Skookum Point Salvage

Environmental Assessment

Plains Unit
Northwest Land Office
Montana Department of Natural Resources and Conservation
June 2016

Skookum Point Salvage Timber Sale

Environmental Assessment

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MEMORANDUM

To: Jeff Hansen

From: David Olsen, Plains Unit Manager, MT DNRC

Subject: Skookum Point Salvage

Date: January 15, 2016

Primary Objective:

The primary objective of salvage operations is to effectively recover value of timber killed, damaged, or otherwise injured by the Douglas fir beetle infestation. Loss to the associated trusts is to be minimized. Administrative rules as applicable to salvage operations shall be applied to this project.

Secondary Objective:

The secondary objective for this project is to promote timber regeneration and vegetative recovery on Trust Lands. Measures to promote natural regeneration as well as tree planting will be addressed in prescriptions for this project.

Environmental Assessment

Project Name: Skookum Point Salvage
Proposed Implementation Date: July, 2016
Proponent: Plains Unit, Northwest Land Office, Montana DNRC
County: Sanders

Type and Purpose of Action

Description of Proposed Action:

The Plains Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing the Skookum Point Salvage Timber Sale. The project is located approximately 36 air miles north of Plains, MT (refer to vicinity map Attachment A-**1** and project map A-**2**) and includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	S 36, T26N, R27W	**639**	**566**
Public Buildings			
School for the Deaf and Blind			

Objectives of the project include:

- Generate revenue for the Common Schools (CS) Trust by harvesting approximately 6.5 MMBF of timber
- Capture the value of dead and dying timber before it loses economic value as directed by MCA 77-5-207.
- Effectively recover value of timber killed, damaged, or otherwise injured by the Douglas-fir beetle infestation and to minimize loss to the associated trusts.
- Bring portions of the project area closer to the DNRC's identified Desired Future Conditions (DFC).
- Maintain and improve forest health and increase forest productivity beneficial to future management actions by removing trees infected by or susceptible to disease and reducing fuel loadings.

Proposed activities include:

Action	Quantity
Proposed Harvest Activities	**#Acres**
Clear-cut	
Seed Tree	
Shelterwood	
Selection	24
Commercial Thinning	
Salvage	542
Total Treatment Acres	**566**
Proposed Forest Improvement Treatment	**#Acres**
Pre-commercial Thinning	
Possible Tree Planting	566
Prescribed Burning	377
Machine Pile/ Scarification	189
Proposed Road Activities	**#Miles**
New permanent road construction	5.51
New temporary road construction	0.45
Road maintenance	0.65
Road reconstruction	1.32
Road abandoned	
Road reclaimed	
Possible Other Activities	

Duration of Activities:	4 Years
Implementation Period:	07/01/2016-08/01/2020

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

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

- The State Forest Land Management Plan (DNRC 1996)
- Administrative Rules for Forest Management (ARM 36.11.401 through 471)
- The Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) (DNRC 2010)
- And all other applicable state and federal laws.

Project Development

SCOPING: SKOOKUM POINT SALVAGE

DATE: August 4, 2015-September 10, 2015

- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: http://dnrc.mt.gov/PublicInterest/Notices/Default.asp
  - Adjacent landowners, statewide scoping list, other interested parties.
  - A notice was also published in the *Clark Fork Valley Press,* the *Sanders County Ledger* and the *Missoulian newspapers.*
- AGENCIES SCOPED:
  - Montana Fish Wildlife & Parks, Montana tribal organizations, US Forest Service, US Fish & Wildlife Service, State of Montana
- COMMENTS RECEIVED:
  - How many: 2
  - Concerns: Cultural resources
  - Results: If cultural resources are found operations will stop and the DNRC archeologist will be notified.

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

INTERDISCIPLINARY TEAM (ID):

- Decision Maker: David Olsen
- Project Leader: Jeffrey P. Hansen
- Archeologist: Patrick Rennie
- Wildlife Biologist: Christopher Forristal
- Hydrologist: Tony Nelson
- Soil Scientist: Tony Nelson
- Economist: Sarah Lyngholm
- Silviculturist: Jeffrey P. Hansen

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

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

and Columbia redband trout. This project complies with the HCP. The HCP can be found at http://dnrc.mt.gov/divisions/trust/forest-management/hcp.

- **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.

- **Temporary Road Use Permit from Weyerhaeuser**
  To utilize the ACM (Anaconda Mining Company) Road for hauling of product and equipment, a Temporary Road Use Permit must be obtained by the DNRC.

- **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. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit.

ALTERNATIVES CONSIDERED:

No-Action: Under this alternative, no timber would be harvested and therefore no revenue would be generated from the project area for the Common Schools Trust at this time. Mortality in live trees would continue and the Douglas-fir beetle would continue to spread in epidemic proportions. The Common Schools Trust would continue to loose stumpage value within the stand.

Action Alternative): DNRC would harvest approximately 6.5 million board feet of timber. Timber would be harvested using ground-based methods on 189 acres while 377 acres would be harvested using skyline operations. Removal of the majority of the Douglas-fir would mitigate the spread of the Douglas-fir beetle to surrounding stands while capturing the value of the timber before it is lost due to mortality.

This action would also call for mechanical site preparation in the ground-based harvest units and the use of prescribed burning in the skyline harvest units, thus promoting the establishment of natural regeneration.

This action would also reduce established noxious weed populations through weed spraying of existing populations and grass seeding of exposed surfaces.

Impacts on the Physical Environment

VEGETATION:

Issues and Concerns- The following concerns developed regarding the effects of the proposed action to vegetation:

- Improve forest health and minimize losses in timber volume from mortality due to insect and disease conditions present within the sale area; specifically Douglas-fir Beetle, (*Dendroctonus pseudotsugae*).
- Promote the continued presence and/or reestablishment of historically appropriate timber types on Trust Lands included in this project.
- Reduce fire hazard and associated risks of loss to State of Montana.
- Disturbance may lead to an increased presence of noxious weeds.

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

- Harvest prescriptions have been developed to remove diseased and insect infested timber and reduce fuel loading.
- Tree removal would cause changes in the vegetative structure of the project area. Silvicultural prescriptions have been developed to keep stands moving towards desired future conditions while maintaining good tree growth and vigor. The proposed action would promote the continued development of the desired future cover types of ponderosa pine, western larch/Douglas-fir, and Douglas-fir.
- Monitor and treat weed populations through the use of chemical herbicides, vehicle washing, and by grass-seeding roads immediately following harvest.

FOR COMPLETE VEGETATION ANALYSIS SEE ATTACHMENT C.

SOILS:

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

- N/A

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

- N/A

FOR COMPLETE SOILS ANALYSIS SEE ATTACHMENT D.

WATER RESOURCES:

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

- N/A

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

- N/A

FOR COMPLETE WATER RESOURCES ANALYSIS SEE ATTACHMENT D.

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

After the consideration of project-specific issue statements and the extent of the proposed actions, potential effects to fisheries resources in the Skookum Point Salvage Timber Sale area watershed are dismissed from further assessment. Potential effects to fisheries resources are dismissed from further assessment due to: (1) less than 10% of the acreage within the watershed would be affected by timber harvest, (2) no timber harvest would occur within 120 feet of any stream channel in the watershed, (3) no forest road haul route use would occur within 150 feet of any stream channel in the watershed, and (4) no road construction would occur within 150 feet of any stream channel in the watershed. No foreseeable direct or indirect impacts to fisheries resources would be expected to occur in the watershed and no additional cumulative effects to fisheries resources would be expected in the watershed as a result of implementing the Action Alternative.

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

- N/A

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

- N/A

FOR COMPLETE FISHERIES RESOURCE ANALYSIS SEE ATTACHMENT X.

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

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

- INSERT TEXT

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

- INSERT TEXT

FOR COMPLETE WILDLIFE ANALYSIS SEE ATTACHMENT X.

AESTHETICS:

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

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

- There are no issues due to the fact that the project area is not visible from a main road and is surrounded by heavily managed forest lands.

HISTORICAL AND ARCHEOLOGICAL SITES:

Scoping letters were sent to those Tribes that requested to be notified of DNRC timber sales. No response was returned that identified a specific cultural resource issue. A Class I (literature review) level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. The Class I search results revealed that no cultural or paleontological resources have been identified in the APE, but it should be noted that Class III level inventory work has not been conducted there to date.

Because the topographic setting and geology suggest a low to moderate likelihood of the presence of cultural or paleontologic resources, proposed timber harvest activities are expected to have *No Effect* to *Antiquities*. No additional archaeological investigative work would be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work would cease until a professional assessment of such resources can be made.

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

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

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

- EA's known:

  Skookum Point EA 1982-1983
  North Meadow and Indian Creek Timber Sales EA 2016
  Richards Peak Timber Sale EA 2002
  Bowers-Boiling Springs EA 1992

Impacts on the Human Population

HUMAN HEALTH AND SAFETY:

Air Quality

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

The project area is located within Montana Airshed 2, which encompasses portions of Sanders County. Currently, this project is not in or near any impact zones.

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

- Smoke would be produced during pile burning.
- Dust may be produced during harvesting and hauling activities.

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

- Only burn on days approved by the Montana/Idaho Airshed group and DEQ.
- Conduct test burn to verify good dispersal.
- Dust abatement on the ACM (Anaconda Mining Company) Road may be required depending on season of haul, timing of haul operations, and various other weather related conditions.
- Slower speed limits may be included in contracts as necessary to reduce dust.

SLASH BURNING

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

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 harvesting. Slash would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter into the local airshed, temporarily affecting local air quality. Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.

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

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

DUST

No Action Alternative:
No increased dust would be produced as a result of the proposed timber sale. Current levels of dust would be produced in the area.

Action Alternative:

Direct, Secondary, and Cumulative Effects

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

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

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

The area is used for hiking, hunting, cross-country skiing, and general recreating. Currently, roads through the area are closed to motorized use and used only for administrative purposes. There would be no change in road closure status and the selection of either alternative would not affect the ability of people to recreate on this parcel.

There would be no change from existing conditions. Therefore, there would be no measurable direct, secondary, or cumulative impacts on recreation from this proposed action.

OTHER IMPACTS ON THE HUMAN POPULATION:

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

Will the No-Action or Action Alternatives 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		
Quantity and Distribution of Employment		X				X				X			NO	1
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					

Comment Number 1:

Impact
According to the Montana Bureau of Business and Economic Research a general rule of thumb is that for every million board feet of sawtimber harvested in Montana, ten person years of employment occur in the forest products industry. This harvest is viewed as a continuation of a sustained yield and as such would not create any new jobs but rather sustain approximately 65 person years of employment in the forest products industry. A few short-term jobs would also be created/ sustained by issuing contracts following harvest. Additionally, local businesses, such as hotels, grocery stores, and gas stations would likely receive additional revenues from personnel working on the proposed project. This would be a positive low impact to quantity and distribution of employment in the area.

Mitigations:
This impact would be positive and mitigations would not be necessary.

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

No locally adopted environmental plans and goals are associated with the timber sale.

OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

The proposed action has a projected harvest volume between 6 and 7 MMBF. This volume is worth approximately $350/MBF delivered to a forest products manufacture site at current market prices. Delivered to market, the proposed action has a total revenue value of an estimated $2,275,000. Removing the timber sale purchaser's contracted operations and DNRC's development, administration, and operation expenses, the trust beneficiaries net between an estimated 15 and 35 percent of total delivered sawlog market value. Therefore, the proposed action may generate net income for trust beneficiaries between $341,250 and $796,250. Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios

are a measure of economic efficiency. A recent revenue-to-cost ratio of the Northwestern Land Office was 2.6. This means that, on average, for every $1.00 spent in costs, $2.60 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 57.6 MMBF, which represents approximately 16.4% of timber harvested in the state of Montana. This project would provide approximately 6.5 MMBF of timber towards the sustained yield target, thus helping sustain current mill capacity.

Environmental Assessment Checklist Prepared By:

Name: Jeffrey P. Hansen
Title: Management Forester
Date: May 13, 2016

Finding

Alternative Selected

The interdisciplinary team has completed the Environmental Assessment for the Skookum Point Salvage Timber Sale. In the development of this EA two alternatives were considered, Action and No Action. These two alternatives were evaluated on their ability to: 1) Minimize the loss of timber value in dead and dying trees due to the infestation of bark beetles; 2) Increase the vigor and health of the stand by limiting the effects of bark beetles and reducing the stocking level; 3) Generate revenue for the Common School Trust Fund; and 4) Increase forest productivity beneficial to future actions.

After a thorough review of the EA, project file, public correspondence, Department policies, standards, guidelines, I have selected the action alternative for implementation on this project. I have selected the Action Alternative for implementation with the understanding that resource mitigation measures identified in the Environmental Assessment will be applied to meet the intended protection.

The Action Alternative has been selected for the following reasons:
1) The Action Alternative meets the Purpose of Action and the specific project objectives addressed in the EA.
2) The Action Alternative captures the value of dead and dying timber before it loses economic value as directed by MCA 77-5-207.
3) DNRC is required to administer these lands to produce the largest measure of reasonable and legitimate long-term return for beneficiaries *(MCA77-1-202*). DNRC meets this obligation by managing intensively for healthy andbiologically diverse forests.
4) The Action Alternative includes the necessary mitigations and a consensus of professional opinion on limits of acceptable environmental impact.

Significance of Potential Impacts

I find that none of the project impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of the natural resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that adverse impacts will be avoided, controlled, or mitigated by the design of the project to an extent that they are not significant.

Need for Further Environmental Analysis

	EIS		More Detailed EA	X	No Further Analysis

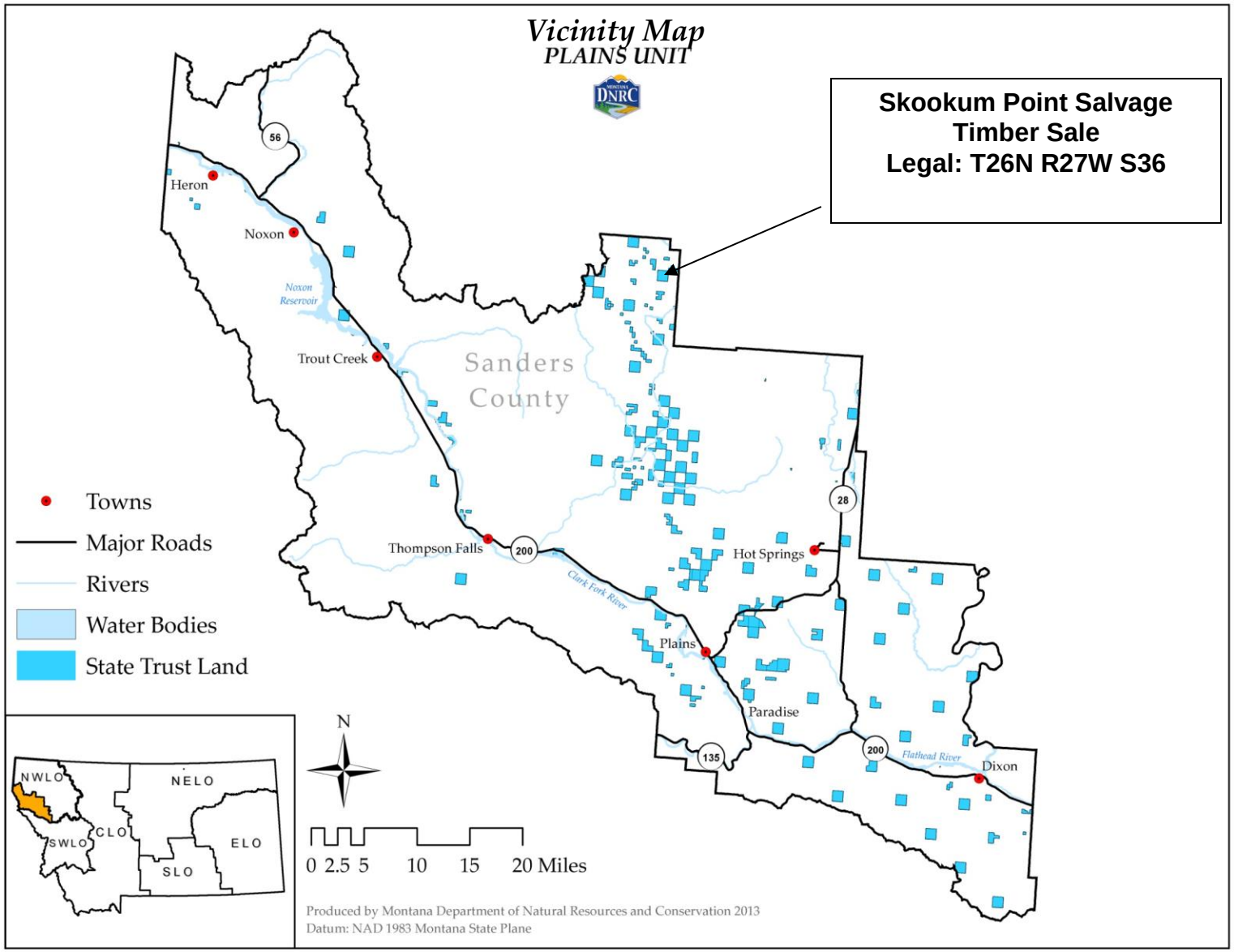
Environmental Assessment Checklist Approved By:

Name: David M. Olsen
Title: Program Manager, Plains Unit
Date: June 2, 2016

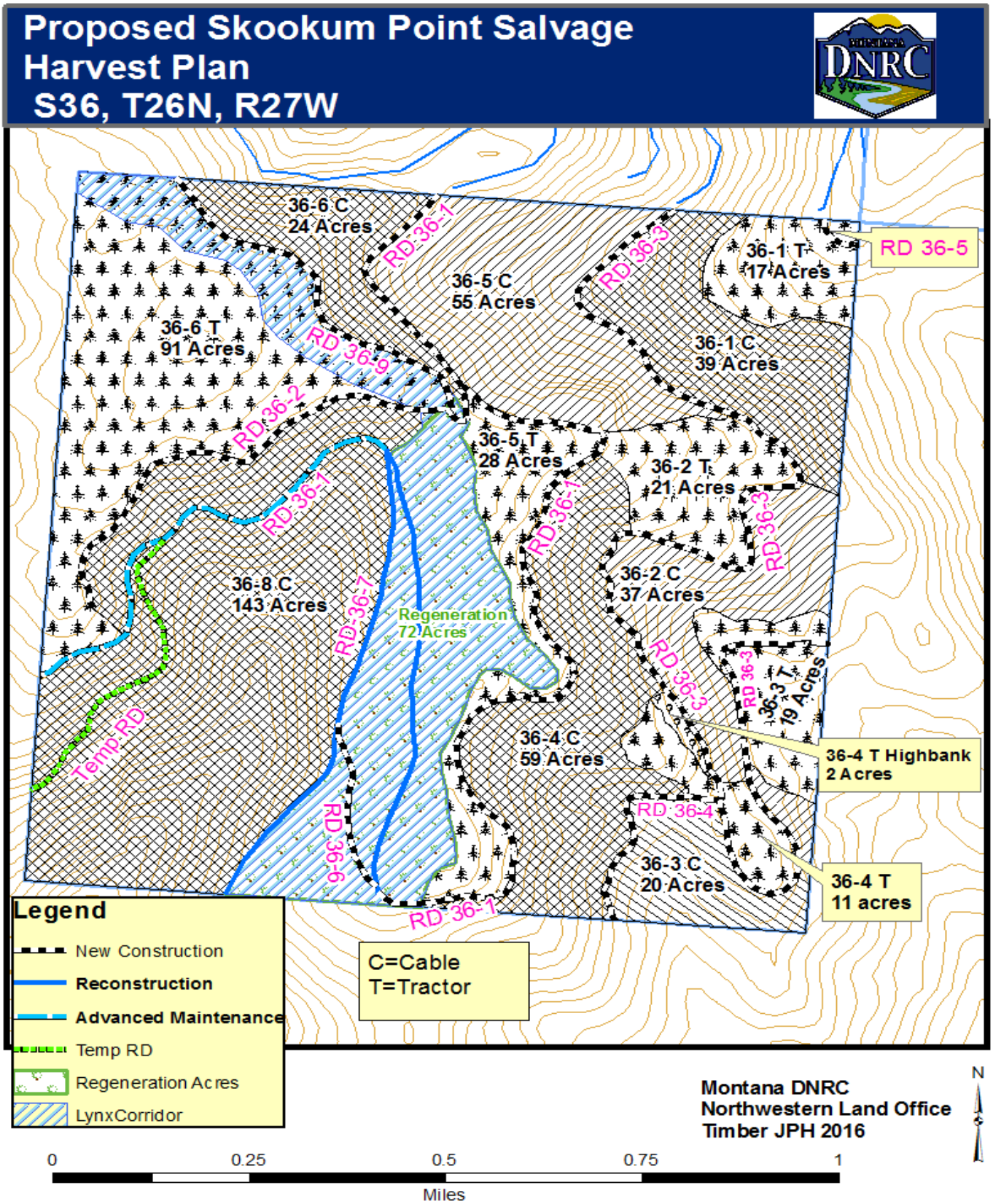
Signature: /s/ *David M. Olsen*

Attachment A - Maps

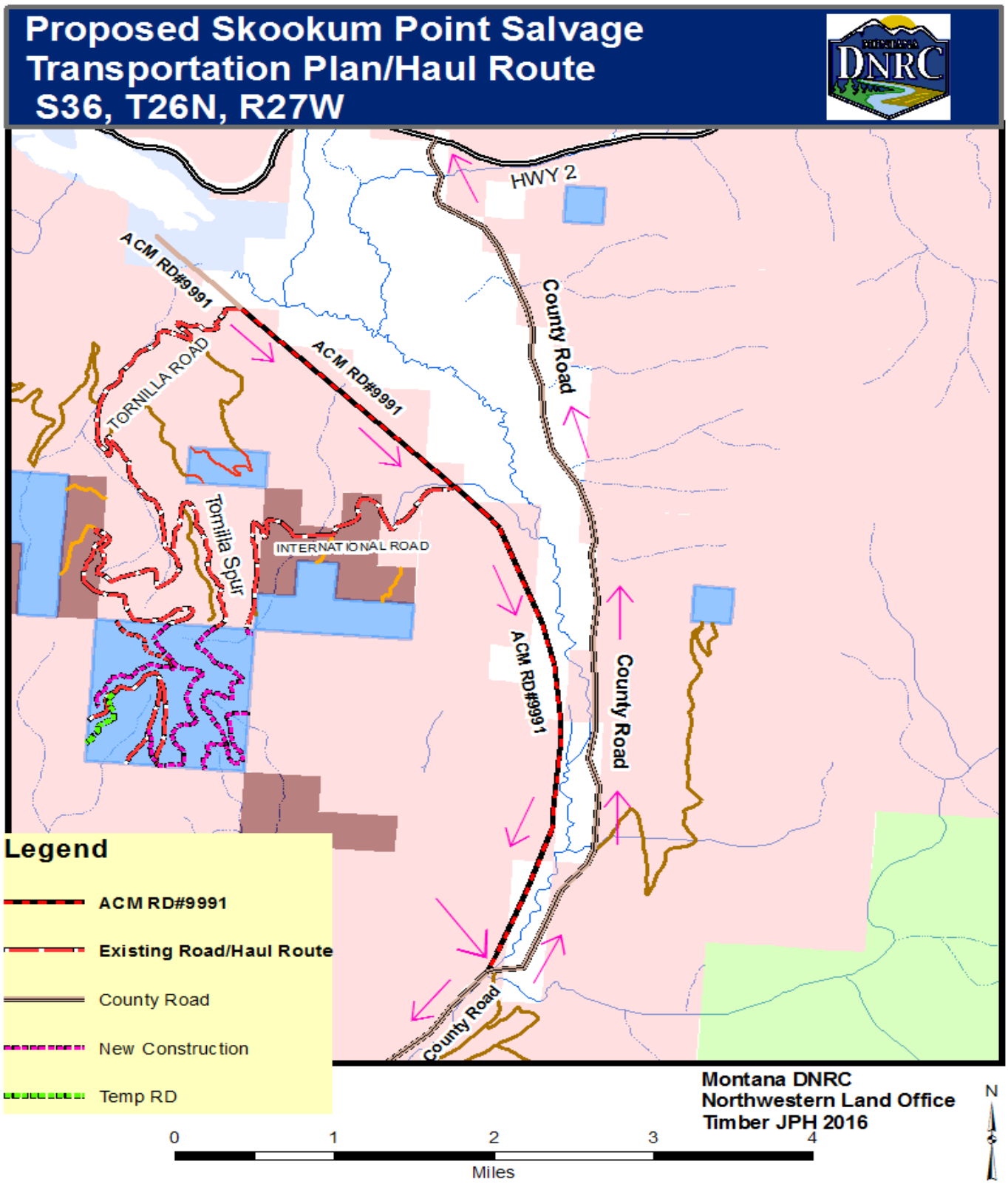
A-1: Skookum Point Salvage Sale Vicinity Map



A-2: Timber Sale Harvest Units



A-2: Timber Sale Transportation Plan/ Haul Route



Attachment B – Timber Sale Harvest Prescriptions

Proposed Skookum Point Salvage Timber Sale
Harvest Unit Prescriptions

Unit Number: 36-1 Tractor **Location:** NE¼ NE¼ S36 T26N R27W **Acres:** 17

Elevation: 4,200-4,400 Ft. **Slope:** 5%-45% **Aspect(s):** NE

Habitat type: TSHE/CLUN-CLUN

Current Cover Type: Mixed Conifer

Desired Cover Type: Western larch/Douglas-fir

Soils: Waldbillig gravelly ashy silt loam/Mitten-Tevis Complex

Description of Existing Stand:

- This unit is comprised of one identified stand in the Stand Level Inventory. This stand's overstory is dominated by mature/over-mature Douglas-fir (*Pseudotsuga menziesii*) with western larch (*Larix occidentalis*), grand fir (*Abies Grandis*), subalpine fir (*Abies lasiocarpa*), western white pine (*Pinus monticola*) and Western hemlock (*Tsuga heterophylla*) present as well. Overstory stand age ranges from 110-185 years old with an average DBH of 12" and average height of 100 ft.
- The mid-level canopy is dominated by Grand-fir with a mix of sub-alpine fir, Western larch and scattered Western white pine and Hemlock. Mid-story age averages 80 years old with a DBH of 8" and a height of 70 ft.
- The understory is comprised of 80-90% grand-fir with the remaining 10% being a mix of hemlock and other species. Understory age averages 40 years of age with and average DHB of 2" and height of 9 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) are active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stands toward the desired future conditions of western larch and Douglas-fir.
- Remove merchantable dead and dying, unhealthy, diseased and insect infested trees, as well as those with poor vigor, from the overstory to promote long-term forest health.
- Create a disturbance to promote natural Western larch and Douglas-fir regeneration.

Prescribed Treatment:

- Seed tree with reserves. Variable retention of trees with healthy crown and bole characteristics spaced to about 70-85 ft., retaining approximately 6-8 trees per acre. Favor leaving dominant, co-dominant and robust intermediate western white pine, western larch and Douglas-fir.
- Harvest all merchantable grand-fir, subalpine fir, Engelmann spruce and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Ground-based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Mechanically pile and burn all slash in excess of retention requirements.

Site Preparation and Regeneration:

- Thinning and retention of the desirable and undamaged regeneration pockets.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-2 Tractor **Location:** SE¼ NE¼, S36 T26N R27W **Acres:** 21

Elevation: 4,700-5000 Ft. **Slope:** 16%-45% **Aspect(s):** E, SE

Habitat type: PSME/CARU, ABGR/XETE, ABGR/LIBO-XETE

Current Cover Type: Western larch/Douglas-fir, Douglas-fir, mixed conifer

Desired Cover Type: Western larch/Douglas fir, ponderosa pine

Soils: Mitten-Tevis complex, Holloway gravelly ashy silt loam

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Description of Existing Stand:

- This unit is comprised of four identified stands in the Stand Level Inventory. This stand's overstory is dominated by 70-79% mature Douglas-fir (*Pseudotsuga menziesii*) with 10-20% lodgepole pine (*Pinus contorta*), 10-20% ponderosa pine (*Pinus ponderosa*) along with grand fir and subalpine fir. Overstory stand age ranges from 120-200 years old with an average DBH of 15"-17" and average height of 80-120 ft.
- The stand's mid-level canopy is composed of 80-89% Douglas-fir and 10-20% lodgepole pine along with grand fir and subalpine fir. Mid-story age ranges from 50-90 years old with an average DBH of 7-8" and height of 50-70 ft.
- The understory is a mix of Douglas-fir, grand fir and subalpine fir and averages 30-39 years of age with a DBH of 2" and height of 12 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Western larch/Douglas-fir and Ponderosa pine.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Western larch/Douglas-fir and Ponderosa pine regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 70-85 ft., retaining approximately 6-8 tree per acre. Favor leaving dominant, co-dominant and intermediate Ponderosa pine, western larch and Douglas-fir.
- Harvest all merchantable grand fir, subalpine fir and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Ground-based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Mechanically pile and burn all slash in excess of retention requirements.

Site Preparation and Regeneration:

- Thinning and retention of the desirable and undamaged regeneration pockets.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-3 Tractor **Location:** NE¼ SE¼ S36 T26N R27W **Acres:** 19

Elevation: 4,400-4,520 Ft. **Slope:** 0-45% **Aspect(s):** S, E

Habitat type: ABGR/XETE-XETE

Current Cover Type: Western larch/Douglas-fir, mixed conifer

Desired Cover Type: Ponderosa pine

Soils: Mollman gravelly loam, Halloway gravelly ashy silt loam

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Description of Existing Stand:

- This unit is comprised of three identified stands in the Stand Level Inventory. This stand's overstory is dominated by 30-39% grand fir (*Abies grandis*), 30-39% Douglas-fir (*Pseudotsuga menziesii*), 20-29% Western larch *(Larix occidentalis)* and 10-19% lodgepole pine (*Pinus contortus*). Overstory stand age ranges from 120-129 years old with an average DBH of 15" and height of 100 ft.
- The stands mid-level canopy is dominated by 70-79% grand-fir, 10-19% Douglas-fir, lodgepole and Western larch. Mid-level stand age is 80-89 years old with an average DBH of 8" and height of 70 ft.
- The understory is comprised of 90-100% grand-fir with an average age of 50 years of age with and average DBH of 1" and height of 10 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Ponderosa pine regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 70-85 ft., retaining approximately 6-8 tree per acre. Favor leaving dominant, co-dominant and intermediate ponderosa pine, western larch and Douglas-fir.
- Harvest all merchantable grand fir, subalpine fir and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Ground-based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Mechanically pile and burn all slash in excess of retention requirements.

Site Preparation and Regeneration:

- Thinning and retention of the desirable and undamaged regeneration pockets.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-4 Tractor **Location:** SE¼ SE¼ S36 T26N R27W **Acres:** 13

Elevation: 4,600-4,800 Ft. **Slope:** 0-55% **Aspect(s):** S, E

Habitat type: ABGR/LIBO-LIBO, ABGR/CLUN-XETE

Current Cover Type: Western larch/Douglas-fir, mixed conifer

Desired Cover Type: Ponderosa pine

Soils: Halloway gravelly ashy silt loam, Mitten-Tevis complex

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Description of Existing Stand:

- This unit is comprised of three identified stands in the Stand Level Inventory. The first half of this stand's overstory is dominated by 60-69% Douglas-fir (*Pseudotsuga menziesii*), 20-29% ponderosa pine (*Pinus ponderosa*) and 10-19% western larch (*Larix occidentalis*). This overstory has an age of 120-129 years of age with an average DBH of 15" and height of 100 ft. The second half of the stand is comprised of 30-39% grand-fir (*Abies grandis*), 10-19% Douglas-fir, 10-19% lodgepole pine and 10-19% western larch. This part of the overstory is 80-89 years old with an average DBH of 8" and height of 70 ft.
- The first half of this stand's mid-level canopy is comprised of 60-69% Douglas-fir, 20-29% grand fir and 10-19% lodgepole pine and Ponderosa pine. This mid-level canopy is 60-69 years old and has an average DBH of 8" and height of 50 ft. The second half of this stand's mid-level canopy is comprised of 70-79% grand-fir and 10-19% of Douglas-fir, lodgepole pine and Western larch. This stand is 80-89 old and has an average DBH of 8" and height of 70 ft.
- This stand's understory is dominated by a mix of grand fir and Douglas-fir. Understory age ranges from 20-60 years old and has an average DBH of 1" and height of 10 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and Western Larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Ponderosa pine regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 70-85 ft., retaining approximately 6-8 tree per acre. Favor leaving dominant, co-dominant and intermediate Ponderosa pine, western larch and Douglas-fir.
- Harvest all merchantable grand-fir, subalpine-fir and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Ground-based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Mechanically pile and burn all slash in excess of retention requirements.

Site Preparation and Regeneration:

- Thinning and retention of the desirable and undamaged regeneration pockets.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-5 Tractor **Location:** W½ E½ S36 T26N R27W **Acres:** 28

Elevation: 4,900 Ft. **Slope:** 36-45% **Aspect(s):** E, SE

Habitat type: ABGR/XETE, PSME/CARU, PSME/CARU-ARUV

Current Cover Type: Western larch/Douglas-fir, Douglas-fir

Desired Cover Type: Ponderosa pine

Soils: Holloway gravelly ashy silt loam, Mitten-Tevis complex

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Description of Existing Stand:

- This unit is comprised of five identified stands in the Stand Level Inventory. Approximately half of this stand's overstory is dominated by 70-79% Douglas-fir (*Pseudotsuga menziesii*), 10-19% lodgepole pine (*Pinus contorta*) and 10-19% Ponderosa pine (*Pinus ponderosa*). This overstory has an age of 120-129 years of age with an average DBH of 15" and height of 80 ft. The second half of the stand is comprised of 40-49% Douglas-fir, 30-39% Western larch and 30-39% grand fir (*Abies grandis*). This part of the overstory is 110-119 years old with an average DBH of 13" and height of 85 ft.
- The first half of this stand's mid-level canopy is comprised of 80-89% and 10-19% lodgepole pine. This mid-level canopy is 50-59 years old and has an average DBH of 7" and height of 50 ft. The second half of this stand's mid-level canopy is comprised of 70-79% grand fir, 20-29% of Douglas-fir and 10-19% lodgepole pine. This stand is 70-79 old and has an average DBH of 8" and height of 60 ft.
- This stand's understory is dominated by a mix of Douglas-fir and grand fir. Understory age averages 33 years old and has an average DBH of 1" and height of 9 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Ponderosa pine regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 70-85 ft., retaining approximately 6-8 tree per acre. Favor leaving dominant, co-dominant and intermediate Ponderosa pine, western larch and Douglas-fir.
- Harvest all merchantable grand fir, subalpine fir and lodgepole pine.
- Snags felled for safety reasons should be retained inside the harvest unit.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Ground-based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Mechanically pile and burn all slash in excess of retention requirements.

Site Preparation and Regeneration:

- Thinning and retention of the desirable and undamaged regeneration pockets.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-6 Tractor **Location:** NW ¼, S36 T26N R27W **Acres:** 91

Elevation: 5,200-5,400 Ft. **Slope:** 0-45% **Aspect(s):** E, SE

Habitat type: ALBA/CLUN-XETE, ALBA/XETE, ABGR/XETE, ABGR/LIBO-LIBO

Current Cover Type: Mixed Conifer, Subalpine fir, Western larch/Douglas-fir

Desired Cover Type: Western larch/Douglas-fir, ponderosa pine

Soils: Holloway gravelly ashy silt loam

Description of Existing Stand:

- This unit is comprised of six identified stands in the Stand Level Inventory. The northern third of this stand's overstory is dominated by 40-50% subalpine-fir (*Abies lasiocarpa*), 30-39% Douglas-fir (*Pseudotsuga menziesii)* and 20-29% western larch (*Larix occidentalis*). This overstory has an age of 150-200 years of age with an average DBH of 18" and height of 110 ft. The central third of the stand's overstory is comprised of 50-59% subalpine fir, 30-39% western larch, 10-19% grand fir (*Abies grandis)* and 10-19% lodgepole pine (*Pinus contorta*). This part of the overstory is 120-129 years old with an average DBH of 17" and height of 85 ft. The southern third of this stand's overstory is comprised of 60-69% subalpine fir, 20-29% western larch and 20-29% lodgepole pine.
- The stand's mid-level canopy is dominated by 50-89% subalpine fir, with a mix of grand fir, Douglas-fir, western larch, western white pine (*Pinus monticola*) and lodgpole pine. This mid-level canopy averages 50-89 years old and has an average DBH of 8" and ranges from 30-75 feet in height.

- This stand's understory is dominated by subalpine fir with a mix of grand fir, Douglas fir and Engelmann spruce (*Picea engelmannii*). Understory age averages 30 years old and has an average DBH of 1" and height of 7 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of western larch/Douglas-fir and ponderosa pine.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural western larch/Douglas-fir and ponderosa pine regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 70-85 ft., retaining approximately 6-8 tree per acre. Favor leaving dominant, co-dominant and intermediate ponderosa pine, western larch and Douglas-fir.
- Full retention within the 22 acre, 300 ft wide wildlife corridor, with the exception of skid corridors spaced approximately 100-150 feet apart.
- Harvest all merchantable grand fir, subalpine fir, Engelmann spruce, and lodgepole pine not marked for retention.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Ground-based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Mechanically pile and burn all slash in excess of retention requirements.

Site Preparation and Regeneration:

- Thinning and retention of the desirable and undamaged regeneration pockets.
- Aggressively protect and retain regeneration pockets within 300 ft. lynx corridor strip to meet canopy retention requirements.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Residual trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-1 Cable **Location:** N ½, S36 T26N R27W **Acres:** 39

Elevation: 4,400-4,600 Ft. **Slope:** 5-50% **Aspect(s):** NE

Habitat type: ABGR/XETE, THSE/CLUN-CLUN

Current Cover Type: Mixed conifer, western larch/Douglas-fir

Desired Cover Type: Western larch/Douglas-fir

Soils: Holloway gravelly ashy silt loam, Mitten-Tevis complex, Waldbillig gravelly ashy silt loam

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Description of Existing Stand:

- This unit is comprised of three identified stands in the Stand Level Inventory. The northern third of this stand's overstory, approximately 11 acres, is dominated by 30-39% western larch (*Larix occidentalis*), 30-39% Douglas-fir (*Pseudotsuga menziesii*) and 30-39% grand fir (*Abies grandis*). This overstory has an age of 150-200 years of age with an average DBH of 18" and height of 120 ft. The central third of the stand's overstory is comprised of 20-29% for each of the species of grand fir, Douglas-fir, western larch and subalpine fir (*Abies lasiocarpa*). This part of the overstory is 150-200 years old with an average DBH of 16" and height of 120 ft. The southern third of this stand's overstory is comprised of 40-49% of western larch and 40-49% Douglas-fir with the remainder of the stand being a mix of subalpine fir and grand fir. This part of the overstory is 150-200 years of age with an average DBH of 17" and height of 120 ft.
- The northern third of this stand's mid-level canopy is dominated by 40-49% grand fir, 20-29% subalpine fir and 20-29% Douglas-fir. This mid-level canopy averages 80-89 years of age, has an average DBH of 9" and height of 75 ft.
- This stand's understory is dominated by 90-100% grand fir with a 0-10% mix of Douglas-fir (*Pseudotsuga menziesii*). Understory age averages 60-70 years old and has an average DBH of 3" and height of 20 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of western larch/Douglas-fir.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural western larch/Douglas-fir regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 trees per acre. Favor leaving dominant, co-dominant and intermediate Western larch, Douglas-fir, and Ponderosa Pine that are wind firm and that have the bark characteristics that would withstand a low intensity prescribed broadcast burn.
- Harvest all merchantable grand-fir, subalpine-fir, Engelmann spruce, and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-2 Cable **Location:** E ½ E ½, S36 T26N R27W **Acres:** 37

Elevation: 4,600-4,800 Ft. **Slope:** 16-50% **Aspect(s):** SE, NE

Habitat type: ABGR/XETE, ABGR/ XETE-XETE, ABGR/LIBO-XETE

Current Cover Type: Mixed conifer, western larch/Douglas-fir

Desired Cover Type: Ponderosa pine, western larch/Douglas-fir

Soils: Holloway gravelly ashy silt loam, Mitten-Tevis complex, Mollman gravelly loam

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Description of Existing Stand:

- This unit is comprised of five identified stands in the Stand Level Inventory. This stand's overstory on average is comprised of 40-49% Douglas-fir, 20-29% western larch (*Larix occidentalis*), 20-29% grand fir (*Abies grandis*), and the remainder being a mix of subalpine fir (*Abies lasiocarpa*), lodgepole pine (*Pinus contorta*) and ponderosa pine (*Pinus ponderosa*). This overstory canopy ranges in age from 110-200 years old with an average DBH of 16" and height of 105 ft.
- This stand's mid-level canopy on average is comprised of 40-49% grand fir, 40-49% Douglas-fir, and the remainder being a mix of subalpine fir, Engelmann spruce, western larch and lodgepole pine. This mid-level canopy ranges in age from 60-89 years old and has an average DBH of 8" and height of 62 ft.
- This stand's understory is dominated by 40-49% Douglas-fir, 60% grand fir, and 30-39% subalpine fir. Understory age ranges from 20-50 years old and has an average DBH of 1-2" and height of 12 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine and western larch/Douglas-fir.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Ponderosa pine and western larch/Douglas-fir regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 tree per acre. Favor leaving dominant, co-dominant and intermediate Western larch, Douglas-fir, and Ponderosa Pine that are wind firm and that have the bark characteristics that would withstand a low intensity prescribed broadcast burn.
- Harvest all merchantable grand fir, subalpine fir, Engelmann spruce, and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-3 Cable **Location:** SE¼ SE¼, S36 T26N R27W **Acres:** 20

Elevation: 4600-4800 Ft. **Slope:** 26-35% **Aspect(s):** S, E

Habitat type: ABGR/LIBO-XETE, ABGR/LIBO-LIBO, ABGR/CLUN-XETE

Current Cover Type: Mixed conifer, western larch/Douglas-fir

Desired Cover Type: Ponderosa pine

Soils: Holloway gravelly ashy silt loam, Mitten-Tevis complex

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Description of Existing Stand:

- This unit is comprised of three identified stands in the Stand Level Inventory. The first identified overstory is comprised of 50-60% Douglas-fir (*Pseudotsuga menziesii*), 40-50% grand fir (*Abies grandis*) and 10% western larch (*Larix occidentalis*). This overstory overstory ranges in age from 120-129 years old with an average DBH of 15" and height of 90 ft. The second identified stands upper level canopy is comprised of 60-69% Douglas-fir, 20-29% pondersosa pine (*Pinus ponderosa*) and 10% western larch. This overstory canopy ranges in age from 120-129 years old with an average DBH of 15" and height of 85 ft. The third identified stands upper level canopy is comprised of 30-39% grand fir, 30-39% Douglas-fir, 20-29% western larch and 10% lodgepole pine (*Pinus contorta*). This overstory canopy ranges in age from 120-129 years old with an average DBH of 15" and height of 120 ft.
- The first identified stands mid-level canopy is comprised of 80-89% grand fir, 10-19% lodgepole pine and 10-19% Douglas fir. This mid-level canopy ranges in age from 70-79 years old and has an average DBH of 7" and height of 50 ft. The second identified stands mid-level canopy is comprised of 60-69% Douglas fir, 20-29% grand fir, 10% lodgepole pine and 10% Ponderosa pine. This mid-level canopy ranges in age from 60-69 years old with an average DBH of 8" and height of 60 ft. The third identified stands mid-level canopy is comprised of 70-79% grand fir, 10% Douglas fir, 10% lodgepole pine and 10% Western larch. This mid-level canopy ranges in age from 80-89 years old with an average DBH of 8" and height of 70 ft.
- The first identified stands understory is dominated by 90-100% grand fir with an age of 50-59 years old, DBH of 2" and height of 10 ft. The second identified stands understory is comprised of 60-69% Douglas fir and 40-49% grand fir with an age of 20-29 years old with a DBH of1" and height of 9 ft. The third identified stands understory is dominated by 90-100% grand fir with an age of 50-59 years old and a DBH of 1" and height of 9 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and Western Larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine and Western larch/Douglas fir.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Ponderosa pine and Western larch/Douglas fir regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 trees per acre. Favor leaving dominant, co-dominant and intermediate Western larch, Douglas-fir and Ponderosa Pine that are wind firm and that have the bark characteristics that would withstand a low intensity prescribed broadcast burn.

- Harvest all merchantable grand-fir, subalpine-fir, Engelmann spruce and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-4 Cable **Location:** W ½ E ½, S36 T26N R27W **Acres:** 59

Elevation: 4700-4900 Ft. **Slope:** 26-45% **Aspect(s):** E, SE

Habitat type: ABGR/LIBO-XETE, ABGR/LIBO-LIBO, ABGR/CLUN-XETE, PSME/CARU-ARUV, ABGR/XETE

Current Cover Type: Mixed conifer, western larch/Douglas-fir, Douglas-fir

Desired Cover Type: Ponderosa pine

Soils: Holloway gravelly ashy silt loam, Holloway gravelly ashy silt loam moist, Mitten-Tevis complex

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Description of Existing Stand:

- This unit is comprised of seven identified stands in the Stand Level Inventory. The overstory of the two identified stands in the southern half of this harvest unit are comprised, on average, of 40-49% Douglas-fir (*Pseudotsuga menziesii*), 30-39% grand fir (*Abies grandis*) and 20-29% western larch (*Larix occidentalis*). This overstory ranges in age from 120 years old with an average DBH of 14" and height of 88 ft. The mid-level canopy of these two stands in the southern half of this harvest unit are comprised, on average, of 70-79% grand fir, 10-19% Douglas-fir, with the remainder being a mix of western larch and lodgepole pine (*Pinus contorta*). This mid-level canopy has an average age of 70-79 years old, a DBH of 8" and height of 55 ft. The understory of these two stands in the southern half of this harvest unit, on average, is comprised of 70-79% grand fir and 20-29% Douglas-fir. This understory has an average age of 45 years old, DBH of 2" and height of 8 ft.

- The remaining northern half of the harvest units upper level canopy is comprised, on average, of 50-59% Douglas fir, 10-19% western larch, 10-19% grand fir, and the rest consisting of a mix of lodgepole pine (P*inus contorta*) and subalpine fir (*Abies lasiocarpa*). This overstory canopy ranges in age from 120-129 years old with an average DBH of 16" and height of 100 ft. The northern half of the harvest unit mid-level canopy is comprised of, on average, 50-59% Douglas-fir, 20-29% grand fir, 10% lodgepole pine, and the remainder consisting of a mix of ponderosa pine (*Pinus ponderosa*), western larch, subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*). This mid-level canopy ranges in age from 60-69 years old with an average DBH of 8" and height of 60 ft. The northern half of this harvest unit's understory is comprised of, on average, 50-59% Douglas-fir, 30-39% grand fir and 0-9% subalpine fir. This understory has an average age of 30 years old, DBH of 1" and height of 11 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine and Western larch/Douglas-fir.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote natural Ponderosa pine and Western larch/Douglas-fir regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 trees per acre. Favor leaving dominant, co-dominant and intermediate ponderosa pine, western larch and Douglas-fir that have the bark characteristics that would withstand a low intensity prescribed broadcast burn.
- Harvest all merchantable grand fir, subalpine fir, Engelmann spruce, and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-5 Cable **Location:** N ½, S36 T26N R27W **Acres:** 55

Elevation: 4900 Ft. **Slope:** 36-55% **Aspect(s):** NE

Habitat type: ABGR/XETE, TSHE/CLUN-CLUN

Current Cover Type: Mixed conifer, western larch/Douglas-fir

Desired Cover Type: Western larch/Douglas-fir

Soils: Holloway gravelly ashy silt loam moist, Holloway gravelly ashy silt loam, Mitten-Tevis complex

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Description of Existing Stand:

- This unit is comprised of three identified stands in the Stand Level Inventory. The overstory of the three identified stands are comprised, on average, of 30-39% Douglas-fir (*Pseudotsuga menziesii*), 30-39% western larch (*Larix occidentalis*), 20-29% grand fir (*Abies grandis*) along with a mix of subalpine fir (*Abies lasiocarpa*). This overstory ranges in age from 150-200 years old with an average DBH of 18" and height of 120 ft. The mid-level canopy of is comprised, on average, of 40-49% Douglas fir, 30-39% grand fir, 10-19% subalpine fir with a mix of Engelmann spruce (*Picea engelmannii*). This mid-level canopy has an average age of 80-89 years old, a DBH of 9" and height of 75 ft. The understory is domintated by grand fir along with a mix of Douglas-fir and subalpine fir. This understory ranges in age from 30-60 years old with an average DBH of 2" and height of 15 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of western larch/Douglas-fir.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote Ponderosa pine and western larch/Douglas-fir regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 tree per acre. Favor leaving dominant, co-dominant and intermediate ponderosa pine, western larch and Douglas-fir that have the bark characteristics that would withstand a low intensity prescribed broadcast burn.
- Harvest all merchantable grand fir, subalpine fir, Engelmann spruce, and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-6 Cable **Location:** N ½ NW¼ S36 T26N R27W **Acres:** 24

Elevation: 4900-5300 Ft. **Slope:** 26-55% **Aspect(s):** NE

Habitat type: ABGR/XETE, TSHE/CLUN-CLUN

Current Cover Type: Subalpine fir, mixed conifer, western larch/Douglas-fir

Desired Cover Type: Western larch/Douglas-fir

Soils: Holloway gravelly ashy silt loam moist, Holloway gravelly ashy silt loam

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Description of Existing Stand:

- This unit is comprised of six identified stands in the Stand Level Inventory. The overstory is comprised, on average, of 30-39% Douglas-fir (*Pseudotsuga menziesii*), 20-29% western larch (*Larix occidentalis*), 20-29% subalpine fir (*Abies lasiocarpa*) and 10-19% grand fir (*Abies grandis*). This overstory ranges in age from 150-200 years old with an average DBH of 18” and height of 115 ft. The mid-level canopy of is comprised, on average, of 50-59% subalpine fir (*Abies lasiocarpa*), 20-29% grand fir and 10-19% Douglas-fir. This mid-level canopy has an average age of 80-89 years old, a DBH of 9” and height of 75 ft. The understory is dominated by subalpine fir and grand fir with a small mix of Douglas-fir as well. This understory ranges in age from 40-69 years old with an average DBH of 3” and height of 15 ft.
- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western Larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of western larch/Douglas-fir.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote ponderosa pine and western larch/Douglas-fir regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 trees per acre. Favor leaving dominant, co-dominant and intermediate ponderosa pine, western larch and Douglas-fir that have the bark characteristics that would withstand a low intensity prescribed broadcast burn.
- Harvest all merchantable grand fir, subalpine fir, Engelmann spruce, and lodgepole pine.
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit Number: 36-8 Cable **Location:** W ½ S36 T26N R27W **Acres:** 143

Elevation: 4,400-5200 Ft. **Slope:** 36-55% **Aspect(s):** SE, W

Habitat type: PSME/SYAL-CARU, PSME/CARU-AGSP, ABGR/LIBO-LIBO, ALBA/XETE

Current Cover Type: Western larch/Douglas-fir, Douglas-fir, ponderosa pine, subalpine fir

Desired Cover Type: Ponderosa pine, western larch/Douglas fir, lodgepole pine

Soils: Holloway gravelly ashy silt loam, Mitten-Tevis complex, Mollman gravelly loam

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Description of Existing Stand:

- This unit is comprised of five identified stands in the Stand Level Inventory. The overstory is comprised of 70-79% Douglas-fir (*Pseudotsuga menziesii*) with the remaining stand having a mix of Ponderosa pine (*Pinus ponderosa*), western larch (*Larix occidentalis*), and lodgepole pine (pinus contorta). This overstory ranges in age from 80-129 years old with an average DBH of 15" and height of 85 ft. The mid-level canopy of is comprised of 80-89% Douglas-fir with the remainder of the stand being a mix of western larch and lodgepole pine (*Pinus contorta*). This mid-level canopy is 70-80 years old with an average DBH of 8" and height of 50 ft.

The understory is dominated by 80-90% Douglas-fir with the remainder being a mix of grand fir (*Abies grandis*). This understory is 30-39 years old with a DBH ranging from 1-4" and an average height of 9 ft.

- Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir dwarf mistletoe (*Aceuthobium douglasii* Engelm) and western Larch dwarf mistletoe (*Arceuthobium Laricis*) is active in epidemic proportions.
- Significant tree mortality has occurred along with new beetle attacks.

Treatment Objectives:

- Move the stand towards the desired future conditions of Ponderosa pine, Western larch/Douglas fir and lodgepole pine.
- Remove unhealthy, diseased and insect infested trees, as well as those with poor vigor, throughout the stand to promote long-term forest health.
- Create a disturbance to promote Ponderosa pine regeneration.

Prescribed Treatment:

- Seed tree. Variable retention of trees with healthy crown and bole characteristics spaced to about 90-100 ft., retaining approximately 4-5 trees per acre. Favor leaving dominant, co-dominant and intermediate ponderosa pine, western larch, Douglas-fir, and in desired areas, lodgepole pine.
- Harvest all merchantable lodgepole pine, grand fir, subalpine fir and Engelmann spruce
- Retain a minimum of two snags per acre, 21" DBH & greater (or largest available size class), plus two snag recruits per acre, where present, if they are not a safety hazard. Snags felled for safety reasons should be retained inside the harvest unit.

Harvest Method:

- Cable logging operations are applicable to this unit.
- Leave trees ***are not*** marked; Cut by prescription.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Low intensity broadcast burn; following the burning and/or the grinding of the landing piles.

Site Preparation and Regeneration:

- Low intensity prescribed broadcast burn to provide for a mineral seedbed.
- Leave trees to provide seed source for natural regeneration.
- As a second alternative, planting would be considered should the prescribed broadcast burn not take place.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from the time of site preparation, and the need for supplemental planting determined.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Attachment C – Timber Sale Vegetation Analysis

Skookum Point Salvage Timber Sale – Vegetation Analysis

Analysis Prepared By:
Name: Jeff Hansen
Title: Management Forester, Montana DNRC

Introduction

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

Issues and Measurement Criteria

No Action Alternative:

- Douglas-fir Beetle, Dendroctonus pseudotsugae, will continue to suppress productivity/growth or cause mortality in the project area

Action Alternative:

- Improve forest health. Minimize losses in timber volume from mortality due to insect and disease conditions present within the sale area; specifically Douglas-fir beetle (*Dendroctonus pseudotsugae*) .
- Promote the continued presence and/or reestablishment of historically appropriate timber types on Trust Land included in this project.
- Reduce fire hazard and associated risks of loss to the State of Montana.

Regulatory Framework

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

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

DNRC Forest Management Rules
DNRC Forest Management Rules (*ARM 36.11.401 through 456*) are the specific legal resource management standards and measures under which DNRC implements the SFLMP and subsequently its forest management program. The Forest Management Rules were adopted in March 2003 and provide the legal framework for DNRC project-level decisions and provide field personnel with consistent policy and direction for managing

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

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

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

Analysis Areas

Direct and Secondary Effects Analysis Area
The proposed project area for direct and secondary effects is 639 acres in Section 36 of T26N R27W. This section is located 36 air miles north of Plains, Montana, known as the Skookum Point parcel.

Cumulative Effects Analysis Area
The Plains Unit administrative area is a cumulative effects area; State Trust Lands that lie within Sanders County.

Existing Conditions

Noxious Weeds
Noxious weeds have not been identified within the existing timber stands.

Noxious weeds currently identified on the road systems leading to the project area are spotted knapweed (*Centaurea maculosa*) and common St. John's wort (*Hypericum* perforatum).

Rare Plants
Using the Natural Heritage Program database, no sensitive, threatened, or endangered plant species have been documented within any of the proposed harvest units.

Stand History/Past Management
State of Montana section records show that approximately 75 acres out of a total of 639 acres within this parcel were entered and harvested in 1982-1983 due to an epidemic Mountain pine beetle (Dendroctonus ponderosa) outbreak. Following this harvest, a broadcast burn was implemented. The remaining acreage has never been entered or harvested.

Current Stand Conditions

Past and current events have changed the forest conditions on the proposed parcel involved in the project area from what would have been present historically according to Losensky's "Historical Vegetation of Montana" (1997). The area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Since the early 1900's, fire has been virtually eliminated from the project area resulting in a dangerously high accumulation of down woody fuels and ladder fuels. Logging activity has occurred in the past on this section in a comparatively small portion.

The majority of the eastern aspect of this parcel's overstory is dominated by a mature component of Douglas-fir with a mix of older western larch, and fading to a mature, overstocked and unhealthy stand of grand fir infested with disease and damage. This mature component of Douglas-fir is currently experiencing a heavy concentration of mortality due to an epidemic infestation of Douglas-fir beetle (*Dendroctonus pseudotsugae*) . The average age of this eastern aspect and eastern half of this parcel is 95 years of age with an average height in the 80 foot range.

The western and southern aspects are dominated by an overstory of mature Douglas-fir with a mix of ponderosa pine and western larch. This mature component of Douglas-fir is currently experiencing a heavy concentration of mortality due to an epidemic infestation of Douglas-fir beetle, (*Dendroctonus pseudotsugae)* with an understory filling in predominately with Douglas fir and a mix of grand fir. The average age of these western and southern aspects is 105 years of age with an average height in the 75 foot range.

The remaining northwestern portion and northern aspects are mixed conifer stands with a high concentration of subalpine fir in the overstory and understory. The average age of this stand is 95 years old with an average height in the 65 foot range.

The SLFMP and associated 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). Cover type refers to the dominant tree species that currently occupy a forested area. There are three desired future cover types identified for the project area: ponderosa pine, western larch/Douglas-fir, and lodgepole pine. Currently there are five cover types present within the proposed project area, resulting in only 16% of the project area comprised of desired future cover types. Therefore, compared to the cumulative Plains Unit's desired future conditions, there is currently a deficiency in the ponderosa pine, western larch/Douglas-fir, and lodgepole pine cover types (see Table V-1).

Table V-1 – Current and appropriate cover type for the Skookum Point Salvage Timber Sale. Project Area 639 acres.

Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Subalpine fir	87	14%		
Douglas-fir	62	10%		
Lodgepole pine	0	0%	31	5%
Mixed conifer	166	26%		
Ponderosa pine	123	19%	282	60%
Western larch/Douglas-fir	201	31%	226	35%
Western white pine				
Non-stocked				
Non-forest				
Other (specify)				
Total:	***639***	***100%***	***639***	***100%***

Environmental Effects

No Action Alternative: Direct and Secondary Effects and Cumulative Effects

Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and no road construction or improvements would occur. The No Action alternative would result in decreased growth rates, continued decline of stand conditions, including an increase in the current epidemic bark beetle outbreak, and increased loading of down woody and ladder fuels within the timber stands. Within the project area, stands dominated primarily by white woods would continue to compete with ponderosa pine, western Larch, Douglas-fir, and lodgepole pine of all age classes, further removing the stands from the desired future conditions. Noxious weeds would continue to exist along the roads and move into the forested areas as natural disturbances provide available seedbeds. This alternative would not produce revenue for the Common Schools (C.S.) Trust Grant or the Forest Improvement account.

Action Alternative: Direct, Secondary, and Cumulative Effects

Noxious Weeds

Direct and Secondary

The spread of noxious weeds from the use of mechanized equipment and ground disturbance would be minimized, but not completely eliminated, by the washing of equipment before entering the site and sowing grass seed on roads after road construction and harvesting (ARM 36.11.445).

Cumulative

Cumulatively, weed populations would be monitored and herbicide treatments on haul roads would be scheduled through the Plains Unit's weed management program in an effort to maintain or reduce infestations.

Rare Plants

Direct and Secondary

Using the Natural Heritage Program database, no sensitive, threatened, or endangered plant species have been documented within any of the proposed harvest units. Therefore no direct, indirect, or cumulative impacts would be expected under either alternative.

Standard Vegetative Community

Direct and Secondary

The proposed action alternative would harvest timber on approximately 566 acres. The proposed harvest would be focused on opening the stand to enhance regeneration of preferred seral species, reduce stocking of shade tolerant climax species, and improving forest health by mitigating bark beetle activity and disease. Gated road closures would prevent the unauthorized removal of snags and snag recruits. Fuel loadings would be reduced by removal of ladder fuels from the understory and intermediate components of the stand. Growth and vigor of the remaining trees is expected to increase as residual tree spacing would allow full light to crowns and more available water. Noxious weeds would be monitored and addressed through the Plains Unit integrated weed management program.

Cumulative

Across the Plains Unit there would be a slight shift towards Desired Future Conditions as the proposed treatment would alter the Current Vegetation Cover Types. Currently, approximately 468 acres would be managed towards the desired future stand conditions while approximately 88 acres, that currently meet desired stand conditions, would be treated as to continue meeting such standards. The Plains Unit has 53,151 Classified Forest acres. This results in a change of less than 1% of the total Classified Forest acres. The project area would be altered with regard to size class distribution and stocking levels. Fuel loading, ladder fuels, insect and disease incidence would be reduced.

Vegetation Mitigations

- Wash equipment prior to harvest to limit weed seed dispersal.
- Plant grass on newly disturbed road surfaces to limit the resources available for weeds to establish.
- Harvest prescriptions have been developed to remove diseased and insect infested timber and reduce fuel loading.

Recommended Mitigations and Adjustments of Treatments for the Benefit of Other Resources

- Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch. Clumps of existing snags would be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.

VEGETATION REFERENCES

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Forestry Best Management Practices.

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Attachment D – Soils Analysis

Skookum Point – Soils Analysis

Analysis Prepared By:
Name: Tony Nelson
Title: Hydrologist, Montana DNRC

Introduction

The following analysis will disclose anticipated effects to soil resources within the Skookum Point 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

Soil Physical Properties
Analysis of soil physical properties addresses the issue that timber harvesting and associated activities may affect soil conditions in the proposed project area through ground-based and cable yarding activities, and through repeated entries to previously harvested areas. Operation of ground-based machinery can displace fertile layers of topsoil, which can lead to a decrease in vegetation growth. Ground-based machinery can also lead to compaction of the upper layers of soil. Compaction decreases pore space in soil, reduces its ability to absorb and retain water, and can increase runoff and overland flow. These conditions can also lead to a decrease in vegetation growth. Surface erosion can also affect vegetation growth and water quality. Sheet and rill erosion can remove fertile surface layers of soil, and also make revegetation difficult.

Measurement Criteria: Soil physical properties will be measured quantitatively by estimating the percentage of harvested ground that would be left in an impacted condition following activity. Estimates will be based on DNRC Soil Monitoring (DNRC, 2011).

Nutrient Cycling
Nutrient cycling, microbial habitat, moisture retention and protection from mineral erosion are provided by coarse and fine woody debris in forested environments (Harmon et al, 1986). Forest management can affect the volumes of fine and coarse woody debris through timber harvesting and result in changes to potentially available nutrients for long-term forest production.

Measurement Criteria: Nutrient cycling will be measured by tons of coarse woody material per acre on harvested sites pre- and post-project.

Slope Stability
Slope stability can be affected by timber management activities by removing stabilizing vegetation, concentrating runoff, or by increasing the soil moisture. The primary risk areas for slope stability problems include, but are not limited to, landtypes that are prone to soil mass movement, and soils on steep slopes (generally over 60 percent).

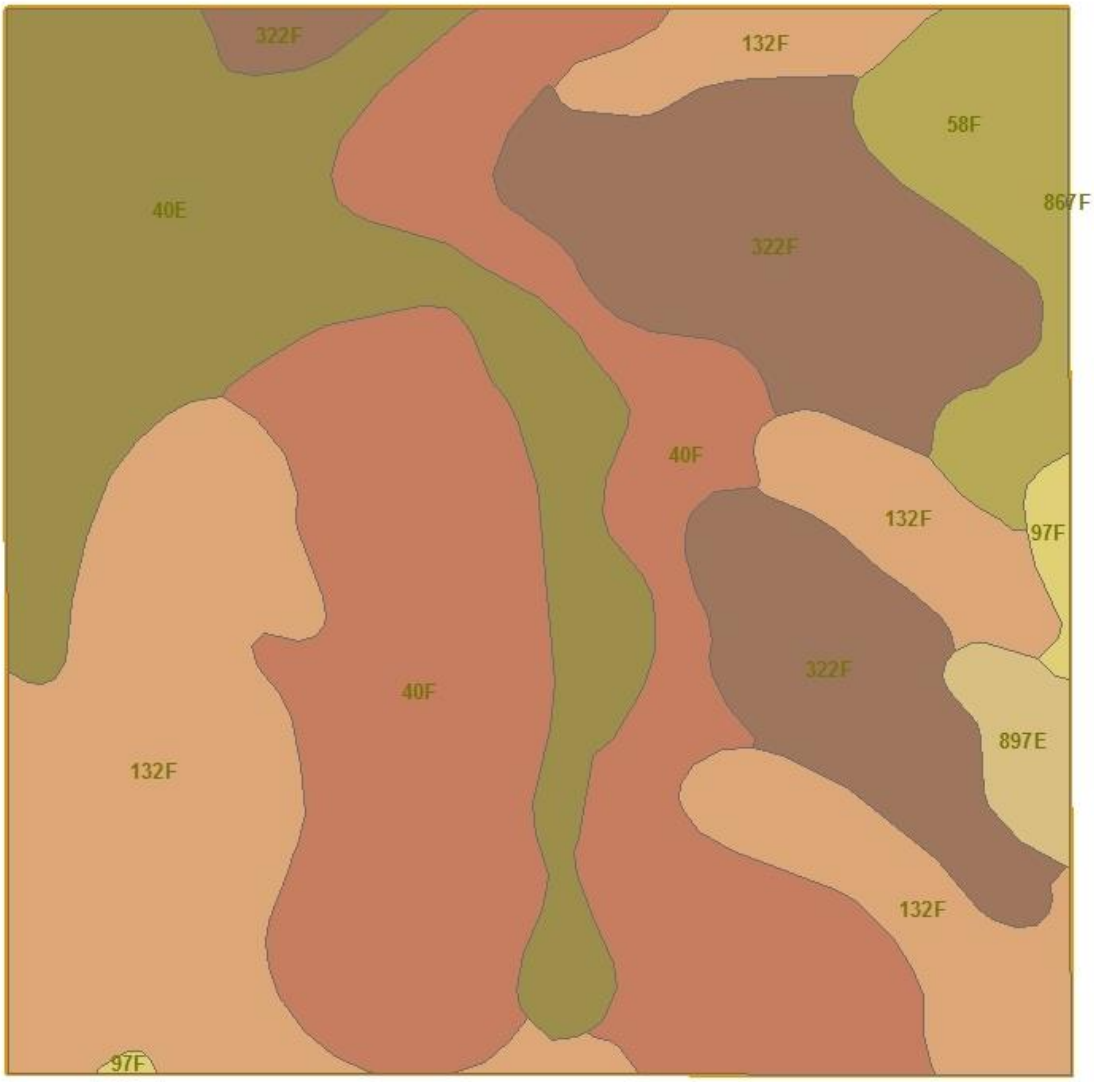
Measurement Criteria: Slope stability risk will be measured based on percentage of slopes steeper than 60% with high risk landtypes.

Analysis Areas

Direct and Secondary Effects Analysis Area

The analysis area for evaluating direct, secondary and cumulative effects to soil physical properties, nutrient cycling and slope stability will include areas proposed for harvest within the gross project area. Analysis area for existing conditions and slope stability will include DNRC owned land within the Skookum Point project area. A map of the Landtypes in the Skookum Point project area is found below in ***Figure S-1***.

Figure S-1 *– Skookum Point Landtype Map*



Analysis Methods

Physical Disturbance (Compaction and Displacement)

Impacts to soil physical disturbance will be analyzed by evaluating the current levels of soil disturbance in the proposed project area based on field review and aerial photo review of existing and proposed harvest units. Percent of area affected is determined through pace transects, measurement, aerial photo interpretation, and GIS to determine skid trail spacing and skid trail width. From this, skid trail density and percent of area impacted are determined. Estimated effects of proposed ground-based and cable yarding activities will be assessed based on findings of DNRC soil monitoring (DNRC, 2011). Soil erosion potential will be measured using the K-value as determined by the NRCS (1996). A description of the K-value and its associated interpretations is found in **Table S2**.

Nutrient Cycling

Nutrient cycling will be analyzed by disclosing existing levels of coarse woody debris from transects conducted during field reconnaissance. The method for quantifying the coarse woody debris is described in the *Handbook for Inventorying Downed Woody Material* (Brown, 1974). Potential impacts to nutrient cycling will be assessed by evaluating risks to nutrient pools and long-term site productivity from timber sale contract requirements and mitigation measures.

Slope Stability

Slope stability risk factors will be analyzed by reviewing the Web Soil Survey to identify landtypes listed as high risk for mass movement. Field reconnaissance will also be used to identify any slopes greater than 60 percent as an elevated risk for mass movement.

Existing Conditions

Geology

The landform and parent materials in the project area are generally quartzite and argillite bedrock soils with small areas of glacial till or glacial drift influence. The majority of the bedrock consists of slightly metamorphosed sedimentary rocks formed from sand, silt, clay, and carbonate materials deposited in an ancient shallow sea during the Precambrian period.

Physical Disturbance (Compaction and Displacement)

Soil physical disturbance can be affected through management activities. In the gross project area, DNRC has conducted timber harvesting since the 1980s. Timber sale records dating back to the 1980s indicate most of the proposed project area has been harvested using a combination of ground-based and cable yarding methods. Ground-based yarding can create soil impacts through displacement and compaction of productive surface layers of soil, mainly on heavily used trails. Existing skid trails are spaced at between 60 and 120 feet apart, and none were identified as erosion or sediment sources. Trails are still apparent, but most are well vegetated and past impacts are beginning to ameliorate from freeze-thaw cycles and root penetration. Based on pace transects of trail spacing, knife penetration tests for compaction, and ocular estimates of revegetation,

approximately 10% of previously ground-skidded harvest units are in an impacted condition in the proposed project area.

- **Table S2 – Soil Map Unit Description**

Map Unit	Description	Acres	Analysis Area	Landtype Description	Compaction hazard	Erosion Hazard	Displacement Hazard
40E	Holloway gravelly ashy silt loam, 15-35%	124	19.4%	Mountains, Volcanic ash over colluvium derived from argillite or quartzite	M	L/M	L
40F	Holloway gravelly ashy silt loam, 35-60%	195	30.5%	Mountains, Volcanic ash over colluvium derived from argillite or quartzite	M	L/M	L
58F	Waldbillig gravelly ashy silt loam, moist, 30-50%	34	5.3%	Mountains, Volcanic ash over till or drift	M	L	L
97F	Mollman gravelly loam, 30-50%	4	0.7%	Mountains, Alpine till or glacial drift	H	L	M
132F	Mitten-Tevis complex, 35-60%	159	24.8%	Mountains, Volcanic ash over colluvium	M	L	L
322F	Holloway gravelly ashy silt loam, moist, 35-60%	113	17.7%	Mountains, Volcanic ash over colluvium derived from argillite or quartzite	M	L/M	L
897E	Mollman gravelly loam, 8-30%	10	1.6%	Moraines, Alpine till or glacial drift	H	L	L

Erosion

No areas of soil erosion were identified during field reconnaissance in 2015 by a DNRC hydrologist. Upland areas harvested during previous entries were found to be stable, well-vegetated and not actively eroding. Erosion from existing road surfaces has been analyzed in the watershed and hydrology analysis.

Nutrient Cycling

Nutrient cycling was assessed in the proposed project area by completing 10 transects to estimate the current levels of coarse woody debris. These transects were focused on proposed harvest units. The average coarse woody debris is 25.9 tons/acre, with a range of 3.6 to 63.6 tons/acre and a median of 22.8 tons/acre. These results are well within the recommended range discussed in *Managing Coarse Woody Debris in Forests of the Rocky Mountains* (Graham et. al., 1994) on similar habitat types. Grand fir and Douglas-fir habitat types in Montana are recommended to have a range of 7 to 24 tons/acre to maintain forest productivity.

Slope Stability

Soil types in the project area are primarily gentle to moderately sloped (0-60%) residual soils and glacially derived soils found on hilly terrain. The Web Soil Survey reports the findings in the *Sanders and Parts of Lincoln and Flathead Counties, Montana (MT651)* (NRCS, 1996) soil survey. This survey identified no areas of soils at high risk for mass movements in the project area. No slope failures were identified during reconnaissance in the proposed project area. Because none of the slope stability risk factors are present in any parcel of the proposed project area, slope stability will not be evaluated on this project in the remainder of this analysis. A list of soil map units found in the Skookum Point project area and their associated management implications is found in **Table S-2**.

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 and Displacement)

Direct and Secondary

Based on DNRC soil monitoring on soils and sites similar to those found in the project area, direct impacts to soil physical disturbance would be expected on up to 47 of the total 562 acres proposed for harvesting in the proposed project area. Soil monitoring conducted on DNRC lands shows that sites harvested on DNRC lands statewide on similar soils with ground-based machinery had a range of impacts from 6 to 21 percent of the acres treated, with an average disturbance rate of 14% (DNRC, 2011. These impacts include operations on dry soils in non-winter conditions. Soil monitoring conducted on DNRC lands shows that sites harvested on DNRC lands statewide on similar soils with cable yarding equipment had a range of impacts from 3 to 8.3 percent of the acres treated, with an average disturbance rate of 5.7% (DNRC, 2011). As a result, the extent of impacts expected would likely be similar to those reported by DNRC soil monitoring (DNRC, 2011), or approximately 6 to 21 percent of ground-based harvested acres, and approximately 3 to 8.3 percent of cable harvest acres. The proposal includes 186 acres of ground-based mechanical harvesting and 376 acres of cable yarding.

Ground-based site preparation would be done on tractor units, and prescribed fire may be used for site preparation on portions of cable harvest units. These activities would also generate direct impacts to the soil physical disturbance. Site-preparation disturbance would be intentionally done, and these impacts are considered light and promote reforestation of the site. The combination of these activities would leave approximately 8.4 percent of the proposed harvest units in an impacted condition. This level is below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the *SFLMP*, and well within the 20-percent impacted area established as a level of concern in the *SFLMP (DNRC 1996)*. This level translates to a low risk of low direct and indirect impacts to soil physical disturbance. These impacts would likely persist for 20-40 years, depending on site specific conditions. In addition, BMPs and a combination of mitigation measures would be implemented to limit the area and degree of soil impacts as noted in ARM 36.11.422 and the SFLMP (DNRC, 1996).

Cumulative

Cumulative effects to soil physical disturbance may occur from repeated entries into a forest stand where additional ground is impacted by equipment operations. None of the proposed units in this alternative have had any past harvesting activity. As a result, the cumulative effects to soil physical properties in these areas would be identical to those displayed in the Direct and Indirect Effects section of this analysis. Cumulative impacts to soil physical properties under the Action Alternative would fall below the range analyzed for in the EXPECTED FUTURE CONDITIONS section of the SFLMP and are well within the 20-percent impacted area established as a level of concern in the SFLMP (DNRC, 1996). This level translates to a low risk of low

cumulative impacts to soil physical properties. These impacts would likely persist for 20-40 years, depending on site specific conditions.

Erosion

Direct and Secondary

Direct and secondary effects to erosion from the proposed project would include skid trails in ground based harvest areas, cable yarding corridors in cable areas and new roads. In each of these areas, there is a high risk of low impacts to erosion due to exposure of bare soil. Skid trails and cable yarding corridors would present a short-term risk which would decrease once disturbed areas re-vegetate. New roads would represent a longer term risk due to continued exposure of bare soil on road tread areas. Erosion from roads is addressed in the watershed and hydrology portion of the analysis.

Cumulative

Cumulative effects to erosion would be similar to the values reported for soil disturbance. Approximately 8.4% of the proposed harvest units would have exposed soil following activity. These areas of disturbance present a low risk of low impacts to erosion and subsequent sediment delivery due to implementation of all applicable BMPs and mitigations listed in this analysis and in the watershed and hydrology analysis.

Table S3 – Detrimental Soil Disturbance for the Action Alternative

Area of Analysis	Total Area (Acres)	Disturbance Rate (%)	Affected Area (Acres)
Harvest Units (including landings)	562	8.4	47
Roads *	24.1	100	24.1

•

Nutrient Cycling

Direct and Secondary

Direct and indirect effects to nutrient cycling would include an increase in coarse woody debris from the Action Alternative. This would present a low risk of low direct and indirect effects to nutrient cycling. Stands where woody debris levels are low would see an increase in large woody debris as a result of the proposed harvesting. In addition, this alternative would lead to an increase in fine woody material in the form of limbs and tree tops being left after harvest. Through the timber sale contract, approximately 8-24 tons of coarse woody material would be left on the ground following harvesting activities, as well as fine material for nutrient retention.

Cumulative

Risk of cumulative effects to nutrient cycling from nutrient pool loss would be low. This would present a low risk of low cumulative effects to nutrient cycling. This alternative would follow research recommendations found in Graham (1994) for retention of coarse and fine woody debris through contract clauses and site-specific mitigation measures.

Soils Mitigations

Limit equipment operations to periods when soils are dry (less than 20% oven-dried weight), frozen or snow-covered in order to minimize soil compaction and rutting, 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 existing trails to use and how many additional trails are needed.

Do not use existing trails if they are located in draw bottoms or other unfavorable locations.

Grass seeding or other erosion control measures may be required to stabilize some trails.

Limit ground-based operations to slopes less than 40% unless they can be used without causing excessive displacement or erosion.

Space cable yarding corridors at least 75 feet apart. Clearing width for corridors to accommodate yarding should not exceed 12 feet.

Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for surface drainage of all roads and skid trails concurrent with operations.

Slash disposal: Limit the total of disturbance and scarification to 30-40 percent of harvest units.

Limit dozer piling to slopes less than 35 percent and limit excavator piling to slopes less than 40 percent unless it can be completed without causing excessive erosion.

Retain between 8 and 24 tons/acre of woody debris 3-inches in diameter or greater (depending on habitat type) and a feasible majority of fine branches and needles following harvesting operations. 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 fine slash on site; 2) for whole-tree harvesting, return skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

Soils References

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Attachment E – Water Resources Analysis

Skookum Point – Water Resources Analysis

Analysis Prepared By:
Name: Tony Nelson
Title: NWLO Hydrologist, Montana DNRC

Introduction

The following analysis will disclose anticipated effects to water resources within the Skookum Point 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

Sediment Delivery

Sediment delivery and subsequent water quality impacts can be affected by timber harvesting and related activities, such as road construction, by increasing the production and delivery of fine sediment to streams. Construction of roads, skid trails, and landings can generate and deliver substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosive power of stream flows.

Measurement Criteria: Sediment delivery from roads, harvesting activities and vegetative removal will be analyzed qualitatively through data collected during past statewide and DNRC internal BMP (Best Management Practices) field reviews.

Water Yield

Water yield increases can result from timber harvesting and associated activities, which can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal (*Haupt 1976*), because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition. Vegetation removal can also reduce peak flows by changing the timing of snowmelt. Openings will melt earlier in the spring with solar radiation and have less snow available in late spring when temperatures are warm. This effect can reduce the synchronization of snowmelt runoff and lower peak flows.

Measurement Criteria: The water yield increase for the project area streams was determined using field review and aerial photo interpretation. Visual inspection of the runoff patterns and stream channel stability within the Skookum Point project area were used to assess the impacts of past management to water yield. Aerial photo interpretation was used to determine the extent of past management in these watersheds.

Regulatory Framework

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

Montana Surface Water Quality Standards
According to the Montana Surface Water Quality Standards found in *ARM 17.30.607* (*1*)(*a*), this portion of the Clark Fork River drainage, including the Thompson River, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases over natural turbidity. "Naturally occurring," as defined by *ARM 17.30.602* (*19*), includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (commonly called Best Management Practices or BMPs) have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that could create impacts.

There are no designated beneficial water uses or surface water rights within the project area.

Water-Quality-Limited Waterbodies
None of the streams in the proposed project area are currently listed as water-quality-limited waterbodies in the *2014 Montana 303*(*d*) list (*DEQ, 2014*).

Montana SMZ Law
By the definition in *ARM 36.11.312* (*27*), none of the draws or other drainage features in the project area meets the criteria to be classified as a stream. As a result, the Skookum Point project area has no streams.

Forest Management Rules
In 2003, DNRC drafted Administrative Rules for Forest Management. The portion of those rules applicable to watershed and hydrology resources include ARM 36.11.422 through 426. All applicable rules will be implemented if they are relevant to activities proposed with this project.

Habitat Conservation Plan
In 2011, DNRC adopted a habitat conservation plan (HCP) in coordination with the United States Fish and Wildlife Service. All applicable HCP riparian timber harvest and aquatic conservation strategies (USFWS & DNRC, 2010) would be implemented if they are relevant to activities proposed with this project.

Analysis Areas

Sediment Delivery
Analysis area for direct, indirect and cumulative effects to sediment delivery will be analyzed on all existing roads in and leading to the proposed project area. Sediment delivery will be analyzed qualitatively where roads cross draws in the proposed project area using visual inspection and lineal measurement to determine the road surface area that could potentially deliver sediment. Additional sites on proposed haul routes located outside the project area will be assessed qualitatively for their potential to affect downstream water.

Water Yield

Direct, indirect and cumulative effects to water yield will be analyzed in the draw features within the project area. All existing activities on all ownership and proposed activities related to the Skookum Point project will be analyzed using methods described below. These areas were chosen as an appropriate scale of analysis, and will effectively display the estimated impacts of proposed activities.

Analysis Methods

Where risk is assessed in both sediment delivery and water yield analyses, the following definitions apply to the level of risk reported:

- low risk means that impacts are unlikely to result from proposed activities,
- moderate risk means that there is approximately a 50 percent chance of impacts resulting from proposed activities, and
- high risk means that impacts are likely to result from proposed activities.

Where levels or degrees of impacts are assessed in this analysis, the following definitions apply to the degree of impacts reported:

- very low impact means that impacts from proposed activities are unlikely to be measurable or detectable and are not likely to be detrimental to the water resource;
- low impact means that impacts from proposed activities would likely be measurable or detectable, but are not likely to be detrimental to the water resource;
- moderate impact means that impacts from proposed activities would likely be measurable or detectable, and may or may not be detrimental to the water resource;
- high impact means that impacts from proposed activities would likely be measurable or detectable, and are likely to have detrimental impacts to the water resource.

Sediment Delivery

Analysis methods to assess sediment delivery will include qualitative assessments where draw crossings exist within the proposed project area using visual inspection and lineal measurement to determine the road surface area that could potentially deliver sediment. Sediment from roads, harvesting activities and vegetative removal will be analyzed qualitatively through data collected during past statewide and DNRC internal BMP field reviews.

Water Yield

Analysis methods to assess water yield increases for the project area streams was determined using field review and aerial photo interpretation. Visual inspection of the runoff patterns within the Skookum Point project area were used to assess the impacts of past management to water yield. All existing activities on all ownership within project area watersheds and proposed activities related to the Skookum Point project will be analyzed using methods described above.

Existing Conditions

General Description

The following section will describe the existing conditions within the proposed project area and the analysis areas that are relevant to the issues discussed above in this analysis.

Sediment Delivery
Sediment delivery on these parcels was reviewed by a DNRC hydrologist in 2015. No stream channels were identified in the project area. All draws and drainage features were found to be stable and not actively eroding. Based on these findings, no in-channel sources of erosion or deposition were identified in the project area.

No sediment delivery from the existing road system was identified on any of the proposed haul routes within or leading to the project area. The existing road system in the proposed project area is moderate standard native-surfaced road. Most reaches of existing road meet applicable best management practices for surface drainage and erosion control, but there are reaches in need of installation of surface drainage features. Most road grades are generally under 8%. The road system was constructed to access timber harvesting by the Plum Creek Timber Company and Montana DNRC during past entries. Most of the road segments in the project area are not causing active erosion or sediment delivery.

Water Yield
No water yield impacts were identified from past activities in and around the proposed project area streams. Past management activities consist of timber management on industrial private and state land. These activities and events have led to reductions in forest canopy cover, and construction of roads.

Evidence of water yield increases was not found during field reconnaissance of the proposed project area. As a result, it was determined that a detailed water yield analysis would not be necessary for the proposed project area. None of the broad ephemeral draws within the proposed project area have any evidence of overland flow (channel scour, re-alignment of litter, definable banks). As a result, water yield increases resulting from past activities in the watershed have not been sufficient to scour a channel in any of the broad draws throughout the project area. After evaluating the watershed cumulative effects risks along with the current conditions in the Skookum Point project area, by ARM 36.11.423, a detailed quantitative watershed analysis is not needed in this parcel.

Environmental Effects

No Action Alternative: Direct, Secondary, and Cumulative Effects
Sediment Delivery
Direct and Secondary
Under this alternative, no timber harvesting or related activities would occur. Sediment delivery would continue as described in the existing conditions.

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

Water Yield
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

Sediment Delivery

Direct and Secondary

There is a low risk of direct or indirect effects to sediment delivery to draws from the timber harvesting activities proposed in the Action Alternative. The project area contains no streams, therefore there are no Streamside Management Zones (SMZ) or Riparian Management Zones (RMZ) to consider and no management is proposed within an SMZ or RMZ. Requirements in Administrative Rules for Forest Management and DNRC Habitat Conservation Plan, and applicable BMPs would be applied to all harvesting activities, which would minimize the risk of sediment delivery to draws. The Montana BMP audit process has been used to evaluate the application and effectiveness of forest-management BMPs since 1990; this process has also been used to evaluate the application and effectiveness of the SMZ Law since 1996. During that time, evaluation of ground-based-skidding practices near riparian areas has been rated 92-percent effective, and these same practices have been found effective over 99 percent of the time from 1998 to present (*DNRC 1990 through 2014*). Since 1996, effectiveness of the SMZ width has been rated over 99 percent (*DNRC 1990 through 2014*). As a result, with the application of BMPs and HCP conservation strategies, proposed activities are expected to have a very low risk of very low impacts to sediment delivery.

The action alternative would maintain and improve erosion control and surface drainage on all roads proposed for haul. The action alternative proposes to construct approximately 5.5 miles of new permanent road and potentially an additional 0.6 miles of optional temporary road. None of the proposed new road construction would involve stream crossings. All applicable BMPs would be followed in order to minimize potential impacts to draws where proposed roads cross. Short-term risk of low levels of erosion and deposition would be increased for approximately 2 to 3 years after completion due to exposure of bare soil during construction, surface drainage improvement and hauling activities. This risk would return to near current levels as road surfaces and cut and fill slopes re-vegetate. Overall, there is a low risk of short-term low-level increase in erosion and sediment delivery for about 2-3 years at the new draw crossings. However, water quality standards are expected to be met and there is a low risk of impacts to downstream beneficial uses.

Cumulative

Risk of sediment delivery and sediment loading to downstream waters from the proposed project area would be slightly increased from current levels in the short term and below current levels in the long term. Maintenance and improvement of existing erosion control and surface drainage on the existing road system would yield erosion rates similar to or below current levels. Overall, there is a low risk of short-term low-level increases in sediment loading for about 2 to 3 years. However, water quality standards are expected to be met and there is a low risk of impacts to beneficial uses.

Water Yield

Direct and Secondary

There is a low risk of very low direct or secondary effects to water yield from harvesting of approximately 563 acres of timber under this alternative within the proposed project area. It is a low risk that this level of harvesting would be sufficient to generate measurable increases in water yield in any streams located within or near the project area or cause scour in any of the draws located within the project area. As a result, there is a low risk of very low direct or secondary impacts to water yield in project area drainages as a result of the proposed Action Alternative.

Cumulative

The proposal is to harvest the stands within the proposed project area with a seed tree prescription. Cumulative effects to water yield in this parcel are not anticipated for the following reasons: 1) The well-drained to excessively well-drained nature of the soils would absorb additional available and not produce

increased surface runoff, and would in turn produce little or no detectable change in water yield from upland sites, 2) Draws in the project area are stable, and have not shown lateral or vertical erosion that could be attributed to increased flows, so any increases in water yield present a low risk of increased erosion or other channel adjustments, and 3) Ephemeral draws within the parcel are stable and vegetated with a dense mat of grass and forbs vegetation, making them capable of handling potential water yield increases without destabilizing.

Water Resources Mitigations

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

- implement BMPs on all new roads and improve BMPs on existing roads where needed
- use spot-blading on existing roads to preserve as much of the existing vegetative cover as possible on vegetated road surfaces

Water Resources References

DNRC, 1990-2012. Montana Forestry Best Management Practices Monitoring. Missoula, Montana.

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Rosgen, David L. 1996. *Applied River Morphology.* Wildland Hydrology, Pagosa Springs, CO.

Attachment F – Wildlife Analysis

Skookum Point 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 and connectivity. The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.
- Canada lynx. The proposed activities could result in the modification of habitat preferred by Canada lynx (*Felis lynx*) and decrease the area's suitability for lynx.
- Fishers. The proposed activities could decrease habitat suitability for fishers (*Martes 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 types, 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 Project Area (*FIGURE WI-1*), which consists of section 36 of T26N, R27W.

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 measureable 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	Section 36 of T26N, R27W	639	Direct & indirect effects for all issues/species
Small CEAA	The project area and 8 sections surrounding it.	5,733	Mature forest cover, flammulated owls, pileated woodpeckers
Large CEAA	Portions of the Thompson River-Twin Lakes Creek and Thompson Lakes HUC12 subwatersheds.	35,768	Canada lynx, fishers, 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 timber sale projects (≤5 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 acres that occur in each analysis area.*

Sale Name	Agency	Harvest Year	Project Area	Large CEAA
Upper Indian Creek	DNRC	2016-2018 (anticipated)	0	121

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 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*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting landscape patterns were a mosaic of forest patches varying in age, species composition and development. Timber harvest, like high-severity 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 5,733-acre Small CEAA as described in *TABLE W-1* and depicted in *FIGURE W-1*. The Small CEAA is large enough to support a diversity of species that use mature forested habitat and/or require connected forested habitats and 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. 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 habitat (≥40% canopy cover, ≥9 inches

dbh), 2) average patch size, 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 565 acres (88.4% of project area) of mature Douglas-fir/western larch and mixed conifer stands that have a reasonably well-developed canopy (≥40% crown closure). Another 74 acres (3.9% of project area) harvested in 1982-1983 is comprised of a well-stocked stand containing advanced conifer regeneration and small pole-sized trees. Old-growth forest, as defined by Green et al. (1992), is not present within the project area. Mature forested stands are well represented and connected within the proposed project area; with one 565-acre patch (see TABLE WI-3). This single patch is relatively isolated by recent harvest on surrounding private timberland. Mature forest stands within the project area are undergoing extensive mortality due to Douglas-fir beetles. Beetles are targeting the larger Douglas-fir trees and live canopy cover is decreasing to below 40% in some areas as trees continue to die. Approximately 2.0 miles (2.0 miles/sq. mile) of roads exist in the project area, of which 0 miles of road are open to public motorized use and 2.0 miles are currently restricted to non-motorized use by the public. Around 1.3 miles of this road is too overgrown for any motorized vehicle use. Due to existing mature forest cover, patch characteristics, scattered DNRC parcels interspersed among private timberland, and existing road densities, habitat suitability and connectivity for species using well-stocked, mature forest is moderate within the project area.

Abundance and locations of mature, well-stocked forest within the Small CEAA has been influenced by past timber harvesting and dry south-facing slopes with open forest habitat types. Approximately 81% of the Small CEAA is owned by private timber companies and has undergone intensive forest management within the last 30 years. Presently, 23.7 percent (876 acres) of the Small CEAA contains scattered mature forest stands possessing ≥40% crown closure, the majority of which is located on DNRC-managed lands. Average patch size of mature forest in the small CEAA is 64.5 acres (21 patches, see TABLE WI-3 – Mature Forest Attributes). No known old-growth stands are located within the CEAA and are unlikely to occur given forest management regimes on surrounding private ownership. Landscape connectivity of mature forest stands within the CEAA is poor, with the majority of mature forest occurring on either the project area, small scattered DNRC parcels, or in narrow stringers associated with streams. Some of these patches contain narrow corridors less than 300 feet that could limit connectivity for some species more sensitive to forest edges. Dry, open slopes are present throughout the CEAA and further limit connectivity of well-stocked stands. About 4,344 acres of the CEAA (75.8%) has been harvested with regeneration-type treatments within the last 30 years. Approximately 4,269 acres (74.5% of CEAA) of private timberlands have likely been harvested within the last 20 years. These lands consist of young, regenerating forest with few large scattered trees and do not provide suitable habitat for species that utilize well-stocked, mature forests. Given these assessments, landscape connectivity of mature forest stands within the CEAA is low. Approximately 60.2 miles (6.7 miles/sq. mile) of roads exist within the CEAA. Of these roads, there are 5.8 miles of open roads that equate to a density of 0.6 miles/square mile. These roads are primarily forest roads used for logging and recreational activities within the CEAA and surrounding area. Across the CEAA, mature forest habitat suitability and landscape connectivity are low for species that require and/or prefer these conditions.

Table WI-3 – Mature Forest Attributes. *Acreages and patch size metrics of mature forested habitat (≥40% canopy cover, ≥9 inches dbh) pre- and post-harvest in the Project Area and Small CEAA for the Skookum Point Timber Sale. 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	564.7 (88.4%)	21.6 (3.4%)	1,355.7 (23.6%)	812.6 (14.2%)
Number of Patches	1	1	21	21
Average Patch Size (acres)	564.7	21.5	64.5	38.7
Minimum Patch Size (acres)	N/A	N/A	0.9	0.9
Maximum Patch Size (acres)	N/A	N/A	564.7	216.7

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. Thus, no direct or indirect effects to 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 or connectivity would be anticipated, and 3) no changes to wildlife use would be expected. Past and ongoing forest management projects have affected mature forest wildlife habitat in the CEAA, and other proposed projects could affect mature forest habitat in the future (see TABLE WI-2). No additional cumulative effects to connectivity and suitability of 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 566 acres (88.7% of the project area) would be harvested. Of these acres, 564 acres (88.2% of the project area) of well-stocked, mature forest would undergo harvesting. Approximately 543 acres of mature forest would receive harvest treatments that would reduce overstory crown closure from ≥40% to 5-15% and increase mature tree spacing to 73-100 feet. Harvesting on another 21 acres of mature forest would reduce tree densities, however crown closure in these treated stands would remain above 40% postharvest and provide suitable habitat for some species. Average patch size of mature forest would be reduced by 564 acres and the number of patches would not change (TABLE WI-3).

Remaining mature forest and connectivity in the project area would be located along a ridge in the north half of the project area. Approximately 21 acres (4.5%) of mature forest in the project area with ≥40% crown closure would remain after harvesting and could provide suitable habitat for species utilizing small patches of mature forest, however this patch is isolated by surrounding private timberland. Under the Action Alternative, 5.5 miles of new restricted roads would be built. These new restricted roads would be gated or bermed after project completion. After harvest, cover types and habitat conditions would likely more closely resemble historical conditions on south-facing slopes in this area; with widely spaced large-diameter seral species (Losensky 1997). Wildlife species preferring larger continuous patches of well-stocked mature forest would likely find the project area unsuitable for 50-80 years. After harvest completion, the project area would appear more similar to adjacent private industrial forestland surrounding the project area, and patch size of young, regenerating forest stands would increase. Thus, high adverse direct and secondary effects to connectivity and suitability of mature forested habitat in the project area would be expected since: 1) harvesting would appreciably reduce

tree density and existing cover on approximately 564 acres (99.9%) of existing available mature stands, 2) connectivity of mature forest would be altered with a decrease in average patch size from 564.7 to 21.5 acres, 3) a measure of habitat availably and connectivity would be maintained on 21 acres (3.2% of project area) of mature forest primarily along a forested ridgeline, and 4) existing open road density would not change but 5.5 miles of additional restricted road would be built.

Action Alternative: Cumulative Effects

Under the Action Alternative, timber harvesting would alter 564 acres of the 1,356 acres (41.5%) of mature forest habitat available in the Small CEAA. Harvest treatments would remove 543 acres of mature forest for 80-100 years and reduce habitat quality on another 21 acres (TABLE WI-3). Reductions in the availability of suitable mature forested habitat would be additive to past harvest activities, and those that are proposed or ongoing in the Small CEAA (TABLE WI-2). Across the CEAA, 14.2% of mature, forested habitats would remain and landscape connectivity would be altered to a moderate degree given habitat conditions within the surrounding forested landscape. Habitat availability and connectivity would be reduced, as the number of mature forest patches would stay the same but average patch size would decrease from 64.5 acres to 38.7 acres (TABLE WI-3). The largest mature forest patch (564 acres) within the CEAA would be altered by the proposed Action. A 21-acre patch of mature forest retained along a ridgeline would offer available habitat for some species able to use smaller patches of lower quality, however this patch would be isolated by surrounding harvested stands. Under the Action Alternative, 5.5 miles of new restricted roads would be built and road use would increase on 9.2 miles of restricted road. During activities, open road density would increase from 0.6 miles/sq. mile to 2.3 miles/sq. mile within the CEAA. Thus, moderate adverse cumulative effects to mature forested habitat abundance, suitability, and connectivity would be anticipated as a result of the Action Alternative since: 1) existing habitat suitability and connectivity of mature forest is low; 2) the abundance of mature forested habitat in the CEAA would decrease by 543 acres (41.5% of existing mature forest); 3) average patch size of mature forested habitat would decrease by 25.8 acres; 4) some suitable habitat along ridgelines and streams would be maintained but patch size would remain relatively small; 5) temporary increases in open roads would occur but long-term open 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-4 – Fine Filter provides an analysis of the anticipated effects for each species.

Table WI-4 – Anticipated Effects of the Skookum Point Timber Sale on wildlife species.

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Threatened and Endangered Species	
Canada lynx (*Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	[**Y**] **Detailed Analysis Provided Below.** The Project Area contains approximately 575 acres of suitable lynx habitat.
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity	[**N**] The project area is located over 7 miles outside of grizzly bear recovery zone and non-recovery occupied habitat associated with the Cabinet-Yaak Ecosystem (USFWS 1993, Wittinger 2002) and no recent sightings of grizzly bears have occurred in the area (MNHP 2016). Use of the project area by grizzly bears is unlikely

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
	due to its location, lack of preferred habitat and surrounding unsuitable habitat. Thus, negligible direct, indirect, or cumulative effects to grizzly bears would be expected to occur as a result of either alternative.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest less than 1 mile from open water	[**N**] No known nest territories are present in the vicinity of the project area and no large water bodies exist within one mile of the project area that might provide suitable locations for nesting. Thus, no 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 moist talus or streamside talus habitat occurs in the Project Area. 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	[**N**] No suitable lake habitat occurs within 500 feet of the Project Area. Thus, no direct, indirect, or cumulative effects to common loons would be expected to occur as a result of either alternative.
Fisher *(Martes pennanti)* Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[**Y**] **Detailed Analysis Provided Below** – Approximately 250 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 63 acres of potentially suitable flammulated owl habitat occur in 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 suitable stream habitat occurs in the vicinity of the Project Area and harlequin ducks have not been observed in the area (*MNHP 2016*). 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)*	[**N**] No suitable wetlands occur within the Project Area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Habitat: Sphagnum meadows, bogs, fens with thick moss mats	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 10 miles of the project area are lacking (MNHP 2016). 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 480 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.
Big Game Species	
Elk	[**Y**] **Detailed Analysis Provided Below –** The Project Area contains potential elk, mule deer, and white-tailed deer winter range habitat**.**
Whitetail Deer	
Mule Deer	

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. 1999, 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 35,768-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The Large CEAA approximates the size of a lynx home range, is centered on the project area, and is defined according to geographic features (e.g., ridgelines, large lakes, 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 suitable horizontal cover develops. All habitat classes were identified according to DNRC's lynx habitat mapping protocols (*USFWS and DNRC 2010*). On non-DNRC lands, mature stands with ≥40% canopy cover provided by trees >9 inches dbh on average was queried to estimate potential lynx habitat. Using these forest metrics on non-DNRC 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

The Project Area contains 575 acres of suitable lynx habitat (TABLE WI-5). In the project area, winter foraging habitat is the most abundant type of suitable habitat (TABLE W-5 – LYNX HABITAT). Suitable lynx habitat is well-connected within the project area, however connectivity adjacent to the project area is low due to surrounding private industrial timberland and relative lack of riparian areas as travel corridors. Some dry open south-facing slopes and unsuitable covertypes create 64 acres (2 patches) of potentially unsuitable habitat within the project area. While the project area currently has a high percentage of suitable habitat for lynx, extensive beetle mortality of large conifers is decreasing cover and reducing the suitability of winter foraging habitat.

The Large CEAA contains 2,305 acres (6.4%) of suitable lynx habitat on DNRC lands and another 3,863 acres (10.8%) of potentially suitable habitat on other ownerships (TABLE WI-5). The remaining portions of the CEAA that do not provide habitat likely to support lynx consist primarily of scree slopes, dry south-facing slopes, wet meadows, and logged stands with <40% canopy cover. DNRC manages 9% of the CEAA, private timber companies own 83%, USDA Forest Service administers 4%, Montana Fish Wildlife and Parks manages 1%, and other private owners account for 3% of the CEAA. Approximately 27,774 (77.7%) of the CEAA has been harvested within the last 30 years and reduced the availability of suitable lynx habitat containing mature trees. In the vicinity of the Project Area and in surrounding private timberlands, abundance and connectivity of suitable lynx habitat is relatively low. The largest potentially suitable block of habitat is situated on higher-elevation USDA Forest Service lands in the far western portion of the CEAA. Observations of lynx within the

CEAA are lacking within the last 30 years (*MNHP 2016*). Lower elevations, lower average snow depths, and the interspersion of unsuitable habitat types within the CEAA are factors that likely reduce the overall suitability of the CEAA for appreciable use by lynx.

Table WI-5 – Lynx habitat. *Estimates of existing lynx habitat and habitat that would persist post-harvest on DNRC lands in the project area and cumulative effects analysis area. Percent refers to the percent of the lynx habitat category of the total potential habitat[a] present on DNRC-managed lands.*

Lynx Habitat Category	Acres of lynx habitat			
	Project Area		Cumulative Effects Analysis Area	
	Existing	Post-Harvest	Existing	Post-Harvest
Other Suitable	0.0 (0%)	20.8 (3.6%)	77.4 (3.1%)	98.2 (3.9%)
Summer Forage	71.1 (12.4%)	71.1 (12.4%)	201.5 (8.1%)	201.5 (8.1%)
Temporary Nonsuitable	0.0 (0%)	482.3 (83.8%)	190.4 (7.6%)	672.7 (27%)
Winter Forage	504.3 (87.6%)	1.3 (0.2%)	2,025.9 (81.2%)	1,522.9 (61%)
Grand Total: Suitable Lynx Habitat	575.4 (100%)	93.1 (16.2%)	2,304.8 (92.4%)	1,822.5 (73%)

[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 Skookum Point Timber Sale 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

The proposed activities would alter approximately 503 acres (87.4%) of the 575 acres of suitable lynx habitat available in the Project Area. After harvest, approximately 93 total acres of potential habitat would remain suitable and 482 acres would be converted to temporary nonsuitable habitat (*TABLE WI-5*). To ensure that forest structural attributes preferred by snowshoe hares remain following harvest, some patches of advanced regeneration and shade-tolerant tree species would be retained where possible within portions of lynx winter forage habitat. The total area of these patches would not be expected to comprise more than 5% of the acres

proposed for harvest. However, steeper slopes on up to 332 acres of the project area could undergo prescribed burning after harvest, which would decrease shade-tolerant understory species in the short-term but likely increase conifer regeneration in the long-term. Additionally, 8 to 24 tons/acre of coarse woody debris would be retained in accordance with DNRC Forest Management Rules (*ARM 36.11.414)* and retention of downed logs ≥15 inch diameter (where feasible) would be emphasized. Lynx habitat connectivity would be reduced; however, some connectivity of suitable habitat would be maintained across the project area through a major ridgeline. Habitat connectivity with this corridor in the project area would continue to be limited by nonsuitable habitat on surrounding private timberlands. If present in the vicinity of the Project Area, lynx could be temporarily displaced by forest management activities for up to 4 years due to disturbance caused by motorized activities. However, appreciable use of the area by lynx would not be expected before or after implementation of the Action Alternative. Thus, moderate adverse direct and indirect effects to Canada lynx associated with landscape connectivity and availability of suitable habitat would be anticipated as a result of the Action Alternative since: 1) suitable habitat for lynx would be altered on 503 acres and reduced by 482 acres (83.8% of existing suitable habitat in the Project Area, *TABLE WI-5*); 2) coarse woody debris and some small shade-tolerant conifers would be retained to promote forest structural complexity in harvest units, expediting their growth back into suitable lynx habitat; and 3) existing lynx habitat connectivity to the project area is poor and appreciable use of the area by lynx would not be expected; and 4) vegetative cover would persist along important travel features despite an overall reduction in landscape connectivity.

Action Alternative: Cumulative Effects on Canada Lynx
The proposed activities would affect 503 acres (13.0%) of the 3,863 acres of potentially suitable lynx habitat available in the Large CEAA. Approximately 482 of these harvested acres would be temporarily unsuitable for use by lynx due to lack of canopy cover in the understory and overstory. Habitat suitability would be reduced on another 20.8 acres, however adequate vegetation would be retained (total crown closure ≥40%) to remain suitable for use by lynx after harvesting. Some patches of shade tolerant trees and approximately 8 to 24 tons/acre of coarse woody debris would be retained and leaving downed logs ≥15 inch diameter would be emphasized. Lynx habitat connectivity would be slightly reduced across the CEAA; however, overall suitability and connectivity of lynx habitat is currently poor. Connectivity in riparian areas would remain in parts of the CEAA, but many corridors are less than 300 feet wide. Changes to lynx habitat availability and connectivity would be additive to past and ongoing forest management projects within the CEAA (TABLE WI-2). Thus, minor adverse cumulative effects to Canada lynx associated with landscape connectivity and availability of suitable habitat would be anticipated as a result of the Action Alternative since: 1) overall baseline habitat suitability would remain poor with 17.2% of the CEAA in potentially suitable habitat; 2) existing suitable lynx habitat within the CEAA would be reduced by 12.5% and those areas would remain unsuitable for at least 15 years, 3) overall habitat connectivity within the CEAA would be affected by proposed activities to a minor degree, and 4) lynx could be temporarily displaced by logging activities in the portion of CEAA overlapping the project area.

Sensitive Species

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 (*Schwartz et al. 2013, Raley et al. 2012*).

Fishers generally avoid large openings, clearcuts, and ponderosa pine and lodgepole pine stands (*Schwartz et al. 2013*). Fishers prey upon 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 35,768-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 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) below 6,000 feet elevation in proximity to perennial and intermittent streams.

Affected Environment

The proposed project area contains 250 acres (50.2% of project area) of suitable fisher habitat (TABLE W-6). Riparian fisher habitat is absent, as there are no Class 1 nor Class 2 streams. Snags and coarse woody debris (CWD) were quantitatively accessed during field visits. Analysis of field sampling plots and observations indicated snags within the project area occurred at a density of 19.1 snags per acre (range 0-40). The average diameter of all snags >8” dbh was 18.2” dbh (range 8-35”). Coarse woody debris levels were also variable across the project area, averaging 25.9 tons per acre (range 3.6-63.6 tons per acre). Similar to snags, downed logs were generally of small diameter (6.8” at transect line, range 3-20”), although some larger logs were observed. Existing suitable stands are providing the forest conditions (≥40% crown closure) necessary for use as fisher travel and resting habitat in upland areas. Suitable fisher habitat is moderately connected within the eastern half of the project area but absent in west half due to non-preferred habitat types. Thus, habitat connectivity across the project area as a whole is moderate to poor. The lands surrounding the project area contain few areas of suitable habitat, few riparian areas, and poor connectivity, making it unlikely that fishers would den or breed in the project area. The project area does not contain any open roads that could facilitate access for trappers and firewood gathering. Given existing habitat conditions and the lack of historical observations in the vicinity of the project area (*MNHP 2016*), appreciable use of the project area by fishers is unlikely.

Historical records of fisher occurring in the CEAA within the last 50 years are lacking, however fishers have been documented in Lincoln and Flathead Counties (*MNHP 2016, Foresman 2012*) and fishers potentially use the CEAA. Within the CEAA, there are 5,412 acres (15.1% of the CEAA) of potentially suitable fisher habitat (TABLE WI-6). The largest patches of this potentially suitable habitat (2,825 acres) occur on scattered DNRC lands and USDA Forest Service lands in the far western portion of the CEAA. Approximately 1,549 acres of suitable fisher habitat on DNRC lands occurs in small scattered parcels interspersed among recently logged

private industrial timberland. Thus, connectivity of suitable upland habitat is low throughout much of the Large CEAA. Riparian fisher habitat within the CEAA consists of approximately 51 acres of preferred fisher cover types on DNRC lands, of which 51 acres (100% of preferred fisher cover types) are currently suitable for use by fishers. Approximately 445 acres adjacent to Class 1 and 2 streams within the CEAA have accompanying riparian vegetation that would facilitate fisher travel, and contribute to habitat suitability and connectivity. This potential riparian habitat primarily consists of narrow stringers of timber surrounded by young regenerating forest. Abundance and connectivity of suitable fisher habitat is influenced by wet meadows with low canopy cover, streams that flow intermittently, dry south-facing slopes containing non-preferred habitat types, and past timber harvesting within the CEAA. Within the CEAA, past harvesting has modified mature crown closure, snags and coarse woody debris levels on 27,774 acres (77.7% of the CEAA). The CEAA contains a network of existing roads (density = 6.2 mi/sq. mile) that facilitate trapper access and firewood harvesting. Collectively, habitat suitability for fishers within the CEAA is poor and risk factors are moderate.

Table WI-6 – **Fisher habitat.** *Estimates of existing and post-harvest acreages of suitable fisher habitat within the project area and CEAA for the Skookum Point Timber Sale, including potential habitat on non-DNRC ownership. Values in parentheses refer to the percentage that each fisher habitat type represents within the larger analysis area.*

Fisher Habitat Attribute	Project Area (639 acres)		Cumulative Effects Analysis Area (35,768 acres)	
	Existing	Post-Harvest	Existing	Post-Harvest
Upland Fisher Habitat (DNRC)	250.1 (39.1%)	1.8 (0.3%)	1,498.2 (4.2%)	1,250.0 (3.5%)
Upland Fisher Habitat (non-DNRC)	0.0 (0%)	0.0 (0%)	3,469.3 (9.7%)	3,469.3 (9.7%)
Riparian Fisher Habitat (DNRC)	0.0 (0%)	0.0 (0%)	51.2 (0.1%)	51.2 (0.1%)
Riparian Fisher Habitat (non-DNRC)	0.0 (0%)	0.0 (0%)	393.9 (1.1%)	393.9 (1.1%)
Total Suitable Fisher Habitat (DNRC)	250.1 (39.1%)	1.8 (0.3%)	1,549.4 (4.3%)	1,301.2 (3.6%)
Total Suitable Fisher Habitat (DNRC lands & non-DNRC lands)	250.1 (39.1%)	1.8 (0.3%)	5,412.7 (15.1%)	5,164.4 (14.4%)

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 Skookum Point 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 248 acres of the 250 acres (99.2%) of suitable fisher habitat in the project area would be harvested under the Action Alternative (TABLE WI-6). Approximately 248 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. No riparian habitat would be harvested, as Class 1 and 2 streams are not present in the project area. In all areas, 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. In addition, 8 to 24 tons of coarse woody debris per acre would be planned for retention within harvest units. However, steeper slopes on up to 182 acres of fisher cover types in the project area could undergo prescribed burning after harvest, which could further limit snags and down wood in these areas. Long-term open road density would not change under the Action Alternative. Because roads would remain restricted during the trapping season, fisher mortality risk due to trapping would be expected to remain the same. The potential future risk for snag and coarse woody debris loss due to firewood gathering would be expected to remain the same, as 5.5 miles of newly constructed road would be restricted from public motorized use. Thus, moderate 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 low and appreciable use by fishers is unlikely, 2) harvesting would reduce suitable upland fisher habitat in the project area by 99.2%, 3) reductions in upland habitat connectivity would occur, 4) some large snags and snag recruits would be retained, and 5) overall risk factors associated with motorized human access levels would not appreciably change.

Action Alternative: Cumulative Effects on Fishers
Approximately 248 acres (4.6%) of 5,413 acres of potentially suitable fisher habitat in the CEAA would be harvested. Of these proposed harvest acres, 248 acres would be upland fisher habitat (TABLE WI-6). Of the approximately 51 acres of preferred fisher cover types associated with Class 1 and 2 streams on DNRC lands in the CEAA, 51 acres (100.0% 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 Upper Indian Creek Timber Sale (TABLE WI-2), and past harvesting within the last 40 years. Approximately 5,164 acres of the 35,768-acre cumulative effects analysis area (14.4%) would remain as suitable fisher habitat (TABLE WI-6). Reductions in landscape connectivity of suitable upland fisher habitat within the CEAA would occur; however existing narrow 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 project area is low and appreciable use by fishers is unlikely, 2) harvesting would alter tree density, snags, and stand structure in 0.7% of suitable fisher habitat within the CEAA, 3) no changes to fisher habitat associated with riparian areas in the CEAA would be anticipated and 100% of the total preferred cover type acreage would adequately forested for use by fishers, 4) suitable fisher habitat would remain connected within riparian areas but overall connectivity would remain low, and 5) no change in the long-term 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 (Otus flammeolus) preferred habitat types, 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 5,733-acre Small CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1.* The Small CEAA scale includes sufficient area to support multiple pairs of flammulated owls if ample suitable habitat is present (McCallum 1994); providing a reasonable analysis area for Flammulated owls that could be influenced by project-related activities.

Measurement Criteria

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of available habitats. Stand level data were used to identify preferred flammulated owl habitat types (*ARM 36.11.403(28)*). Snags were assessed during site visits using 10 stratified random plots in the proposed project area and reviewing past DNRC harvesting information. 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

Within the project area there are approximately 63 acres (27.1%) of potential flammulated owl habitat. Of these potential acres, over 75% currently contain dense forest conditions likely unsuitable for foraging by flammulated owls, although widespread beetle mortality is likely improving habitat conditions. Much of the project area (73.0%) contains cover types not preferred by flammulated owls. Site-specific growing conditions and past timber harvesting have influenced the abundance and distribution of flammulated owl habitat and large snags within the proposed project area. Analysis of sampling plots and field observations indicated snags within the project area occurred at a density of 19.1 snags per acre (range 0-40). The average diameter of all snags >8” dbh was 18.2” dbh (range 8-35”). Recent tree mortality due to beetles is created large snags (>21” dbh) that could be suitable nesting sites for flammulated owls. Given the relatively small amount of preferred forest habitat and dense forested conditions in this habitat, habitat suitability for flammulated owls within the project area is currently low to moderate.

The CEAA contains approximately 63 acres (1.1% of the Small CEAA) of potentially suitable flammulated owl habitat. All of these acres consist of preferred flammulated owl cover types on DNRC lands. Although cover types preferred by flammulated owls likely exist on private timberlands within the CEAA, extensive harvesting has removed all of the large, older trees and forest conditions do not likely support owls. Flammulated owls have been recorded in the vicinity of the CEAA in the past as recently as 2014 (MNHP 2016) and presence of flammulated owls within the CEAA is possible. Suitable flammulated owl habitat within the CEAA is primarily limited by the presence of non-preferred cover types, the lack of large snags for nesting, dense forested conditions on DNRC lands, and recent harvesting. Harvesting on 4,344 acres (75.8% of the CEAA) of private timberlands within the CEAA has created more open canopy habitat favored by flammulated owls, however it has also reduced the number and quality of large trees snags available for nesting. Additionally, 5.5 miles of open road within the CEAA allows for limited access for firewood gathering, which likely further reduces the amount of available snags. Currently, habitat suitability for flammulated owls within the CEAA is low.

Environmental Effects – Flammulated owl

No Action Alternative: Direct and Secondary Effects on Flammulated owl
Under this alternative, no proposed project activities would occur. Thus, since there would be no change in availability or structure of preferred flammulated owl habitats, no direct or indirect effects to habitat suitability for flammulated owls would be anticipated as a result of the No-Action Alternative.

No Action Alternative: Cumulative Effects on Flammulated owl
Under this alternative, no proposed project activities would occur. Past forest management projects not associated with the proposed Skookum Point Timber Sale have affected Flammulated owl habitat in the CEAA, and ongoing and proposed projects could alter owl habitat in the future (TABLE WI-2). Activities on non-DNRC lands could continue altering Flammulated owl habitat and create disturbance within the CEAA. Thus, since no additional change in the availability or structure of preferred flammulated owl habitats would occur, no cumulative effects to habitat suitability for flammulated owls would be anticipated as a result of the No-Action Alternative.

Action Alternative: Direct and Secondary Effects on Flammulated owl
Timber harvest would occur on 63 of the 63 acres (100.0%) of suitable flammulated owl cover types available in the project area. The proposed activities would open stands to 5% to 15% canopy cover, improving stand structure suitability for flammulated owls in harvest units. Additionally, the proposed harvest prescription would favor leaving larger-diameter ponderosa pine, western larch and Douglas-fir live trees and snags, however the density of these species would decrease. Some snags would be removed by the proposed harvest, but at least 2 snags and 2 snag recruitment tree per acre (>21 inches dbh, or largest available) would be retained (*ARM 36.11.411*). Some clumps of smaller regenerating conifers would be preserved, which would add to forest structure complexity and improve habitat for flammulated owls. Flammulated owls are tolerant of human disturbance (McCallum 1994), however disturbance associated with harvesting could temporarily displace flammulated owls should they be present in the project area. Flammulated owls would not be displaced by activities occurring in the winter months when the birds have migrated to their winter range. All existing restricted roads and 5.5 miles of newly constructed restricted roads would remain restricted; potential for snag loss due to firewood gathering in the future would not appreciably change. Thus, minor direct and indirect effects to flammulated owl habitat suitability would be anticipated as a result of the Action Alternative since: 1) no change in the availability of preferred flammulated owl habitat would occur, 2) proposed harvesting would alter 100.0% of existing suitable cover types; 3) changes in forest structure and cover type caused by harvesting would generally increase flammulated owl habitat suitability; and 4) the number of large snags available for nesting would decrease but at least 2 large snags/acre would be retained.

Action Alternative: Cumulative Effects on Flammulated owl
Timber harvest would occur on 63 of the 63 acres (100.0%) of potentially suitable flammulated owl habitat available in the project area. The proposed activities would open stands to 5% to 15% canopy cover, improving the suitability of stand structure for flammulated owls in harvest units. The proposed harvest prescriptions would favor leaving 6-8 trees per acre of larger-diameter ponderosa pine, western larch, and Douglas-fir. Some snags could be removed by the proposed harvest, but at least 2 snag and 2 snag recruitment trees 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 the project area. Flammulated owls would not be displaced by activities occurring in the winter months when the birds have migrated to their winter range. Thus, minor cumulative effects to flammulated owl habitat suitability would be anticipated as a result of the Action Alternative since: 1) no change in the availability of preferred flammulated owl habitats would occur and existing habitat suitability across the CEAA would remain low, 2) harvesting would alter approximately 100% of potentially suitable habitat, and 3) changes in structure and cover type within harvest units would generally increase flammulated owl habitat suitability.

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 (1985) described pileated nesting habitat as..."stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." 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 5,733-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) below 6,000 feet elevation.

Affected Environment
In the project area, there are approximately 480 acres (75% 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, ponderosa pine, western larch and mixed conifer stands that function as a single patch. This patch is not connected to surrounding patches due to the lack of suitable habitat on adjacent private industrial timberlands. An extensive, widespread beetle outbreak is actively killing large Douglas-fir trees throughout the project area. While this is reducing live tree densities and canopy cover, it is also generating large snags and providing nest trees or food for pileated woodpeckers. Snags and coarse woody debris within the proposed project area generally abundant for the existing habitat types. Snags and coarse woody debris (CWD) were quantitatively accessed during field visits. Analysis of sampling plots and field observations indicated snags within the project area occurred at a density of 19.1 snags per acre (range 8.0-39.6). The average diameter of all snags >8" dbh was 18.2" dbh (range 8-35"). Coarse woody debris levels were also variable across the project area, averaging 25.9 tons per acre (range 3.6-63.6 tons per acre). Downed logs were generally small diameter (6.8" at transect line, range 3-20"), 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, is unlikely within much of the project area due the lack of roads. Given these observed existing habitat conditions, pileated woodpecker habitat suitability is currently moderate within the project area for 1-3 nesting pairs.

The CEAA contains approximately 882 acres (15.4% of the CEAA) of potential pileated woodpecker habitat. Together, these are distributed among 21 patches and average patch size is 60.4 acres. The largest patch of suitable habitat (480 acres) occurs within the project area. Recent harvesting on 4,344 acres (75.8% of the CEAA) within the last 40 years has altered forest habitat and created forest conditions unsuitable for use by pileated woodpeckers. Firewood gathering is moderate along 5.8 miles of open road and on private lands within the CEAA. Thus, habitat quality and availability for pileated woodpeckers within the CEAA is currently low.

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 Skookum Point Timber Sale 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 occur in 480 acres (100.0%) of the 480 acres of pileated woodpecker habitat available in the Project Area. Proposed harvest prescriptions on 475 acres would open stands to 5-20% canopy cover causing the structure of these stands to become unsuitable for appreciable use by pileated woodpeckers. An additional 5 acres of suitable habitat would undergo harvest treatments that would reduce habitat suitability but would retain sufficient large trees for some use by pileated woodpeckers. Patch size and connectivity of suitable habitat would be reduced to one 5-acre patch, although some seed-tree harvested areas could provide foraging habitat if enough snags and downed wood are retained (Bull et al. 2007). Snags would likely 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. Approximately 8-24 tons of coarse woody debris would also be left in harvest units. Post-harvest prescribed burning on up to 332 acres would further reduce snags and woody debris. Disturbance associated with harvesting could adversely affect pileated woodpeckers within the Project Area for approximately 4 years, should they be present. Thus, high 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) harvesting would reduce pileated woodpecker suitable habitat availability by 475 acres (99.0%) and alter 6 acres (1.0%) of available suitable habitat; 2) forest structural changes would occur, but mitigation would include retention of snags and coarse woody debris (*ARM 36.11.411, ARM 36.11.414*), as well as large-diameter seral species; 3) patch size of suitable habitat would decrease and connectivity would be converted to a patch not large enough to support nesting pileated woodpeckers; and 4) pileated woodpeckers could be temporarily displaced for up to 4 years.

Action Alternative: Cumulative Effects on Pileated Woodpeckers

Under this alternative, pileated woodpecker habitat would be altered on 480 acres (54.4%) of the 882 acres of potentially suitable habitat in the CEAA. Harvesting would remove 475 acres of suitable habitat and reduce habitat suitability on another 6 acres of the CEAA. Snags, coarse woody debris, and potential nesting trees would be retained in the project area according to forest management *ARM 36.11.41*; however, snags and live trees would be reduced from existing levels in all of the proposed harvest units. Disturbance associated with the proposed activities could adversely affect pileated woodpeckers in the vicinity of the Project Area for up to 4 years. 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. Timber harvesting

throughout the CEAA and firewood gathering along open roads would continue to limit the abundance of snags and woody debris within areas of the CEAA. Thus, moderate cumulative effects to habitat suitability for pileated woodpeckers would be anticipated since: 1) 54.4% of suitable pileated woodpecker habitat currently present within the CEAA would be altered; 2) patch size of suitable habitat would decrease and connectivity of suitable habitat would remain poor within CEAA; and 3) 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 and 8-24 tons per acre of coarse woody debris in harvested areas.

BIG GAME

ELK, WHITE-TAILED DEER, AND MULE DEER WINTER RANGE

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 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 cover on winter range enables big game survival by ameliorating the effects of severe winter weather conditions. Winter ranges tend to be areas found at lower elevations that support concentrations of big game, which are widely distributed during the remainder of the year. Suitable winter ranges 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.

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 male animals and resulting decrease in hunter opportunity.

Analysis Area
The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 35,768-acre Large CEAA as described in TABLE WI-I and depicted in FIGURE WI-1. The Large CEAA is defined according to geographic features (e.g., watershed boundaries), which provide a reasonable biological analysis unit for big game animals that could be influenced by project-related activities.

Measurement Criteria
Factors considered in the analysis include: 1) the degree of timber harvesting, 2) the availability and structure of forest cover on big game winter range, and 3) the level of human access for recreational hunting. Forested habitat (≥40% canopy cover, >9 inch dbh average) was considered capable of providing minimal conditions capable of providing thermal cover for big game in the Large CEAA.

Affected Environment

The entire proposed project area (639 acres) has been identified by DFWP as white-tailed deer and elk winter range, despite elevations ranging between 4,300 and 5,370 feet. Evidence of summer/fall deer and elk use was observed during field visits to the project area. The project area contains approximately 639 acres (100.0%) of habitat that is currently providing year-round cover and visual screening for big game. Of these acres, 539 acres (84.4%) provide moderate to high amounts of thermal cover and snow intercept for wintering big game. An additional 100 acres (15.6%) of the project area have forested stands that contain a more open overstory canopy (<40% canopy cover) or small-diameter trees than what would be considered high-quality thermal cover or cover that would provide appreciable snow intercept. Elk security habitat is present in much of the project area. Motorized hunter access is not present in the project area due to road restrictions and the lack of roads in the parcel. The density of open roads in the project area is 0 miles/sq. mile and total road density is 1.9 miles/sq. mile. The higher elevations in the project area compared to the surrounding locale likely reduce effectiveness and use of the available habitat during harsh winter conditions.

White-tailed deer winter range occupies approximately 35,129 acres (98.2%) and 33,239 acres (92.9%) is elk winter range within the CEAA. Big game winter ranges within the CEAA are connected to a much larger winter range area (>500,000 acres) extending north along US Highway 2 and south along US Highway 200. Presently, approximately 6,831 acres (19.1%) within the CEAA are providing usable thermal cover and snow intercept for big game. These forest patches are distributed primarily on DNRC and Forest Service lands within the CEAA, as private lands consist of meadows or have undergone harvesting. Some harvested areas older than 20 years interspersed throughout the CEAA contain dense patches of 10-20 foot-tall trees that could be providing marginal levels of thermal cover/snow intercept. In the last 40 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. The CEAA also likely receives moderate to high levels of hunter access, especially in areas where roads, both open and restricted, are more numerous. Open road density within the CEAA is 1.4 miles/sq. mile and total road density is 6.2 miles/sq. mile.

Environmental Effects

No Action Alternative: Direct and Secondary Effects on Big Game

No changes in big game habitat would be expected as no timber harvesting activities would occur. Existing cover would continue to contribute to winter range quality and visual screening would not be altered. Thus, no direct or indirect effects to big game habitat in the project area would be anticipated since: 1) no changes to big game habitat would be anticipated and continued maturation of forest cover would improve thermal cover and snow intercept, and 2) the level of human access would remain unchanged.

No Action Alternative: Cumulative Effects on Big Game

No additional changes in big game habitat would be expected as no timber harvesting activities would occur. Existing levels of cover would persist. Past and ongoing forest management projects not associated with the proposed Skookum Point Timber Sale have affected big game habitat in the project area, and other proposed projects could disturb big game species and/or alter habitat quality in the future (TABLE WI-2). Activities on other ownerships could continue altering big game winter range habitat and create disturbance within the CEAA. No additional cumulative effects to big game habitat quality are expected to result from the No-Action Alternative that could affect big game species in the CEAA since: 1) no big game habitat would be altered and continued maturation of forest cover would improve thermal cover and snow intercept, and 2) the level of human access would remain unchanged.

Action Alternative: Direct and Secondary Effects on Big Game
Under the Action Alternative, approximately 566 acres (88.7% of project area) of big game habitat and winter range would be harvested within the project area. Of these acres, 539 acres (100.0%) of forest currently providing thermal cover would be harvested. Harvest prescriptions in 539 acres of harvest units would result in forest canopy too open to effectively function as thermal cover or snow intercept. Approximately 21 acres of existing cover would undergo harvesting that would maintain hiding cover. Additionally, retention of small, scattered patches of regenerating conifers could provide marginal levels of thermal cover/snow intercept and hiding cover. Forest vegetation capable of providing adequate winter range cover would require 40-60 years for suitable sized trees (>40 ft. tall) to develop in harvested stands.

Proposed tree removal would increase sight distances in harvest units and could increase risk of hunting mortality for 15-20 years. Steep topography and the retention of scattered patches of regenerating conifers 5-20 feet tall within harvest units would help mitigate some loss of big game security. Some short-term (1-4 years) displacement of big game would be expected as a result of the proposed motorized logging disturbance. Approximately 5.5 miles of new restricted road would be constructed and 1.9 miles of existing restricted road use within the project area would see a temporary increase in use. During all phases of the project, any restricted roads would be restricted from motorized-use by the general public and closed after completion of project activities. Long-term open road density would not change.

Thus, moderate adverse direct and indirect effects to big game security habitat and winter range habitat quality would be expected for the next 40 to 60 years since: 1) 100.0% of thermal cover in the project area would be altered by harvesting; 2) existing winter range habitat quality for big game is lowered by higher elevations within the project area; 3) sight distances would increase on 566 acres, which could increase big game vulnerability (reduce security) and associated hunting mortality risk; 4) steep variable topography and retained patches of regenerating conifers would mitigate some of the adverse effects of cover removal; 5) relatively short-term logging activities would create disturbance in this area; and 6) long-term open road density would not change but total road density would increase by 5.6 miles/sq. mile.

Action Alternative: Cumulative Effects on Big Game
Forest stands providing suitable thermal cover and snow intercept would be altered by harvesting on approximately 566 acres (8.3%) of the 6,831 acres containing these habitat qualities. All of these acres undergoing treatment would be too open to provide adequate thermal cover/snow intercept after project completion. This reduction in thermal cover and snow intercept would be additive to past reductions within the CEAA due to forest management. Approximately 21 acres of existing cover would undergo harvesting that would maintain hiding cover. Some dense patches of regenerating conifers (>6 feet height) and some canopy cover (5-15%) would be retained, providing some residual cover in harvest units. Reductions in cover may cause moderate decreases in winter use by deer and elk in the project area; however, appreciative changes in big game distribution or abundance would not be expected at the scale of the CEAA. Continued maturation of 74 acres of previously harvested stands within the CEAA would improve thermal cover/snow intercept and partially offset these current losses within 20 to 40 years.

Harvesting and motorized disturbance within the CEAA associated with the proposed project could temporarily displace wintering big game for up to 4 years. Under the Action Alternative, use of existing roads and construction of new roads for harvesting activities could temporarily increase access and disturbance on 17.7 miles of roads. After harvesting, open road density would be not change, however an extensive network of open and restricted roads would continue to facilitate moderate amounts of 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 566 acres (8.3% of existing cover) of winter range within the CEAA; 2) existing thermal cover and snow intercept on winter range in the CEAA would be altered, but approximately 6,265 acres of these attributes would remain; 3) some canopy cover and regenerating

conifer patches would remain; 4) overall habitat quality within the larger winter range would not be appreciably altered; 5) logging activities would create additional disturbance on a minor portion of the CEAA; and 6) long-term open road densities would not change.

Wildlife Mitigations

- If a threatened or endangered species is encountered, consult a DNRC biologist immediately. Similarly, if undocumented nesting raptors or wolf dens are encountered within ½ mile of the Project Area contact a DNRC biologist.
- 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)*.
- Contractors will adhere to food storage and sanitation requirements as described in the timber sale contract. Ensure that all attractants such as food, garbage, and petroleum products are stored in a bear-resistant manner.
- Restrict public access at all times on restricted roads that are opened for harvesting activities. Effectively close all restricted roads following harvest completion.
- Close roads and 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.
- Retain patches of advanced regeneration of shade-tolerant trees within harvest units as per *LY-HB4* (*USFWS and DNRC 2010*).
- Retain visual screening along roads where possible to increase security for wildlife.
- Retain at least 2 snags and 2 snag recruits per acre, particularly favoring western larch, ponderosa pine and Douglas-fir for retention. Increase snag retention within the old-growth maintenance unit to the extent practicable. If designated snags are cut for safety concerns, leave them in the harvest unit. Retain coarse-woody debris as described in the Forest Management ARMs and *SOILS ANALYSIS* in this document.

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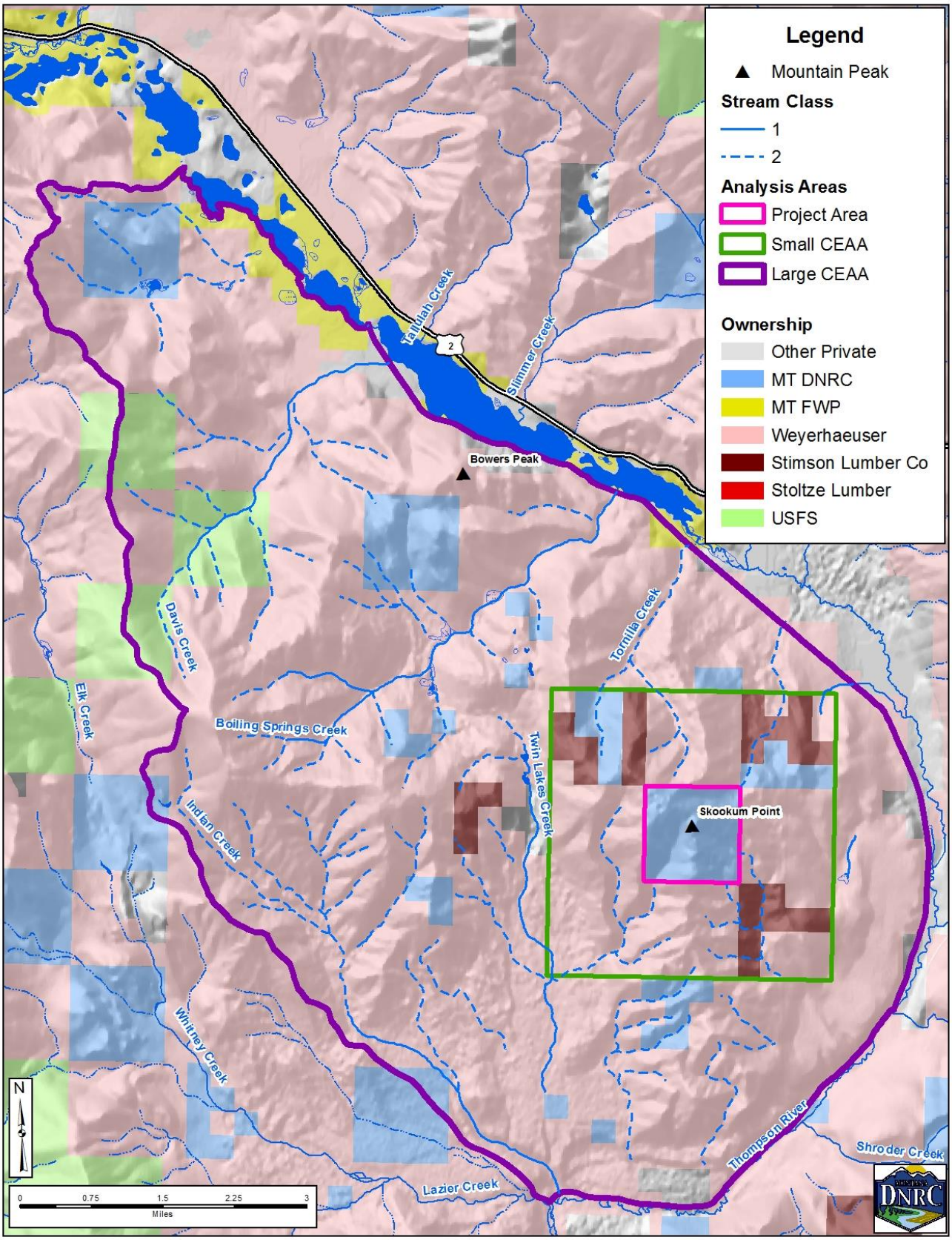
Figure WI-1 –Wildlife analysis areas for the proposed Skookum Point Timber Sale.