of available habitat) of preferred cover types would be removed, 2) proposed harvesting would improve habitat suitability on another 24.2% of existing suitable cover types, 3) half of the existing potentially suitable habitat would remain unaltered, and 4) mitigations would include timing restrictions, retention of large snags and snag recruits within harvest units, as well as retaining scattered patches of regenerating trees.

Action Alternative: Cumulative Effects on Flammulated owls

Timber harvest would occur on 91 of the 206 acres (44.2%) of suitable flammulated owl cover types available on DNRC lands in the CEAA. The proposed activities would open stands to 20% to 40% canopy cover on 44 acres, improving the suitability of stand structure for flammulated owls in harvest units. Approximately 47 acres would be converted to temporarily unsuitable habitat by harvesting. Additionally, the proposed harvest prescription would favor leaving larger-diameter seral species, which would benefit flammulated owls. Some snags could be removed by the proposed harvest, but at least 2 large snag and 2 large snag recruitment tree per acre (>21 inches dbh, or largest available) would be retained (ARM 36.11.411). If flammulated owls were near harvest units, they could be temporarily (up to 4 years) disturbed and displaced by the proposed activities. However, harvesting activities would not occur during the flammulated owl breeding season. Potential disturbance and displacement would not be expected to extend outside of the Project Area into the larger CEAA. Flammulated owls would not be displaced by activities occurring in the winter months when the birds have migrated to their winter range. Thus, minor adverse cumulative effects to flammulated owl habitat

suitability would be anticipated as a result of the Action Alternative since: 1) approximately 22.8% of potential flammulated owl habitat on DNRC lands would be removed by harvesting, 2) changes in forest structure due to harvesting would generally increase flammulated owl habitat suitability on 44 acres of preferred habitat, and 3) mitigations would include timing restrictions and retention of large snags, snag recruits and scattered patches of regenerating trees within harvest units.

Pileated Woodpeckers

Issue
The proposed activities could reduce tree density and alter the structure of mature forest stands, which could reduce habitat suitability for pileated woodpeckers.

Introduction
Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. Aney and McClelland (*1990*) described pileated nesting habitat as..."stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." Necessary feeding and nesting habitat attributes include large snags, large decayed trees, and downed wood, which closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 11,673-acre Small CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The Small CEAA is centered on the Project Area and provides a sufficient area to support multiple pairs of pileated woodpeckers if enough suitable habitat is present (*Bull and Jackson 2011*).

Measurement Criteria
Factors considered in the analysis include: 1) the degree of harvesting and 2) the amount and structure of pileated woodpecker preferred habitat types. On DNRC-managed lands, sawtimber stands ≥100 years old within preferred pileated cover types (*ARM 36.11.403(58)*) with ≥40% canopy closure were considered potential pileated woodpecker habitat. On non-DNRC lands, the stands considered potential pileated woodpeckers habitat were mature forest stands (≥40% canopy cover, >9 inches dbh average) typically below 6,000 feet in elevation.

Affected Environment
In the Project Area, there are approximately 1,534 acres (46.1% of Project Area) of potential pileated woodpecker habitat. Pileated woodpecker calling was heard and foraging evidence was observed during field visits to the Project Area. Current potential pileated habitat within the Project Area consists of mature Douglas-fir/western larch and mixed conifer stands. Average patch size is 307 acres (5 patches) and the largest patch of suitable habitat is 1,125 acres. The abundance and availability of suitable habitat within the Project Area has been largely influenced by past timber harvesting on 1,146 acres. Snags and coarse woody debris (CWD) were qualitatively assessed during field visits. Snags and coarse woody debris within unharvested portions of the proposed Project Area are generally appropriate for the existing habitat types, although snags have been removed by firewood gathering within 200 feet of most open roads. Snags greater than 21 inches dbh were present in low densities within most unharvested stands. Similar to snags, downed logs were generally small diameter, although some larger logs were observed. Firewood gathering, which can result in a reduction of snags and downed logs valuable as woodpecker nesting and foraging substrates, commonly occurs along

open roads within the Project Area. Given these observed habitat conditions, pileated woodpecker habitat suitability is currently moderate within the Project Area.

The CEAA contains approximately 3,641 acres (31.2% of the CEAA) of potential pileated woodpecker habitat. Together, these are distributed among 52 patches and average patch size is 70 acres. Several smaller patches within the CEAA are connected to larger patches of suitable habitat outside of the CEAA, increasing effective patch size. The largest suitable patch within the CEAA is 1,680 acres and includes the largest patch in the Project Area. In general, potentially suitable patches on 1,914 acres of surrounding private lands in the CEAA are smaller and narrower. The availability and patch characteristics of suitable habitat within the Project Area has limited by past forest management activities and more recent land clearing/development. Firewood gathering is active along 61 miles of open road and on most private lands within the CEAA. Thus, habitat quality and availability for pileated woodpeckers within the CEAA is currently moderate.

Environmental Effects – Pileated Woodpeckers

No Action Alternative: Direct and Secondary Effects on Pileated Woodpeckers

Under this alternative, no proposed project activities would occur. Thus, no direct or indirect effects to pileated woodpecker habitat suitability would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Pileated Woodpeckers

Under this alternative, no proposed project activities would occur. Past forest management projects not associated with the proposed Beaver to Boyle Timber Sale(s) have affected pileated woodpecker habitat in the CEAA, and ongoing and proposed projects could affect habitat suitability in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering pileated woodpecker habitat within the CEAA. Thus, since no additional changes in available habitat would be anticipated as a result of the No-Action Alternative, no cumulative effects to pileated woodpecker habitat suitability would be anticipated.

Action Alternative: Direct and Secondary Effects on Pileated Woodpeckers

The proposed activities would affect up to 499 acres (32.6%) of the 1,534 acres of pileated woodpecker habitat available in the Project Area. Proposed harvest prescriptions on 427 acres (12.8% of Project Area) would open stands to less than 40% canopy cover; causing the structure of these stands to become unsuitable for appreciable use by pileated woodpeckers. An additional 72 acres of suitable habitat would undergo harvest treatments that would reduce habitat suitability to a lesser extent but would retain sufficient large trees and snags for use by pileated woodpeckers. The number of suitable habitat patches would increase from 5 to 12 but average patch size would decrease from 307 acres to 92 acres. The largest available patch would decrease in size from 1,125 acres to 736 acres. Intermediate harvest prescriptions would focus on retaining larger healthy, seral species (such as western larch and ponderosa pine) that could improve pileated woodpecker habitat in the long-term. Patch size and connectivity of suitable habitat would be reduced, although connectivity of remaining habitat with adjacent suitable habitat would be retained in narrower corridors. Additionally, mature forest stands in non-preferred cover types interspersed between suitable patches would likely contribute to some connectivity for pileated woodpeckers. The reduction in suitable habitat and patch size could decrease the number of potential pileated woodpecker breeding territories by one to two pairs. However, enough suitable habitat would be present to support multiple breeding territories. Some snags and large trees would be removed by the proposed harvest, but at least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh, or next largest size class) would be retained (*ARM 36.11.411*) where present. In addition, 10 to 20 tons of coarse woody debris per acre would be planned for retention within harvest units except directly adjacent to private lands, where high-hazard fuel reduction is required. Although pileated woodpeckers are relatively tolerant of moderate amounts of human disturbance, disturbance associated with harvesting could adversely affect pileated woodpeckers on portions of the Project Area for approximately 4 years (should they be present in the vicinity of activities). However, no harvesting activities would occur during the pileated woodpecker breeding season. Thus, moderate adverse direct and indirect effects to pileated woodpecker habitat suitability in the Project Area would be anticipated as a result of the Action Alternative since: 1) forest structural changes would occur, but 1,108 acres (33.3% of Project Area) of suitable habitat would remain; 2) harvesting would reduce existing pileated woodpecker suitable habitat

availability by 427 acres (27.8% of available habitat) and alter 72 acres (4.7% of available habitat); 3) patch size of suitable habitat would decrease and connectivity would be altered to a moderate degree; 4) mitigations would include retention of snags and coarse woody debris within harvest units (*ARM 36.11.411, ARM 36.11.414*); and 5) pileated woodpeckers could be temporarily displaced during the non-breeding season for up to 4 years but would persist within the Project Area.

Action Alternative: Cumulative Effects on Pileated Woodpeckers
Under this alternative, pileated woodpecker habitat would be altered on 499 acres (13.6%) of the 3,656 acres of potentially suitable habitat in the CEAA. Harvesting would remove 427 acres of suitable habitat and reduce habitat suitability on another 72 acres of the CEAA. The number of suitable patches would increase from 52 to 59 and average patch size would decrease from 70 acres to 54 acres. The largest available patch would decrease in size from 1,680 acres to 1,265 acres. Snags, coarse woody debris, and potential nesting trees would be retained in harvest units according to forest management *ARM 36.11.41*; however, snags and snag recruitment trees would be reduced from existing levels in all the proposed harvest units. Disturbance associated with the proposed activities could adversely affect pileated woodpeckers near the Project Area for up to 4 years but timing restrictions on harvesting would minimize disturbance during the breeding season. Past harvesting in the CEAA has altered the quality and abundance of pileated woodpecker habitat; reductions associated with this action alternative would be additive to those reductions and any private lands harvesting within the CEAA (TABLE WI-2). Because almost half of the available suitable habitat within the CEAA occurs within the Project Area and suitable patches outside of the Project Area are generally smaller and more scattered, reductions in habitat and connectivity due to the Action Alternative would appreciably affect pileated woodpecker populations within the CEAA by one to two pairs. Firewood gathering along open roads would continue to limit the abundance of snags and woody debris within areas of the CEAA, however no new open roads would be built under the Action Alternative. Thus, moderate adverse cumulative effects to habitat suitability for pileated woodpeckers would be anticipated since: 1) 13.6% of suitable pileated woodpecker habitat currently present within the CEAA would be altered; 2) approximately 3,229 acres (27.7 of the CEAA) of suitable habitat would remain after logging; 3) patch size of suitable habitat would decrease and existing connectivity within the CEAA would be impacted by a minor degree; and 4) some snags and snag recruits would be removed in the proposed harvest areas for operational and human safety purposes, however, mitigation measures would retain at least 2 large snags and 2 large recruitment trees per acre in harvested areas.

Big Game

Issue
The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, increasing roads in secure areas, and disturbing animals.

Introduction
Timber harvesting can increase big game (e.g. elk) vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during times of hunting pressure (*Hillis et al. 1991*). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and resulting decrease in hunter opportunity. Large (>250 acres) heavily forested patches at least ½ mile from an open road that would limit visibility of elk (and subsequently deer) and hunter accessibility are considered security cover (*Hillis et al. 1991*). Hillis et al. (*1991*) also recommended that >30% of a fall elk herd home range area should contain cover patches meeting these criteria to provide adequate security for elk. It is expected that when elk security is substantially compromised, effects to deer can also be expected (albeit to a lesser degree than for elk).

Timber harvesting can affect big game and habitat quality through disturbance during harvest activities, removal of forest crown closure, and by creating openings in the forest used for foraging. Forested habitat with high crown closure on winter ranges enables big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be areas confined to lower elevations that support concentrations of big game, which are widely distributed during the remainder of the year. Suitable winter range stands have adequate midstory and overstory cover that reduces wind velocity and intercepts snow, while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose.

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 46,493-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The large CEAA surrounds the Project Area, is defined by borders that could reasonably influence big game movement patterns and approximates an area capable of supporting an elk herd home range.

Measurement Criteria
To assess big game habitat on the Project Area, SLI data were used to identify stands with cover types and forest structure (≥40 crown closure) that could provide thermal and/or hiding cover for big game species. Direct, indirect, and cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and a GIS analysis of available habitats.

To determine levels of elk security habitat, existing open roads were buffered by 0.5 mile and those areas identified as areas not meeting elk security habitat criteria (*Hillis et al. 1991*). Within the cumulative effects analysis area, recent timber harvest activities and permanent non-forest openings (e.g. lakes, wetlands) were taken into account as they likely reduce the amount of secure habitat for elk. Additionally, elk security habitat patches need to be large forested blocks (>250 acres) with adequate cover (≥40% crown closure) to afford elk security during the general big game hunting season, so areas failing to meet this criteria were also removed, leaving patches that were distant enough from open roads, were large enough to meet the minimum acreage criteria, and had adequate forest cover density to provide elk security habitat (*Hillis et al. 1991*).

Factors considered in the analysis include the amount and quality of winter range habitat available, the extent of past and proposed harvesting, and level of human access for recreational hunting.

Affected Environment
Portions of the proposed Project Area have been identified by DFWP as white-tailed deer, mule deer, moose and elk winter range (DFWP 2008) and use of the Project Area by big game during all seasons is likely. The entire Project Area (3,328 acres) is mapped as moose and white-tailed deer winter range. Approximately 731 acres (22.0% of Project Area) and 1,358 acres (40.8%) are considered elk and mule deer winter range, respectively. Evidence of summer season elk and deer use was observed during field visits to the Project Area. The Project Area contains approximately 2,475 acres (74.1% of Project Area) of habitat that are currently providing year-round cover and visual screening for big game. These acres also provide moderate to high amounts of thermal cover and snow intercept for wintering big game. Due to past forest management or open (dry) forest types, 642 acres (19.3%) of the Project Area have forested stands that are too open to be considered high-quality thermal cover or cover that would appreciably intercept snow. In some forest stands, insects and diseases are killing trees and decreasing overstory crown closure below 40%. Another 207 acres (6.2% of Project Area) are comprised of lakes and wetlands that do not provide cover. Additionally, hiding cover, which provides security for big game and reduces hunting mortality, is abundant in the Project Area. High levels of hunter access exist because of 13.8 miles of open roads, 2.7 miles of restricted road occasionally opened to disabled hunters for one month, and non-motorized access opportunities on 13.9 miles of trails as well as closed roads. Due to open roads, heavily-used recreational trails, and surrounding private lands, elk security habitat is not present within the Project Area and will not be analyzed further in this document.

Approximately 22,774 (49.0%) and 12,104 acres (26.0%) of the CEAA were identified as white-tailed and mule deer winter range, respectively (DFWP 2018). Moose and elk winter range comprise 44,852 acres (96.5%) and 12,995 acres (28.0%) of the CEAA, respectively. Winter range for deer and elk are generally located in the southern half of the CEAA, where elevations and snow loads are lower. White-tailed deer winter range within the CEAA is connected to a much larger winter range area (>500,000 acres) extending south through the Flathead Valley. Presently, approximately 16,565 acres (35.6% of the CEAA) across all lands are providing appreciable thermal cover and snow intercept for big game. These forest patches are currently well-distributed throughout big game winter range occurring within the CEAA. In the last 30 years, harvesting has reduced thermal cover and snow intercept on winter range within the CEAA. These recent harvests have reduced the quality and quantity of usable cover on winter range within the area, but they may have increased forage quality and quantity by opening up the forest overstory canopy. However, forage occurring in forest openings is often not available to wintering animals during appreciable portions of the winter due to deep, crusted snow conditions. Encroachment of noxious weeds into recently logged areas has also likely offset some of the potential gain in forage production. Ongoing and future harvesting (*see TABLE W-2*) could continue to reduce cover attributes on winter range and temporarily displace big game within the CEAA. The CEAA also likely receives moderate levels of hunter access/pressure, especially in areas where roads, both open and restricted, are more numerous.

Environmental Effects – Big Game

No Action Alternative: Direct and Secondary Effects on Big Game

Under this alternative, no proposed project activities would occur. Thus, no direct or indirect effects to big game habitat quality or security would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Big Game

Under this alternative, no proposed project activities would occur. Past forest management projects not associated with the proposed Beaver to Boyle Timber Sale(s) have affected big game habitat in the CEAA, and ongoing and proposed projects could affect habitat quality in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering big game habitat within the CEAA. Thus, since no additional changes in available habitat or security would be anticipated as a result of the No-Action Alternative, no cumulative effects to big game would be anticipated.

Action Alternative: Direct and Secondary Effects on Big Game

The proposed activities would affect up to 963 acres (28.9%) of the 3,328 acres of big game habitat available in the Project Area. Proposed harvest prescriptions on 818 acres (33.1% of the available cover) of would open stands to less than 40% canopy cover; causing the structure of these stands to become unsuitable to serve as thermal cover or snow intercept. Of these acres regeneration harvest prescriptions on 197 acres of harvest units would result in areas too open to effectively function as hiding cover, thermal cover or snow intercept for 40-60 years until suitable sized trees (>40 ft. tall) develop in harvested stands. Hiding cover would be expected to recover in 15-20 years. Intermediate harvest prescriptions on 621 acres would remove some tree canopy and mature trees, however small portions of these units would likely have patches of vegetation that could continue providing limited amounts of hiding cover, thermal cover or snow intercept. Proposed logging would increase sight distances in harvest units and could increase risk of hunting mortality. Retention of scattered patches of sub merchantable trees combined with broken topography in much of the Project Area would reduce sight distances and mitigate some of the mortality risk. Maintaining visual screening vegetation adjacent to open roads would also decrease big game mortality risk from hunters. Some short-term (1-4 years) displacement of big game would be expected as a result of the proposed motorized logging disturbance. Harvesting would not occur during the spring period or during calving/fawning season. No long-term changes in the amount of open roads would occur. Approximately 4.7 miles of existing restricted roads would be temporarily opened in combination with 0.4 miles of temporary road construction within the Project Area. During all phases of the project, existing restricted roads and new temporary roads opened with project activities would be restricted from use by the public and closed after completion of project activities. The 0.4 miles of new temporary road would be effectively closed to all motorized use at the conclusion of activities.

Thus, moderate adverse direct and indirect effects to big game habitat quality and security would be expected since: 1) harvesting would alter 33.1% of effective thermal cover/snow intercept in the Project Area; 2) approximately 1,657 acres (49.8% of Project Area) of habitat with thermal cover/snow intercept on winter range would remain; 3) sight distances and associated hunting mortality risk would increase on 963 acres, but would be partially mitigated by retention patches, visual screening along open roads, and broken topography; 4) relatively short-term (1 to 4 years) logging activities would create disturbance in this area; and, 5) there would be no long-term changes in open road density or motorized access.

Action Alternative: Cumulative Effects on Big Game
The proposed activities would affect up to 963 acres (2.1% of the CEAA) of big game habitat in the CEAA. Forest stands providing suitable thermal cover and snow intercept would be removed from approximately 818 acres and altered on another 145 acres on winter range within the 46,493-acre CEAA. Of the 818 acres, hiding cover would be removed on 197 acres in seed-tree harvest units. These reductions in visual screening, thermal cover and snow intercept would be additive to past reductions within the CEAA due to land development and forest management. A minor decrease in big game habitat quality on winter range within the CEAA would be expected, however only a small portion (<1%) of the larger winter range area falls within the proposed harvest areas. Appreciable changes in big game movements or populations within the CEAA would not be expected. Harvesting and motorized disturbance within the CEAA associated with the proposed project could displace wintering big game in the vicinity of the Project Area for up to 4 years. However, harvesting would not occur during the spring period or during calving/fawning season. Disturbance and changes in winter range habitat quality under this alternative would be also be additive to any displacement associated with ongoing and planned projects within the CEAA (*TABLE W-2*). Approximately 840 acres of DNRC-managed winter range habitat harvested over 30 years ago would continue to grow and could be providing appreciable thermal cover/snow intercept in the next 10-20 years. Under the action alternative, existing restricted roads and new road construction used for harvesting activities could temporarily increase access and disturbance on 6.8 miles of roads and result in a temporary increase in open road density to 2.5 miles/sq. mile within the CEAA. After harvesting, open road density would return to 2.4 mi/sq. mile in the CEAA and continue to facilitate hunter access. Thus, minor adverse cumulative effects to big game winter range and elk security habitat would be expected since: 1) harvesting would reduce overall levels of cover on 963 acres (2.1%) of winter range, 2) existing thermal cover and snow intercept on winter range in the CEAA would be removed on 818 acres, 3) overall habitat quality within the larger winter range would not be appreciably altered, 4) logging activities would create temporary disturbance lasting 1-4 years, and 5) long-term open road densities would undergo a minor increase.

Wildlife Mitigations

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435). Similarly, if undocumented nesting raptors or wolf dens are encountered within ½ mile of the Project Area contact a DNRC biologist.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per ARM 36.11.444(2) and GB-PR2 (USFWS AND DNRC 2010, Vol. II p. 2-5).
- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (USFWS AND DNRC 2010, Vol. II p. 2-6).
- Public access would be restricted at all times on restricted roads and temporary roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).
- Effectively close temporary roads to all motorized use at project conclusion.
- Restrict commercial harvest from April 1 to September 15 to minimize disturbance to wildlife during the spring and summer seasons.

- Restrict commercial harvest and motorized road maintenance activities from April 1 until August 1 in proposed harvest units “E” and “F” around Boyle lake (ARM 36.11.441). If loon breeding surveys conducted thereafter observe loons still on a nest, an extension of the timing restriction would be implemented.
- In a portion of harvest units, retain patches of advanced regeneration of shade-tolerant trees to break up sight distances for grizzly bears and big game, as well as benefit lynx habitat.
- Retain at least 2 snags per acre (≥21 inches dbh, or largest available size class) and 10-20 tons of coarse woody debris per acre where possible, and emphasize the retention of downed logs ≥15 inches dbh where they occur. Favor western larch, Douglas-fir and ponderosa pine for snag retention and recruitment.
- Retain visual screening along open roads by retaining up to 100 feet of vegetation to increase security for grizzly bears, big game, and other wildlife.
- Close roads and skid trails to the maximum extent possible following the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering.

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Figure WI-1 – WILDLIFE ANALYSIS AREAS. Wildlife analysis areas for the proposed Beaver to Boyle Timber Sale(s).

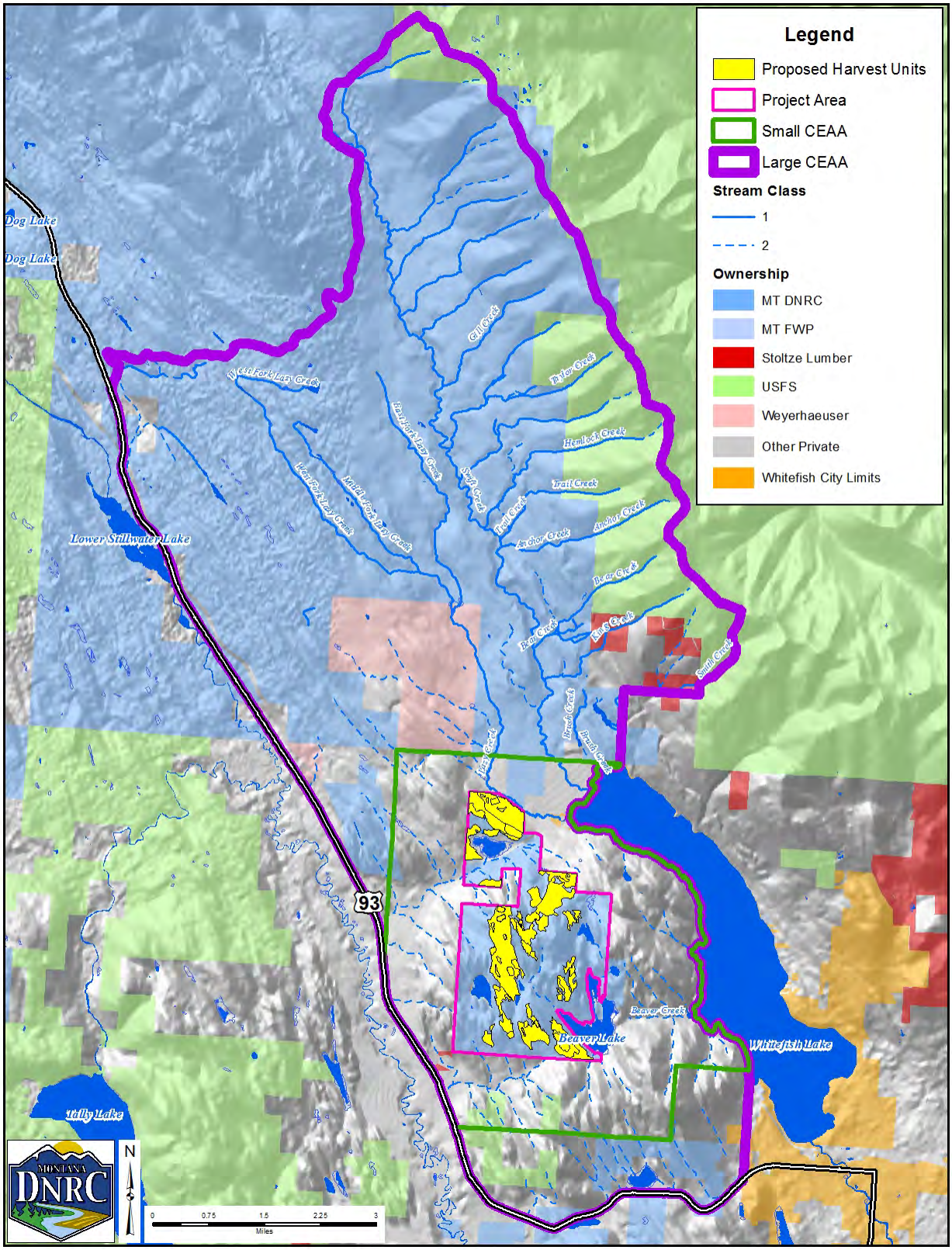
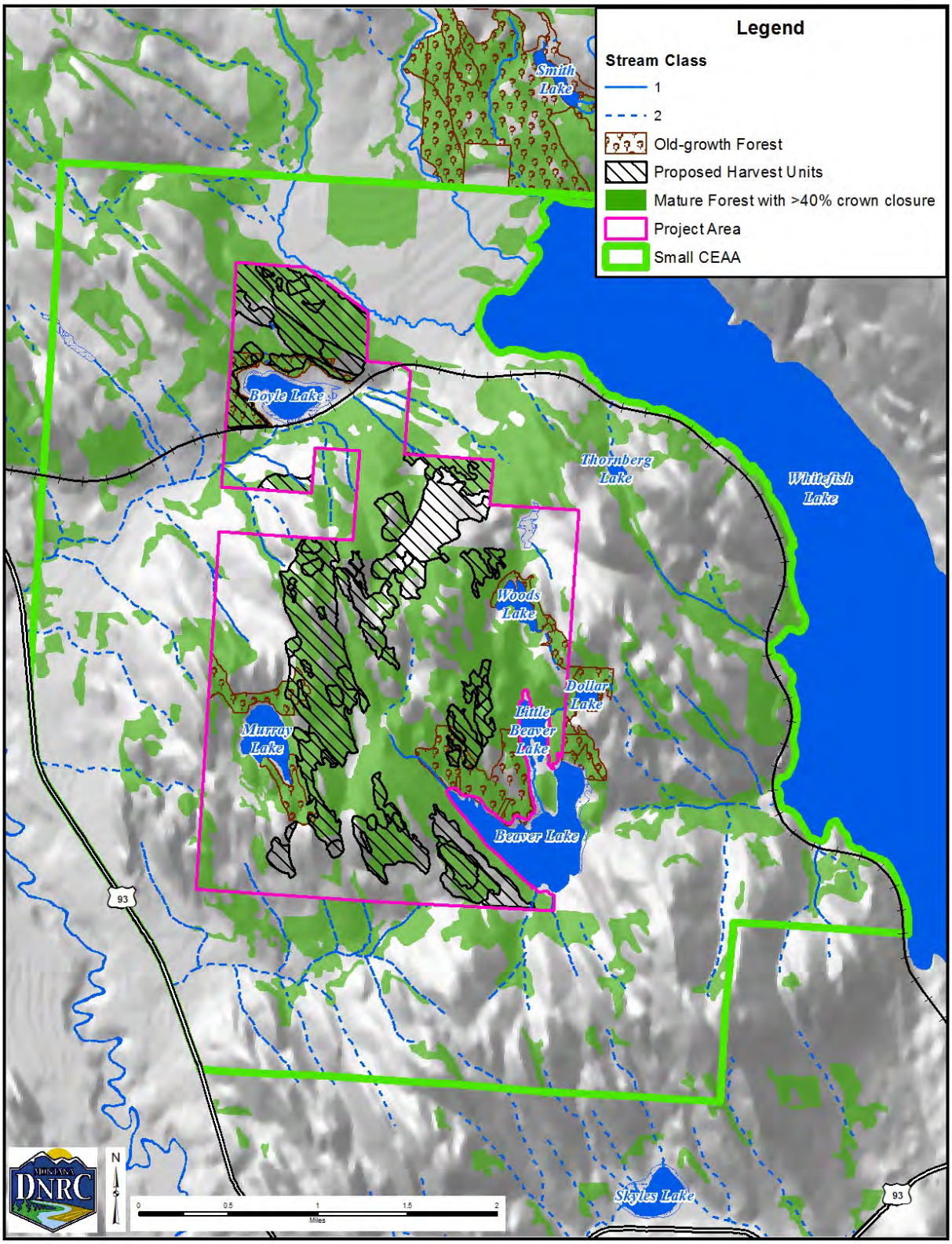


Figure WI-2 – MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY. Relationship of the Project Area and proposed units to mature forested stands and potential connectivity for the DNRC Beaver to Boyle Timber Sale(s).



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Appendix E –Aesthetics Analysis

Beaver to Boyle Timber Sale – Aesthetics Analysis

Analysis Prepared By:
Name: Michael McMahon
Title: Forest Management Specialist, Montana DNRC

Introduction

This analysis describes the existing landscape as it relates to attributes associated with aesthetic quality and viewsheds within the Beaver to Boyle Timber Sale project area and discloses the potential environmental effects the proposed action may have on those visual attributes.

Issues and Measurement Criteria

- *Activities associated with the proposed action may affect the visual quality as seen from the trail and road systems and several observation locations within or near the project area including along Delrey and East Lakeshore roads and within the Whitefish Mountain Resort.*

Regulatory Framework

The following plans, rules, and practices have guided this project's planning and/or will be implemented during project activities:
None

Analysis Areas

Primarily, the analysis of direct and indirect effects to aesthetics and viewshed looks qualitatively at the effects to foreground (close-up) views, middleground views, and background views from identified observation points. Observation points or areas that were determined to be important areas of concentrated public viewing are noted below. The cumulative effects analysis area utilizes the middleground and background observation points and considers views of a larger landscape, including private ownerships.

In the analysis of the foreground views (0 to 0.50 mile), the observation points are along primary open-road systems and along trails adjacent to proposed harvest units where continual views into the project may be of interest.

In analysis of the middleground views (0.25 to 4.0 miles), the following areas were used as observation points:

- Center of Beaver Lake
- East Lakeshore Drive near Luge Run Road, and
- Delrey road near Swift and Lazy creeks.

Background views (more than 4 miles) used observation points from the ski slopes on Whitefish Mountain Resort.

Analysis Methods

Potential impacts on the visual resource caused by timber harvesting and road building were determined based on the following assessments:

- How the visibility of the harvest areas would be impacted by harvesting and road building/improvement activities.
- How visual attributes associated with past and proposed harvest treatments, such as color and texture as determined by the amount and distribution of trees remaining on site, size characteristics, and species of retained trees, regeneration, and the distinct lines of harvest boundaries and roads, would change.

The locations of the observation points were based on field reconnaissance, aerial-photograph interpretation, use of the *Arcview GIS* programs, and *Google Earth*.

Existing Conditions

There are two geographical areas that will be described, the Beaver Lake and Boyle Lake areas.

- **BEAVER LAKE AREA:**

  Observation locations in the Beaver Lake area will include those areas along open roads and established trail systems near proposed harvest units (foreground views), center of Beaver Lake (middle-ground views), and on Whitefish Mountain Resort's ski slopes (background views).

  Timber sales in the Beaver Lake area started around 1919, but the most recent, large-scale harvest activities were between 1999 and 2012. In this recent time frame, the existing road system was revamped and approximately 8 MMbf was harvested with several harvest prescriptions.

  There are approximately 12.6 miles of open road and 25 miles of existing or planned trails in the Beaver Lake area, therefore the duration of view of the forest from roads and trails is extensive. The characteristics of past harvest treatments display a wide range of tree sizes (diameter and height), stocking densities (number of trees per acre), and tree species. Large down woody material lies across the landscape in both previously harvested and unharvested areas and is notable in foreground views. Sight distance into the forest varies and these foreground views are often limited by tree stocking densities and topography.

  The middleground views related to this proposed action are mostly limited to various private properties in the Lion Mountain area. Extensive views from the center of Beaver Lake are very limited into areas where the topography is gentle as the trees along the shoreline break up the view although several tall, prominent moraines are visible to the northwest. Very little past harvest treatments on State lands are visible from this location. Depending on the elevation of properties near Lion Mountain, the views include a mosaic of forest stand conditions and the broken topography that was a result of glacial deposits from the last ice age. The broken topography has played a key role in previous harvest unit boundaries which, depending upon the angle of view, may not even be detectable.

  From various areas on the Whitefish Mountain Resort's ski slopes, much of the Beaver Lake area is visible. One noticeable feature is the broken topography and geology due to glacial deposits from the last ice-age period. Topography has played a key role in the boundary location of past harvest areas; the topography has created natural barriers to harvest equipment accessibility. Past harvest areas are detectable from Whitefish Mountain Resort. The most recent harvests, between 1999 and 2012, cover approximately 33 percent of the State ownership in the Beaver Lake area. Characteristics viewed from the ski slopes include a mosaic of sizes and shapes of harvest areas, stocking densities, and patterns of trees left on those sites. Areas that have undergone more intensive treatment (i.e., clearcuts with reserves or seed trees with reserves) often appear lighter in color than those that have undergone intermediate treatments that were

less intensive. Winter conditions with snow on the ground define these areas more than during summer conditions.

- **BOYLE LAKE AREA**:
  There are no roads open to public motorized use within this area. The Whitefish Trail's Close the Loop trail is proposed in this area although no commitment has been made to construct the trail; this will be addressed in the cumulative effects section of this analysis.

  The description for foreground views in this area is very similar to what had been noted above for the Beaver Lake area.

  The middle-ground views related to this proposed action are mostly limited to the north end of Whitefish Lake and Delrey Road south of Swift Creek. Past regeneration harvest treatments (primarily units I and Y) and existing roads are nearly undetectable except for a slight coloration difference related to hardwood species that regenerated due to the ground disturbance. From Delrey Road, the ridge line and hillside north of Boyle Lake (Unit A) appears as a fully timbered landscape, and the 2002 seedtree harvest unit (Unit I in this proposal) is slightly visible as the fully stocked stand of sapling-sized trees, mainly western larch, now hide the forest floor.

  The background view description is similar to that noted above for the Beaver Lake area.

Environmental Effects

DIRECT AND INDIRECT EFFECTS

- *Direct and Indirect Effects of the No-Action Alternative to Aesthetics*

  Timber harvesting or road construction would not take place at this time. Effects to the visual resource would be from activities such as firewood gathering and recreational use, which are presently taking place. In time, tree growth would create more timber stands with closed canopies. Natural processes on the landscape, such as wildfire, blowdown events, insect infestations, or disease infections, would continue to alter the visual resource over time from foreground, middle-ground, and background vantage points.

- *Direct and Indirect Effects of the Action Alternative to Aesthetics*

  General

  The proposed silvicultural treatments, with exception of the precommercial thinning treatment, discussed in *CHAPTER II - ALTERNATIVES* would convert multistoried and multi-specie conifer stands to stands with open spacing, yet those stands would still maintain structural diversity. Structural diversity means the stands have a variety of tree sizes (heights and diameters), tree species, deadwood (standing and down), broken-topped trees, and large downed logs. In order to maintain structural diversity within stands, DNRC would retain:

  - as many of the larger snags as are safe to leave,
  - 2 to 50 larger-diameter, disease-free trees per acre, with preference given to ponderosa pine, western larch, western white pine, and Douglas-fir;
  - healthy, vigorous, intermediate-sized trees with greater than 35 percent of the tree having a live crown that is conical in shape;
  - healthy, vigorous, sapling-sized trees along roads and scattered throughout the stands; and
  - large, down woody debris left in varying amounts, depending on its location in the wildland/urban interface.

  Once the regeneration (seedtree and shelterwood with reserve trees harvest treatments) harvest areas are logged, the stands would be more open, but would still contain most of the same tree species. Western

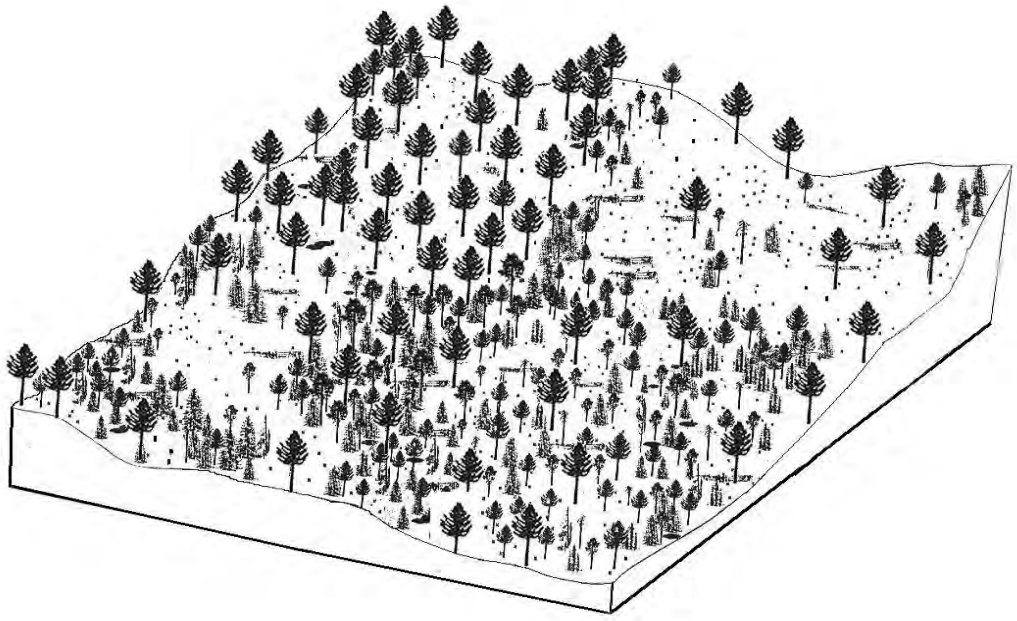
larch would be regenerated, adding to the diversity of small trees as well as to the colors associated with western larch in the spring and fall.

On 133 acres, the proposed overstory removal would convert two-storied stands into primarily single-storied stands with scattered or grouped overstory trees.

In the commercial-thin or improvement-cut areas, similar attributes would be retained, but more trees per acre would be left, although generally they would be within the 8- to 14-inch size class. These remaining trees would generally have live crown ratios greater than 35 percent and would likely be either the Douglas-fir or western larch tree species.

Many of the harvest areas proposed to harvest with an improvement cut lend themselves to a combination of several prescriptions and following harvest may appear as displayed in the following graphic, FIGURE AES.1, Graphic Detail of Improvement Cut.

Figure AES.1: Graphic Detail of Improvement Cut



General Assessment of Attributes and Mitigations Associated with Foreground Views

With the application of the following project design elements, vegetation damage and soil disturbance would have short-term effects to the visual resource as seen from roads and trails within the project area. The following design elements and mitigations include, but are not limited to:

- slashing (cutting down) small trees and shrubs that are damaged during logging;
- limiting the location, size, and number of landings (areas where trees or logs are taken to be prepared for transport to sawmills);
- grass seeding disturbed areas around landings and along roads; and
- feathering or leaving more trees along the edges of harvest units and trail system.

Some large logs or large down woody debris would be left on site for soil, water, and wildlife conservation. The finer branches and tops would be piled and burned or trampled into the duff layer to reduce fire risks. Through plant succession, initially grasses and forbs, then trees and shrubs, would regenerate and begin to cover the downed material.

The view distance into the harvest units and to broader landscapes would be increased due to the reduction in tree densities along roadways and trails. Retaining areas of brush and small trees along roadways, across topographic breaks, and near the edge of harvest areas would reduce viewing distances and soften the edge effect near harvest area boundaries.

There is usually a lag time between the harvesting of trees and final cleanup of harvest units. In this project, DNRC plans to complete the harvest in fall/winter periods and contract the final fuels cleanup and site preparation the following summer/fall period. Short-term visual impacts are anticipated and, over time, brush, grasses, and seedlings would regenerate lessening the visual impacts.

The harvest area size and the length of harvest unit along maintained roadways and trail systems were considered in evaluating effects for viewing distances.

General Assessment of Attributes and Mitigations Associated with Middle-ground and Background Views

In the Beaver Lake area, seasonal color contrast would be the most notable effect at these landscape levels. Short term, the contrasts would be most notable immediately after harvesting and, for a longer period of time when snow is present on the ground.

In the Boyle Lake area harvesting within Unit A on the northeast face ridge, approximately 90 acres (most of the unit) would be very visible. The proposed harvest is an improvement cut; extra mature trees would be retained in groups from 1/10th of an acre to 10 acres. This would provide a mosaic of seedtree openings, moderately stocked areas, uncut areas, and areas with vigorous sapling-sized understory trees (an overstory removal situation). Also, more trees would be retained along boundaries adjacent to private property; this would have a feathering effect into their denser, uncut stands of timber.

The following description of treatments provides a level of variation one might expect to see on this hillside in Unit A:

- The seedtree areas would be open with trees spaced approximately 75 feet apart. This would appear quite open with the forest floor potentially visible. The forest floor would be brown in the short-term due to logging slash and logging skid trails that are visible, and in the winter the snow layer would be more prominent. The benches in this area would receive more of the seedtree treatments, much of which wouldn't be visible due to the angle of view from the Delrey Road.
- Several areas would have extra trees (reserve trees), retained; these areas would be thinned and have up to 50 larger-sized trees per acre which would break up the open seedtree areas. Visibility to the forest floor would be limited and the texture and color should remain similar to current conditions.
- An area near the ridgeline is steep and most of this portion of the unit would not be harvested so the texture and color should remain similar to current conditions.
- The area below existing roads in this unit generally have a continuous layer of smaller sapling-sized trees that would be retained and thus reduce the view to the forest floor, meaning there would be less brown visible from the logging slash and less white from the snow in the winter.

The angle of view also has an effect on texture. Looking up from Delrey Road, the tree crowns intercept the direct view of the ground and make the area appear more uniform. Looking down at the project area from the ski slopes, the ground can be seen through the tree crowns; this presents a view that defines the patchiness or uniformity of the leave trees and often gives a clearer view of road systems.

Many of the harvest boundaries are defined by topographic features such as sharp ridgelines, cliffs, or draws. These boundaries would often be aligned with boundaries noticed following wildfires.

CUMULATIVE EFFECTS

- *Cumulative Effects of the No-Action Alternative on Aesthetics*

  No harvesting associated with this project would occur at this time. Those DNRC timber stands that had been recently regenerated from harvests between 1999 to 2006 would continue to grow and canopy coverage would begin to lessen the view of the ground. Western larch is regenerating and the seasonal color changes associated with this species would become more apparent over time. Those mature stands with tree mortality would begin to show a change in stand texture as deadfalls create spaces in the tree canopies.

  Cumulative impacts to the proposed Whitefish Trail's Close the Loop trail would not occur as a result of this project. The trail would continue through second growth and mature timber stands as are currently on the ground.

  Historically, much of the private ownership and DNRC ownership has been harvested creating a mosaic of forests and associated textures, lines, colors and forms on the landscape.

- *Cumulative Effects of the Action Alternative on Aesthetics*

  Those timber stands managed by DNRC that have been recently regenerated from harvests around 2003 would continue to grow and canopy coverage would begin to lessen the view of the ground. Western larch is regenerating and additional areas would most likely regenerate with western larch so the seasonal color changes associated with this species would become more apparent over time.

  Cumulative impacts to the proposed Whitefish Trail's Close the Loop Trail would occur as a result of this project. The trail would continue through new areas of regeneration, second growth, and mature timber stands. Short-term effects would be similar to those described in the direct and indirect effects foreground section of this report. Treatment of this area would also open views of the Swift Creek drainage and mountains to the north and northeast.

  Historically, much of the private ownership and DNRC-managed state land has been harvested, creating a mosaic of forests and associated textures, lines, colors, and forms on the landscape. The proposed action would be similar but would be additive to changes that have taken place within the viewshed historically.

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Appendix F – Recreation Analysis

Beaver to Boyle Timber Sale – Recreation Analysis

Analysis Prepared By:
Name: Nicole Stickney
Title: Real Estate Specialist / Recreation, Montana DNRC

Introduction

Many residents and nonresidents in Montana enjoy recreational opportunities on the state trust lands that surround the greater Whitefish area. Over 196,000 acres, which are managed by DNRC's Stillwater and Kalispell units, are available for various recreational activities.

This analysis describes recreational uses in the project area and surrounding areas. It also discloses the potential environmental effects and impacts on the human population that the proposed No-Action and Action alternatives may have on those uses.

Issues

- *The proposed action could disrupt recreation on the Beaver Lake trail system and within the Recreation Use Easement boundaries.*
- *Timber harvesting and slash cleanup may impact proposals such as the Connect the Loop project.*

Regulatory Framework

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

- Whitefish Area Trust Lands Neighborhood Plan (2004)
- Real Estate Management Programmatic Plan Environmental Impact Statement (2005)
- Beaver Lakes Area Deed of Public Recreation Use Easement with the City of Whitefish (2015)

Analysis Areas

The analysis area for recreation includes the project area as shown in Attachment A-4 Recreation Map and includes the Beaver Lakes Area Public Recreation Use Easement (Recreation Use Easement), and the existing and proposed Whitefish Trail segments located in the Beaver Lake and Boyle Lake areas. The project area will be used to determine direct, indirect and cumulative effects of the proposed No-Action and Action alternatives on the recreation resource.

Analysis Methods

This analysis identifies recreational uses and potential conflicts between timber harvesting activities, the trail system and recreational uses. The following criteria were established to evaluate the extent of the potential direct, indirect, and cumulative effects the proposed action may have on recreational uses in the area:

- Changes in road conditions and use

- Changes in use related to the recreation easement
- Changes in general recreation use
- Changes in use to recreational licenses and leases

Existing Conditions

Beaver Lake Area

Road Access and Condition

Beaver-to-Boyle Project Area encompasses 12.6 miles of open State forest roads that allow motorized recreational access to lakes, homes, trails and trailheads, and fishing and boating access points. These forest roads also provide access for forest management and were constructed to minimum standards to facilitate BMPs for log hauling. Since 1999, when the existing transportation plan was devised, timber sale monies have provided for road upgrades such as turnouts, drainage features, improved visibility, and safe driving surfaces.

Road maintenance is generally conducted before and after log hauling is complete and was last done in 2014 on several roadways connected with the Beaver Swift Timber Sale. The roads were not designed for all-season use. Vehicle traffic over the years, especially in the wet or very dry periods, has led to deterioration of road surfaces. Roads with the higher levels of public use, such as South Beaver and North Beaver roads, have deteriorated making travel slow and difficult through the many potholes and exposed rock areas.

Other than the sections of North Beaver Lake and North Woods Lake roads that connect to Spur 18A, these roads are not routinely plowed in winter months. Motorized access on the remainder of these roads in the winter is usually by snowmobile.

Beaver Lakes Area Public Recreation Use Easement with the City of Whitefish

In July of 2015, the State of Montana Board of Land Commissioners granted the City of Whitefish a public recreation easement consisting of 1,520 acres in the Beaver and Skyles lakes area. Within the analysis area, the Whitefish Trail system consists of six existing trailheads (North Beaver, Beaver Lake, Woods Lake, Dollar Lake, Lion Mountain, and Skyles Connection) and 24 miles of natural surface trail. These trail systems include stacked loops, scenic overlooks, single-track trails, and gated logging roads. In the summer of 2019, a one-mile segment of trail was constructed to connect the existing trail system to the Beaver Lake boat launch. Additionally, boat launch improvements were completed in the fall of 2019 that include an informational kiosk, seasonal toilet facilities, a wood observation deck and graveled viewing areas. Approximately 1 mile of trail has yet to be built that was approved under the 2015 easement. As provided for in the easement, a State General Recreational Use License is not required when recreating within the Whitefish Trail corridor.

Along with the authorization for the Whitefish Trail and associated amenities, the easement also allows for the City of Whitefish and Whitefish Legacy Partners (WLP) to host non-commercial, special events such as equipment demonstrations, outreach activities, fundraising events, educational activities, hikes, and bicycle events. The Whitefish Trail Learning Pavilion, located 0.5 miles from the Lion Mountain Trailhead (managed by DNRC's Kalispell Unit), offers a base or gathering point for environmental educational programs for the community and opportunities for people to engage with their natural surroundings.

In April 2018, a research paper titled, "The Economic Impact of Outdoor Recreation and the Whitefish Trail in Whitefish, Montana" was published by Headwaters Economics. They installed Eco-Counter infrared trail counters at the four most popular Whitefish Trail trailheads: Lion Mountain, Beaver Lakes, Swift Creek, and Spencer Mountain. These counters detect and tally the number of people that pass by the counter, regardless of travel mode. Headwaters Economics also conducted in-person surveys at the four trailheads and four in-town locations from May 1 through October 31, 2017. The research paper reported that Lion Mountain is the most popular trailhead, with 33 percent more uses than the other three trailheads combined. Travel modes varied substantially across trailheads, with Lion Mountain and Swift Creek the main destinations for pedestrian

users. Spencer Mountain was used by 66 percent mountain bikers, and Beaver Lakes was used by 50 percent bicyclists and 50 percent pedestrians.

Summarized trail user data from the WLP and Headwaters Economics 2017 report are provided in Table R-1. *Trail Usage January 2017 – December 2017*.

Table R-1. Trail Usage January 2017 – December 2017

Trail	Yearly Total Visits	Summer Monthly Average Visits (June-Sept):	Winter Monthly Average Visits (Dec-Mar):	Average Summer Daily Visits (June-Sept):	Average Winter Daily Visits (Dec-Mar):
Lion Mountain	**43,615**	**4,812**	**2,353**	**158**	**78**
Swift Creek	**13,473**	**1,818**	**573**	**60**	**19**
Beaver	**8,237**	**1,136**	**311**	**37**	**10**
Spencer	**9,654**	**1,285**	**196**	**42**	**7**

General Recreation

The Beaver Lake area is open to hunting, fishing, and other recreational activities. Hunting and fishing (conservation) licenses include authorization to hunt and fish on state lands. In fiscal year 2019, 499,969 conservation licenses were sold state-wide. General recreation outside of the Recreation Use Easement requires a State General Recreation Use License. DNRC reports that the number of General Recreational Use Licenses sold state-wide in 2019 was 13,879. DNRC's *Recreational Use Rules (ARM 36.25.146* to *162)* apply to these lands outside of the Recreation Use Easement and regulate and provide for the reasonable use of legally-accessible state school trust lands.

This popular recreation area is open to visitors and residents for hunting, fishing, camping and other recreational activities. Other than the Whitefish Trail system and the Montana Fish, Wildlife, and Parks (MFWP) boat ramp on Beaver Lake, there are currently no developed and maintained recreation sites such as picnic/day use or campsites in this area. Some undeveloped sites do exist along roads and near lakes throughout the project area. These sites usually consist of rock fire rings and/or small openings for tents.

Special Recreation Licenses and Leases

Along with general dispersed recreational use, the DNRC also grants Land Use Licenses (LULs) and Special Recreational Use Licenses (SRULs). LULs are term licenses that are non-exclusive and are usually commercial in nature. They may consist of some minor development such as trails, etc. Beyond the Boundaries, a local business that offers guided bicycle tours, lessons and youth camps, has an existing LUL to operate in the project area. Whitefish Bike Retreat, a local business that offers lodging and other recreational amenities, also has an existing LUL to maintain and utilize a short spur trail that connects their private property to the Whitefish Trail.

SRULs can be commercial or non-commercial in nature and are issued for short-term concentrated use such as product demo days, races and special events. The DNRC mitigates the authorized use to prevent damage to existing developed trail-related improvements.

Since the 1950s there have been 20 developed residential cabin leases on the north and south shores of Beaver Lake. These cabin sites have been primarily used for recreational purposes and not as year-round residential homes. In 2015, the DNRC initiated the cabin site sale program where lessees could nominate their lease for sale. Since that time, three lots on Beaver Lake have been sold and six are currently in the sale program for 2019.

Boyle Lake Area

Road Use and Condition

Public access to this area is restricted due to the surrounding adjacent private property. DNRC does have an existing easement for forest resource management purposes on the road access from the west side of this parcel.

Forest logging roads are in place and only in need of minor maintenance. One two-track road would need realignment and widening to access two timber stands along the north and west side of Boyle Lake.

Beaver Lakes Area Public Recreation Easement

The Boyle Lake area is outside the Recreation Use Easement, therefore direct and indirect effects will not be analyzed for this area. Cumulative effects will be addressed as related to the Close the Loop and Public Recreation Use Easement Project EA (2019).

General Recreation

Boyle Lake currently receives little public use due to the lack of trails and access roads into the area. Some recreational use such as hunting and fishing does occur by illegally crossing the BNSF railroad tracks that lie to the south or by trespass by motorized UTVs and passenger vehicles from private or railroad property.

Special Recreation Licenses and Leases

Due to the lack of public access, DNRC has not issued recreational licenses and leases, therefore direct and indirect effects will not be analyzed for this area although cumulative effects will be addressed.

Environmental Effects

No Action Alternative: Direct and Indirect Effects

Under the No Action Alternative, it is anticipated that DNRC would improve and recondition the main roads open to public motorized uses especially in the Beaver Lake area. North Beaver and South Beaver roads would be the primary roads to recondition. DNRC would continue to monitor and maintain road closures to address the unauthorized use of motorized vehicles.

It is also anticipated that no appreciable changes or conflicts would result with following list of current uses:

- Uses related to the recreation easement
- Traditional recreational pursuits such as camping, hunting and fishing
- Licensed activities

Action Alternative: Direct and Indirect Effects

Beaver Lake

Road Use and Condition

The proposed project would directly affect 12.6 miles of open roads that are currently accessible to the public. Designated roads associated with the proposed timber sale would be reconditioned and upgraded to meet BMPs. Reshaping and grading the roads would enhance motorized access into the project area. Dust abatement could be used on haul roads to control dust and stabilize road surfaces to prevent the loss of fine-grained soil particles from the road surface fines during dry conditions. This would most likely lead to higher numbers of recreational users accessing areas in the Beaver Lake area where road conditions are currently poor.

Haul routes would be utilized in the Beaver Lake area over a three-year period. Log truck traffic would temporarily limit public access on open road systems in the short term with delays and temporary road closures. Temporary traffic delays would be expected on all haul routes where logging activities are active. Temporary closures along roads and some trails are expected on South Beaver Road when there is active

logging. Closures may be in effect Monday through Friday with the area generally being open for public use Saturday's and Sunday's during the winter months.

To lessen overall disturbance to public access on open road systems, harvest unit schedules would be grouped together in phases based on geographic area. For example, units that would utilize the South Beaver Road as a haul route would be harvested during one season. Likewise, units R, S, and T would utilize the North Beaver Lake Road and be harvested during one season.

Winter logging may positively impact recreational access during the winter months when haul roads are being plowed. Recreational users that could benefit most from this would be ice fisherman and other winter recreationalists.

Beaver Lakes Area Public Recreation Easement

This project, as designed, would preserve the existing and future recreational value of the area as identified in the Recreation Use Easement. DNRC land managers met with the City of Whitefish and WLP on several occasions to discuss project layout and design of the proposed timber sale. The intent of these meetings was to implement the timber sale in coordination with the recreational use of the area and develop solutions to minimize conflicts with these uses. For more information related to project design and development and associated mitigations related to recreation, please see the Project Development section of the EA and mitigations to be applied in Appendix G – Stipulations and Specifications.

Even with mitigations developed and implemented, there would be some short-term negative impacts to the user experience on the Whitefish trail system. Noise disturbance from active machinery would be audible to recreationists and nearby residents. For user safety, segments of the trail which go through proposed harvest units would be temporarily closed during active logging of those units. Due to these disturbances, recreational use of the trail system would likely decrease the overall use of the area in the short term. DNRC anticipates the decrease in use would be low to moderate. How much decrease in use would depend on the availability of areas providing similar access nearby and harvest activity schedules.

As stated under the existing condition, the easement allows for the City of Whitefish and WLP to host noncommercial, special events. DNRC would coordinate on how to accommodate the events but there may be some unavoidable short-term conflicts with the proposed timber sale. The City of Whitefish and WLP may choose to not host some events in the Beaver Lakes area and instead move the event location elsewhere.

General Recreation

The proposed project would have direct negative impacts to traditional recreational pursuits such as fishing, picnicking, hunting, berry picking and dispersed camping. As stated above, there would be noise disturbance and temporary delays and road closures especially during the weekdays on specific haul routes during active logging. There would also be direct impacts to those users wishing to access the MFWP Beaver Lake boat launch as temporary closures are expected on South Beaver Road during active logging. Since DNRC would only allow one winter season to harvest units along the South Beaver Road, the effects would be very short term. Hunters, over the length of the project, may not be able to hunt their usual areas but again that is a short-term impact. Overall, reduction in general recreational use would likely decrease the overall use of the area in the short term.

Special Recreation Licenses and Leases

The proposed project would have direct impacts to Land Use Licenses (LULs) and Special Recreational Use Licenses (SRULs). In the short term, Beyond the Boundaries would be negatively affected as the proposed project would limit areas of the trail system that they are authorized to use. Their existing license however also covers areas of the Whitefish Trail that are outside the analysis area where they could continue to operate without conflict.

The Whitefish Bike Retreat could also be negatively impacted by the proposed project. While Whitefish Bike Retreat is only authorized to maintain a short spur trail that connects to the Whitefish Trail, it is assumed that a moderate amount of their guests utilize this spur trail to connect to the Beaver Lake area trail system due to proximity.

The Beaver Lake residential leases and lots would be negatively affected mostly by road delays and noise disturbance. How much they would be affected would depend largely on harvest activity schedules. For example, if logging is active in the winter months when the cabins are not inhabited, the effect on lessees would be minor.

Boyle Lake

Road Use and Condition

Designated haul roads associated with the proposed timber sale would be upgraded to meet BMPs. The access road into units E and F would be improved for log hauling and site preparation. This road has been bermed to prevent illegal motorized disturbance adjacent to Boyle Lake.

General Recreation

As there is currently no public access, DNRC would continue to maintain road barriers to limit vehicular trespasses from adjacent private properties.

Cumulative Effects of The No-Action and Action Alternatives for The Beaver Lake and Boyle Lake Areas

Past and present recreational development (Trail Runs Through It/Whitefish Trail- Recreation Use Easement) has increased the use in the area, both motorized and non-motorized.

Other planned or proposed recreational developments and easements, such as the proposed the Close the Loop Trail project would increase the overall use in the area and would further preserve recreational opportunities. If the Close the Loop trail is established, the easement would perpetually provide for public access in the trail corridor.

If or when the Close the Loop Trail is constructed and legal access is obtained to cross the BNSF rail line south of Boyle Lake, then nonmotorized use of the Boyle Lake area would moderately increase under both alternatives. A mitigation under the Action Alternative would delay construction of the Close the Loop trail until logging activities have been completed.

An increasing local population and visitor numbers around Whitefish along with the popularity of outdoor recreation would also increase use of the Beaver-to-Boyle project area. Additional use would likely result in conflicts between motorized and non-motorized users, between hunters and other recreationists, and between pedestrian and bicycle use.

RECREATION REFERENCES

Lawson, Megan, Ph.D. (2014). *The Economic Impact of Outdoor Recreation and the Whitefish Trail in Whitefish, Montana.* Headwaters Economics

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Appendix G – Stipulations and Specifications

Beaver to Boyle Timber Sale – Stipulations and Specifications

Stipulations and specifications for the Action Alternative include project design provisions that follow Forest Management Rules, relevant laws and regulations. They also include mitigations that were designed to avoid or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by, and occurring during the contract period, would be contained within the Timber Sale Contract. As such, they are binding and enforceable. Project administrators would enforce stipulations and specifications relating to activities such as hazard reduction, site preparation, and planting, that may occur during or after the contract period.

The following stipulations and specifications would be incorporated into the selected Action Alternative to mitigate potential effects on resources.

Aesthetics

- Damaged residual vegetation would be slashed.
- The size and number of landings would be limited.
- Disturbed soil sites along road rights-of-way would be grass-seeded.
- Leave trees are to be left with both even and clumpy distributions.
- Where possible, a higher number of trees will be left closer to unit boundaries to feather stand edges.
- The temporary roads and all jump-ups would be reclaimed after harvesting.
- A higher concentration of trees would be left within 100-foot buffers in units along open roads.
- The size and number of landings would be limited; most landings along South Beaver Road would be off the road in an area with limited visibility.
- Unburned portions of landings near roads and trails would be spread out, re-bunched and burned, or buried. On some landings there may be potential to redistribute topsoil over the site to improve the regrowth of native vegetation.
- In most harvest areas, trees of all diameter size-classes and species would be retained. To help provide structure or different forest levels (overstory, mid-story, and understory) for the near term as well as the long term, retained trees would generally be the healthiest trees with full crowns. Wildlife trees and snags would also be left.
- Within the improvement cut harvest areas there are numerous areas designated as ‘no-cut’ areas mainly due to steepness of the topography. These ‘no-cut’ areas, along with strips of small trees along roads, would help reduce the sight distance into the harvest areas.
- Most of the areas treated with the intermediate harvest treatment would have 30-50 larger trees per acre remaining individually or in groups.
- Unit A has a northeast exposure towards the East Lakeshore Drive and Delrey Road. There is also a proposed trail associated with the Close the Loop project that would traverse through Unit A. An improvement cut that would vary the retention of trees across the hillside, thereby reducing the effects to some viewsheds. Seedtree areas within this prescription would be irregularly shaped and trees would be retained in larger groups within the area. More densely stocked intermediate harvest areas would be mixed in with the seedtree areas and retain a diversity of tree species, tree sizes, and densities.

- Extra trees would be retained to the north and below the road in Unit A. The crowns of the trees would help reduce the visibility of the road.
- Logging would be excluded from 16-foot trail corridor easement and there would be an additional buffer between actual harvest unit and the trail easement although this does not exclude harvest within that buffer.
- Logging skid trails would cross the trail system perpendicular to the tread on most trail crossing sites. City of Whitefish and WLP have visited most sites and an agreement has been reached on how to address damage caused by harvest operations.
- Unit boundaries near existing trail corridors would coincide with natural topographic or vegetation breaks. Additional trees would be marked for harvest in the buffer areas between the unit boundaries and the trail corridors. In these buffer areas, higher numbers of trees would be left to feather stand edges
- Temporary roads would be reclaimed, grass seeded and receive some level of weed control after site preparation.

Air Quality

- To minimize cumulative effects during burning operations, burning would be done in compliance with the Montana Airshed Group reporting regulations and any burning restrictions imposed in Airshed 2. This would only allow for burning during conditions of acceptable ventilation and smoke dispersion.
  - Only burn on days approved by the Montana/Idaho Airshed group, DEQ, and Flathead County air quality regulations.
  - Conduct test burn to verify good dispersal.
- Dozer, excavator, landing, and roadwork debris would be piled clean to allow ignition during fall and spring when ventilation is good and surrounding fuels are wet. The Forest Officer may require that piles be covered so the fuels are drier, ignite easier, burn hotter, and extinguish sooner.
- To reduce smoke production, some large woody debris would be left on the forest floor to minimize the number of burn piles.
- Dust abatement may be applied on some road segments, depending on the seasonal conditions and level of public traffic.
- DNRC would work with the logging contractor to haul during morning or in the damper seasons to reduce road dust. Dust abatement may be used as necessary.
- If necessary to reduce dust from roads, a slower speed limit may be imposed on State roads and is currently set at 25 mph on the County road. DNRC will be monitoring complaints and operations.

Archaeology

- A contract clause provides for suspending operations if cultural resources were discovered; operations in that area may only resume as directed by the Forest Officer following consultation with a DNRC Archeologist.
- If cultural resources were discovered, the Confederated Salish and Kootenai Tribes would be notified.

Fisheries

- Apply all applicable Forestry Best Management Practices (BMPs), including the Streamside Management Zone (SMZ) Law and Rules, HCP commitments, and Forest Management Rules for fisheries, soils, and watershed management (*ARMs 36.11.425* and *36.11.426*).
- Apply the SMZ Law and Rules to all streams and lakes.
- Monitor all road-stream crossings for sedimentation and deterioration of road prism.

Noxious Weed Management

- All tracked and wheeled equipment would be cleaned of noxious weeds prior to beginning project operations.
- Disturbed roadside sites would be promptly revegetated with a native grass seed mix. Roads used and closed as part of this proposal would be reshaped and reseeded.
- DNRC foresters would continue to monitor weed populations and spray herbicide within the project area to contain and suppress Category 2A weeds, such as orange hawkweed and tansy ragwort. Many areas and roads would be sprayed before harvest activities begin.

Recreation

- Information such as road closures and log hauling activity would be disseminated to the public through signage and other means of public notification such as postings in local newspapers, coordinating social media venues with WLP and City of Whitefish, or at operation meetings with DNRC winter recreation lease holders. Individuals desiring progress updates, trail closures, and other communications pertinent to this project may subscribe to be contacted by the Stillwater DNRC listserv by emailing Matt Lufholm at **mlufholm@mt.gov**. Please include "LISTSERV – BEAVER TO BOYLE" in the subject line of your email. Information will also be shared with the Whitefish Legacy Partners and the City of Whitefish on their respective websites:
    - www.whitefishlegacy.org
    - www.cityofwhitefish.org
- Logging would be excluded from 16-foot trail corridor easement and there would be an additional buffer between actual harvest unit and the trail easement although this does not exclude harvest within that buffer.
- Logging skid trails would usually cross the trail system perpendicular to the tread. City of Whitefish and WLP have visited most sites and an agreement has been reached on how to address damage caused by harvest operations.
- Logging and log hauling operations would be accomplished during times of the year when recreation use numbers are historically lower.
- Harvesting would begin in the fall after Labor Day except on units along the South Beaver Road. Operations in these units (V-Z) would begin when frozen soil or snow depth would limit soil disturbance.
- Harvest and log hauling would occur into March or until County road load limit restrictions are put in place.
- Logging operations in units V-Z, along the South Beaver Road would be completed in 1 operating season.
- Logging operations in units R-T would be completed in 1 operating season.
- Some roadwork may be completed in May of each year when compaction of road surface is ideal.

- Site preparation for regenerating new trees, fuels reduction treatments and precommercial thinning would likely occur during summer and fall periods. Plans would be made to accomplish this work within one season following logging. These activities would not require road-use restrictions.
- Gates on road systems may be temporarily closed Monday through Friday to prevent public ingress into logging operation areas. Notice will be provided as described in the first bullet above.
- Harvest activity may be conducted during weekends, provided that the activity is not within 300 feet of open roads or the Whitefish Trail Easement Corridor.
- No slash piles will be located closer than 66 feet from the trail corridor.

Soils

Soil Compaction and Displacement

- Limit equipment operations to periods when soils are relatively dry (less than 20 percent), frozen, or snow-covered in order to minimize soil compaction or displacement and to maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- On ground-based units, the logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and how many additional trails are needed. Skid trails that do not comply with BMPs (i.e. draw-bottom trails) would not be used without additional mitigation and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.
- Tractor skidding should be limited to slopes less than 40 percent unless the operation can be completed without causing excessive displacement or erosion. Based on site review, short, steep slopes above incised draws may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline, and skidding from more moderate slopes of less than 40 percent.
- Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrently with operations.
- Slash disposal: Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent, unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.
- Retain 10 to 25 tons of large woody debris and fine litter as feasible following harvesting. On units where whole-tree harvesting is used, implement one of the following mitigations for nutrient cycling:
    1. Use in-woods processing equipment that leaves slash on site;
    2. For whole-tree harvesting, return-skid slash and evenly distribute in the harvest area; or
    3. Cut tops from every third bundle of logs so tops are dispersed as skidding progresses. Sites near private property, trail system and open roads would have less large woody debris and fine litter left to reduce fire hazards.

Erosion

- Roads used by the purchaser would be reshaped and the ditches redefined prior to use to reduce surface erosion.
- Drain dips and gravel would be installed on roads as needed to improve road drainage and reduce maintenance needs and erosion.

- Some road sections would be upgraded to meet design standards that reduce erosion potential and maintenance needs.
- Certified weed-free grass seed and fertilizer would be applied in a prompt and timely manner to any existing disturbed cutslopes, fillslopes, and landings immediately adjacent to open roads. Seeding to stabilize soils and to reduce or prevent the establishment of noxious weeds would include:
  - Seeding all road cuts and fills concurrent with construction.
  - Applying "quick-cover" seed mix within 1 day of work completion at culvert installation sites involving stream crossings.
- Based on ground and weather conditions, water bars and logging-slash barriers would be installed on skid trails where erosion is anticipated as directed by the Forest Officer. These erosion-control features would be periodically inspected and maintained throughout the contract period or extensions thereof.
- Temporary roads will be reclaimed by removing any culverts, placing water bars at intervals to adequately provide drainage for runoff and placing slash and other debris on the road surface to make roads impassable and to meet DNRC's reclamation standards.

Vegetation

- All harvest areas shall have a minimum of 2 snags and 2 snag-recruits over 21 inches dbh, or the next largest size class available. Additional large-diameter recruitment trees may be left if sufficient large snags are not present. These snags and recruitment trees may be clumped or evenly distributed throughout the harvest units.
- Old growth, as defined by DNRC, would be maintained within units E and F.
- Trees of all size classes would be retained in all harvest prescriptions. Sites for new regeneration would be provided where openings are created. Wildfire hazard, aesthetic concerns, and recreational issues would be considered when retaining large woody debris in the harvest areas.
- Certain portions within the harvest areas would be left uncut. These areas may include large healthy trees, snag patches, small healthy trees, rocky outcrops, steep slopes, SMZs, and small wetlands.
- If any plant species of concern are confirmed within a proposed harvest unit then timber harvest would be postponed in that specific area until risk to any SOCs can be evaluated.

Watershed

- Implement BMPs on all new temporary roads and improve BMPs on existing roads where needed.
- Streamside Management Zones (SMZs) would be defined along those streams and/or wetlands where they occur within, or adjacent to, harvest areas. This project would meet or exceed SMZ rules.
- Brush would be removed from existing road prisms to allow for effective road maintenance. Road maintenance can help reduce sediment delivery.
- The contractor would be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.,) that may affect water quality.

Wildlife

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435). Similarly, if undocumented nesting raptors or wolf dens are encountered within ½ mile of the Project Area contact a DNRC biologist.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per ARM 36.11.444(2) and GB-PR2 (USFWS AND DNRC 2010, Vol. II p. 2-5).
- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (USFWS AND DNRC 2010, Vol. II p. 2-6).
- Public access would be restricted at all times on restricted roads and temporary roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).
- Effectively close temporary roads to all motorized use at project conclusion.
- Restrict commercial harvest from April 1 to September 15 to minimize disturbance to wildlife during the spring and summer seasons.
- Restrict commercial harvest and motorized road maintenance activities from April 1 until August 1 in proposed harvest units “E” and “F” around Boyle lake (ARM 36.11.441). If loon breeding surveys conducted thereafter observe loons still on a nest, an extension of the timing restriction would be implemented.
- In a portion of harvest units, retain patches of advanced regeneration of shade-tolerant trees to break up sight distances for grizzly bears and big game, as well as benefit lynx habitat.
- Retain at least 2 snags per acre (≥21 inches dbh, or largest available size class) and 10-20 tons of coarse woody debris per acre where possible and emphasize the retention of downed logs ≥15 inches dbh where they occur. Favor western larch, Douglas-fir and ponderosa pine for snag retention and recruitment.
- Retain visual screening along open roads by retaining up to 100 feet of vegetation to increase security for grizzly bears, big game, and other wildlife.
- Close roads and skid trails to the maximum extent possible following the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering.
- When possible, forested corridors would be retained to maintain landscape connectivity, and patches of dense vegetation would be retained to provide security cover.